

## MEETING REPORT

Scope: Follow-up of the CERN/US-LHC Memorandum of Understanding on structural Safety. Fermilab quadrupoles.

Date: 2 October 2000

Place: Fermilab

Participants;

- FNAL: J. Kerby
  - US LHC Accelerator Project Office: P. Pfund
  - CERN: M. Bona, H. Schönbacher
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The Memorandum of Understanding (MoU), between CERN and the US LHC Accelerator Project, in place since January 1999, transfers a part of the TIS responsibility to the US Laboratories via the US LHC Accelerator Project. Periodic meetings are held to review the implementation of the MoU.

The previous official meeting took place on May 1999.

The purpose of this meeting was to review the safety related activities for items falling under the responsibility of FNAL.

The main items in the agenda were:

- Overview/Status of the programme
- Design and safety reviews
- Weld qualification and weld inspection activities
- Integration of KEK MQXA deliveries

- **Overview / Status of the programme**

Since the last official follow-up meeting (May 1999), we have extensively discussed structural safety aspects of the Fermilab quadrupoles on several other occasions.

A major meeting took place among representatives from CERN, FNAL and the US LHC Accelerator Project Office at the time of the quadrupole cold

mass (MQXB) engineering design review (EDR) held at Fermilab in March 2000. It was followed by another meeting, which also included KEK representatives, held in April 2000 at CERN.

The main outcome of these two meetings and subsequent follow-ups, was the establishment of the official list of inspections and tests to be conducted on the FNAL quadrupoles to satisfy the CERN structural safety requirements.

J. Kerby presented an overview of the FNAL programme.

FNAL will fabricate 18 MQXB units and 27 cryostats, enough for all inner triplets, plus one spare triplet. CERN will deliver correctors to FNAL for assembly.

FNAL will assemble the MQXB and MQXA quadrupole cold masses supplied by KEK into FNAL cryostats. The first two cryostated KEK MQXA units will be cold tested by FNAL.

The 3-year R&D programme has successfully come to its conclusion, after fabrication and test of nine model magnets. The prototype phase, consisting of two magnets, started recently. No significant structural safety modifications have been introduced in the prototype design.

At present, the first prototype (Q2P1) is being assembled, with the objective of cold testing it by the end of the year 2000. This cold mass, without corrector magnets attached, will be assembled into a cryostat of final design.

Coil winding of the second prototype (Q2P2) will start as late as possible, compatible with the overall schedule, and preferably after the first test results of prototype 1. Cold test of this magnet, if no problem shows up, is foreseen around June 2001.

#### - **Design and safety reviews**

The MQXB passed an Engineering Design Review (EDR) in March 2000. This EDR was attended by TIS. The next step will be the Production Readiness Review (PRR), which will take place after completion of the cold test programme on prototype Q2P2.

Before the PRR, the FNAL safety panel will review both prototype Q2P1 and prototype Q2P2. The relevant FNAL review documents, as well as the TIS related replies, will be issued according to the procedure detailed in the MoU.

An EDR has been tentatively scheduled for the cryostat at the beginning of 2001. It was agreed that TIS would take part to that review.

After the usual review by the FNAL safety panel, the cryostat will then undergo a Production Readiness Review (PRR), which will be conducted at the same time as the quadrupole PRR. The exchange of official cryostat documents will follow the procedure detailed in the MoU.

It was agreed that the next periodic follow-up meeting would tentatively be scheduled sufficiently in advance of the quadrupole/cryostat PRR, so as to allow TIS to address its possible remarks for the PRR.

- **Weld qualification and weld inspection activities.**

The official weld qualification and inspection plan is described in the document "Weld inspection on FNAL Q2a and Q2b quadrupoles" (version 9), dated 15 September 2000.

M. Bona announced that TIS has accepted the US standards proposed by FNAL in the document, in replacement of the European standards usually requested by CERN.

The tests on FNAL welded samples will be contracted to a laboratory in Colorado that is capable of conducting low temperature tests. The samples have been taken from the welded skin of a "mechanical model" fabricated by FNAL. The test results are expected within the next few weeks.

FNAL has already qualified 3 welders for the welding technique to be adopted. A fourth welder will be qualified using the run-offs from the first prototype.

- **Integration of KEK MQXA deliveries**

P. Pfund and J. Kirby pointed out that the KEK cold masses will officially be provided to Fermilab via CERN.

M. Bona will discuss this point with T. Taylor with the goal to ensure that compliance to the CERN structural safety requirements is verified before the magnets actually reach Fermilab.

M. Bona

P. Pfund

Distribution:

- Participants
- US-LHC Project: J. Strait
- CERN: A. Desirelli, A. Faugier, L. Jacquet, C. Margaroli, T. Taylor, R. Vuillermet, W. Weingarten.