US HL-LHC Accelerator Upgrade Project

Coils Acceptance Review
for MQXFA07b and MQXFA11

TABLE OF CONTENTS

1. Goal & scope

The HL-LHC AUP project is planning to start re-assembly of MQXFA07b in November 2021 and subsequently assembly of MQXFA11 in December 2021.

MQXFA07b is the first re-assembly of an MQXFA magnet. MQXFA07 showed detraining to 15 kA after it reached 16.1 kA. All detraining and limiting quenches were in coil 214 [1]. The other three coils of MQXFA07 did not show any issue and will be re-used if they pass QC tests (electrical and CMM) after disassembly.

MQXFA11 is the fourth series low-beta quadrupole magnet (MQXFA) for HL-LHC. If MQXFA07b and MQXFA11 meet MQXFA requirements [2] they will be used in a Q1/Q3 cryo-assembly to be installed in the HL-LHC.

AUP is planning to use one new coil for MQXFA07b and four new coils for MQXFA11 out of this list: 134, 135, 218, 219, 222 and 223.

Conductor and series coil specifications are presented in [3-7]. Discrepancy or Non-conformity Reports are generated whenever a component does not meet specifications.

The reviewers are requested to review discrepancies and non-conformities in strands, cables and coils, for the following coils: 134 (cable P43OL1153), 135 (cable P43OL1154), 218 (cable P43OL1133), 219 (cable P43OL1134), 222 (cable P43OL1144) and 223 (cable P43OL1145).

2. Charge questions

The committee is requested to answer the following questions:

1. Have Discrepancies and Non-conformities been adequately documented and processed?
2. If there are critical Discrepancies/Non-conformities, have they been adequately documented and processed?
3. Did the L3s properly identified critical Discrepancies/Non-conformities?
4. Is there any coil that you recommend not to use in MQXFA07b or MQXFA11?
5. Do you have any other comment or recommendation regarding these coils and their conductor for allowing MQXFA07b and MQXFA11 to meet MQXFA requirements [2]?

3. Technical information

Committee
Steve Gourlay (chairperson), LBNL
Arup Ghosh, BNL retired
Susana Izquierdo Bermudez, CERN

Date and Time
November 12, 2021. Start time is 7/9/10/16 (LBNL/FNAL/BNL-FSU/CERN)

Location/Connection
Video-link by Zoom, info by email.

Link to agenda with talks and other documents
https://indico.fnal.gov/event/51729/

4. References

1) *MQXFA07 Test Results*, https://indico.fnal.gov/event/51196/
2) *MQXFA Functional Requirements Specification*, US-HiLumi-doc-36
3) *Specification for Quadrupole Magnet Conductor*, US-HiLumi-doc-40
4) *Cable Specification*, US-HiLumi-doc-74
5) *Quadrupole Magnet Cable Insulation*, US-HiLumi-doc-75
6) *QXFA Series Coil Production Specification*, US-HiLumi-doc-2986
7) *QXFA Series Coil Fabrication Electrical QC plan*, US-HiLumi-doc-521