HL-LHC: Configuration Management
Engineering Change Request

ECR DESCRIPTION

WP	WP11	***Process***	New equipment, i.e. process to be defined
Equipment	New equipment, i.e. code to be created	***Baseline affected***	Scope, Schedule, Cost
Drawing	New equipment, i.e. drawings to be produced	***Date of Issue***	2016-03-15
Document	None	***CI responsible***	F. Savary

Detailed Description

The installation of TCLD collimators for heavy-ion secondary beams around IP2, which was originally foreseen at the location of the main dipoles in A10L2 and A10R2, is now required at the location of the connection cryostats in between the last main dipole of the Dispersion Suppressor region and Q11 [1]. Therefore, 11T dipole magnets are no longer needed for IP2. Instead, special connection cryostats are needed to create the room temperature longitudinal space required for the collimators and to ensure continuity of the continuous cryostats and sub-systems such as the beam pipes, the bus bars, and the helium heat exchanger tube.

The need for one collimator per beam around IP7, i.e. one cryo-assembly per beam with 11T dipole magnets, is confirmed. These two cryo-assemblies will be installed during LS2 at the location of the main dipoles in B8L7 and B8R7 . Two other cryo-assemblies will be installed during LS3, if needed, at the location of the main dipoles in B10L7 and B10R7 [1] [2].

The spare policy is not changed. There will be one spare cryo-assembly for LS2 and one spare cryo-assembly for LS3.

Regarding the prototypes, there will be as already planned one full length prototype made with RRP cable for LS2, but only one full length prototype made with PIT cable for LS3. The second full length prototype made with RRP cable for LS3 is no longer in the plan. For the RRP cable of the new section, which will be identical to the cross section optimized for the PIT conductor, we will rely on the fabrication and testing of a short model.

Reasons for change

In IP2, the primary Bound-Free Pair Production (BFPP) losses location is further upstream from the connection cryostat. The solution to avoid exceeding quench limits in neighbour magnets consists in replacing the existing connection cryostat by a modified assembly to include a collimator that will absorb the BFPP losses. Operational experience with IR bumps conducted in late 2015 have shown that bumps can be used effectively to steer BFPP losses in collimators located in the connection cryostats [1].

Impact on Cost, Schedule & Performance

The conceptual design of the special connection cryostats was started in the beginning of 2016. Although a detailed schedule could not be drawn out yet, it will be possible to fabricate two special connection cryostats for installation in the LHC machine during LS2. There should not be any impact on the overall schedule of LS2.

The costs for the fabrication and installation of the two special connection cryostats, which are new items to be made, is under evaluation.

Impact on other items within the WP

The fabrication of two special connection cryostats will necessitate the design and fabrication of specific bus bars, heat exchanger pipe and beam screens of shorter length. The cabling for the powering of the sector valves for the beam pipes and the vacuum instrumentation will have to be checked.

Impact on other WPs

None

Actions to be carried out if ECR is accepted

It is planned to complete the conceptual design of the special connection cryostat by June 2016.

The final design of the special connection cryostat and its ancillaries (bus bars, heat exchanger pipe, beam screen, …), will be completed by September 2016, and the procurement launched by October 2016 to make sure the equipment is ready available for installation before the beginning of LS2, which is currently scheduled to start in the beginning of 2019.

Comments by WPL

References:

[1] S. Redaelli and J.Jowett, LHC Performance Workshop, LHC Performance Workshop – Chamonix, January 2016

[2] A. Lechner et al., 3rd HiLumi LHC-LARP Meeting – Daresbury, November 2013

Comments by other WPLs when required

Comments by PO

DECISION

Description of the Decision

ECRs affecting different WPs will be discussed during the TCC.

Remarks

Decision of the WPL/s :	***Decision of the Project Leader:***
☐ Rejected.	☐ Rejected.
☐ Accepted	☐ Accepted
	☐ Accepted with remarks.
Date of Decision:	**Date of Approval:**

ACTIONS/FOLLOW-UP

Action Description	**Who**	**Date completion**
Verb, action to be done, by when	N. Surname	201Y-MM-DD
