

HL-LHC: Decision Management CE works P1 and P5 underground

Decision Description

WP	WP17.1	<i>Date of Issue</i>	2015-06-02
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Reassess the baseline for the civil engineering works in P1 and P5 for HL-LHC

Facts

Several options have been analysed for the CE works that are needed to host the Cryogenics, Radio Frequency for crab cavities, powering and related technical services connected to the new HL-LHC equipment in P1 and in P5. The existence of several possible solutions makes more complicated to pursue the study the technical services associated.

The impact of vibrations induced by the CE works makes impossible to plan CE works during LHC running time without relevant risk of heavily perturb the machine operation and makes the LS2 the only suitable window for accomplishing the CE works.

The approximatively volume of the CE works is required by the CE group before sending the CE Engineering works Market Survey.

Options

From the different options studied, the decision to be taken is which of the two options between the so called "Surface" and "double-decker" will become the new Baseline. The options were presented on the 30.04.2015 during the TC meeting.

Rating of Options

The identified strength of the double decker compared with the "surface" options are the following:

- Minimum intervention during LS3 (compared with 13 month), reducing almost to zero the disruptive works of the LHC tunnel and therefore also easing the constraints on the usage of IP1 and IP5 shafts (is not occupied to bring the spoils to the surface).
- Allows installation of main technical services during run III (compared with little installation due to impact of civil works).
- Provides de possibility to reduce the distance between equipment and Power converters
- Ease the installation of the QPS electronics for the triplet in a zone with low radiation, without the necessity of (very) long cables.
- Allow a re-location of some radiation sensitive QPS equipment from the RRs and DSs into the new tunnel and therefore help further mitigating R2E issues and increasing the availability.
- Furthermore, if the protection equipment doesn't have to be radiation tolerant it is easier to reduce its reaction times (i.e. increase the performance of the quench detection electronics), which is especially relevant for the protection of the new Nb3Sn ITs.
- Eases the protection of the Mg2B sc. links.
- Provides the possibility to reduce the length of the SC and the material cost associated according to project and WP choices.
- Reduces the length of the RF service equipment (wave guides or coax).
- Provides the possibility to avoid the risk of the installation of equipment in the vertical cores or in the pit (SC link, RF coax or waveguide) and therefore limiting the equipment technical complexity and related R&D.
- Reduce the risk of damaging the stability of the LHC tunnel during its partial demolishment to provide the volume for the RF crab service routing.

- Less building in surface and new land to be occupied that could cause a negative perception from the local communities and more constraints for the environmental impact study.

The identified weakness of the double decker compared with the “surface” options are the following:

- Around 35% more m³ of rock to be eliminated after the works

Other factors considered:

- Cost for both solutions are in the same order with less than 5% difference in favour of the double decker (in the error band of the cost evaluation)
- Scheduled time of both solutions for works inducing vibration inside the 24months new window of LS2

Decision

To be completed during PLC

Define the decision taken and any possible extra reasons if the rating of options was not 100% conclusive.

Implementation actions

When and by whom will the decision be communicated.

Actions linked to the decision

Approved by	L. Rossi (Project Leader)	Date of Closure	201Y-MM-DD
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