Space reservation and crane limitations linked to refrigeration cold box in TX46

13th HL-LHC Parameter and Layout Committee Meeting

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Motivation: HL-LHC, Cryogenics for RF @ P4

Requirements for TX46

- As described in the PDR, an independent and dedicated refrigerator is foreseen for RF at P4 of the LHC

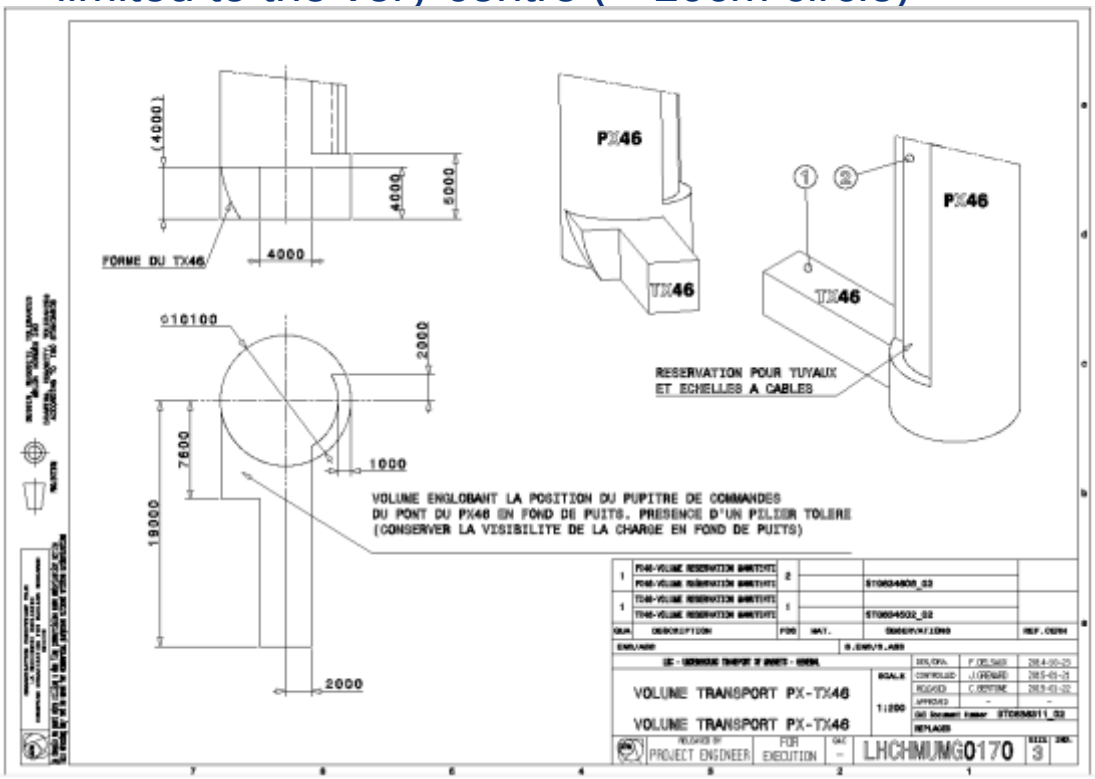
- Integration has been done by WP15 for surface and underground areas, and reported at 10th-TC 15Jul'14, with space in TX46 to be properly shared between transport and Cryo requirements
  https://indico.cern.ch/event/326098/material/minutes/1.pdf

=> This presentation provides the feedback from the perspective of transport (Cryo already validated the integration principles)

- Any further development envisaged for the cryogenic architecture should try to comply with the agreed integration principles, or at least evaluate required changes w.r.t to the present baseline

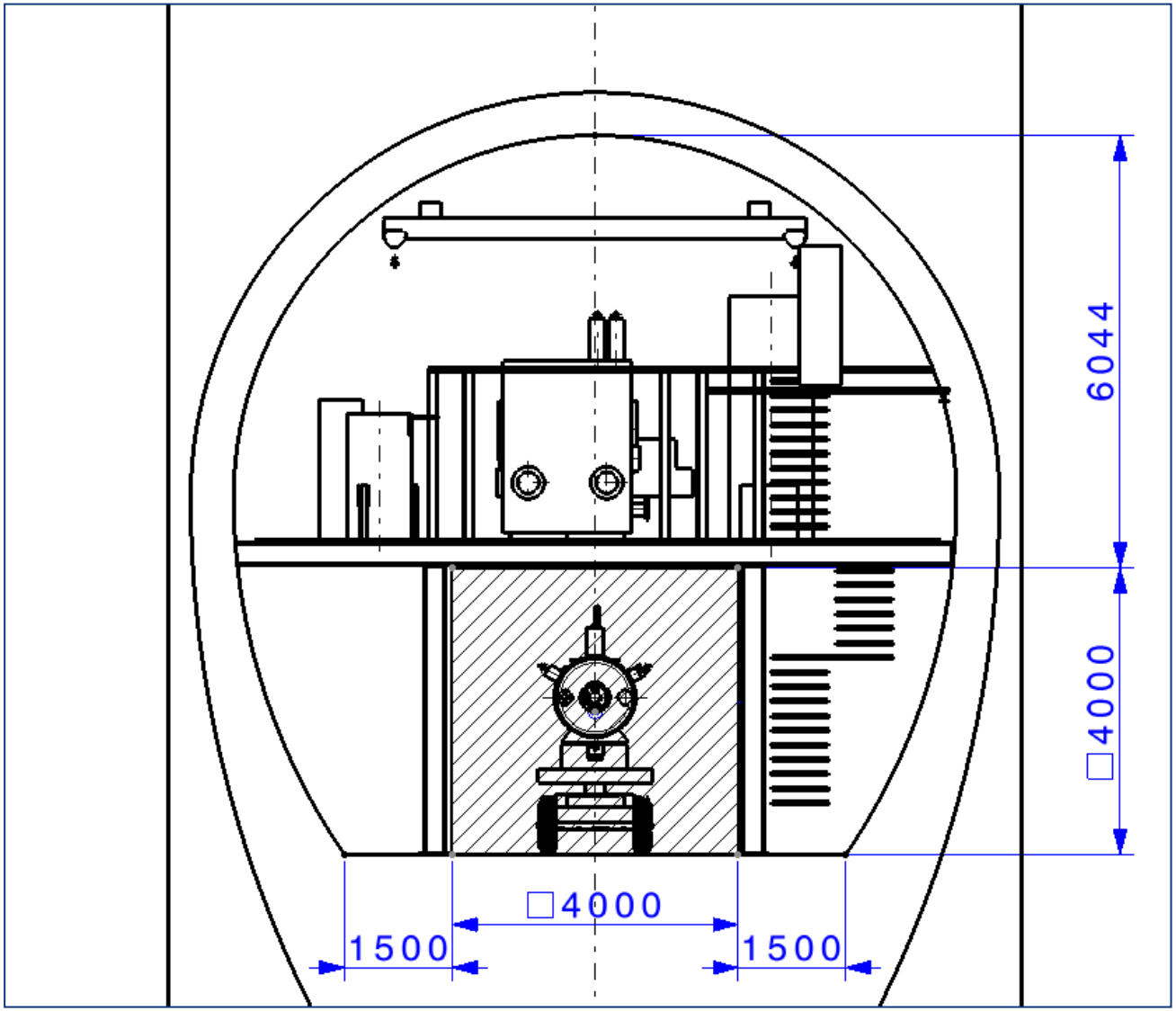
Reserved space

- After handling studies taking into account the several types of objects that can/will transit by this way in the future years, a minimal necessary handling volume has been identified
- Measures on place have shown that due to 140m depth of the shaft and crane rope opening, the coverage of the hook at the bottom of the shaft is essentially limited to the very centre (+-10cm circle)

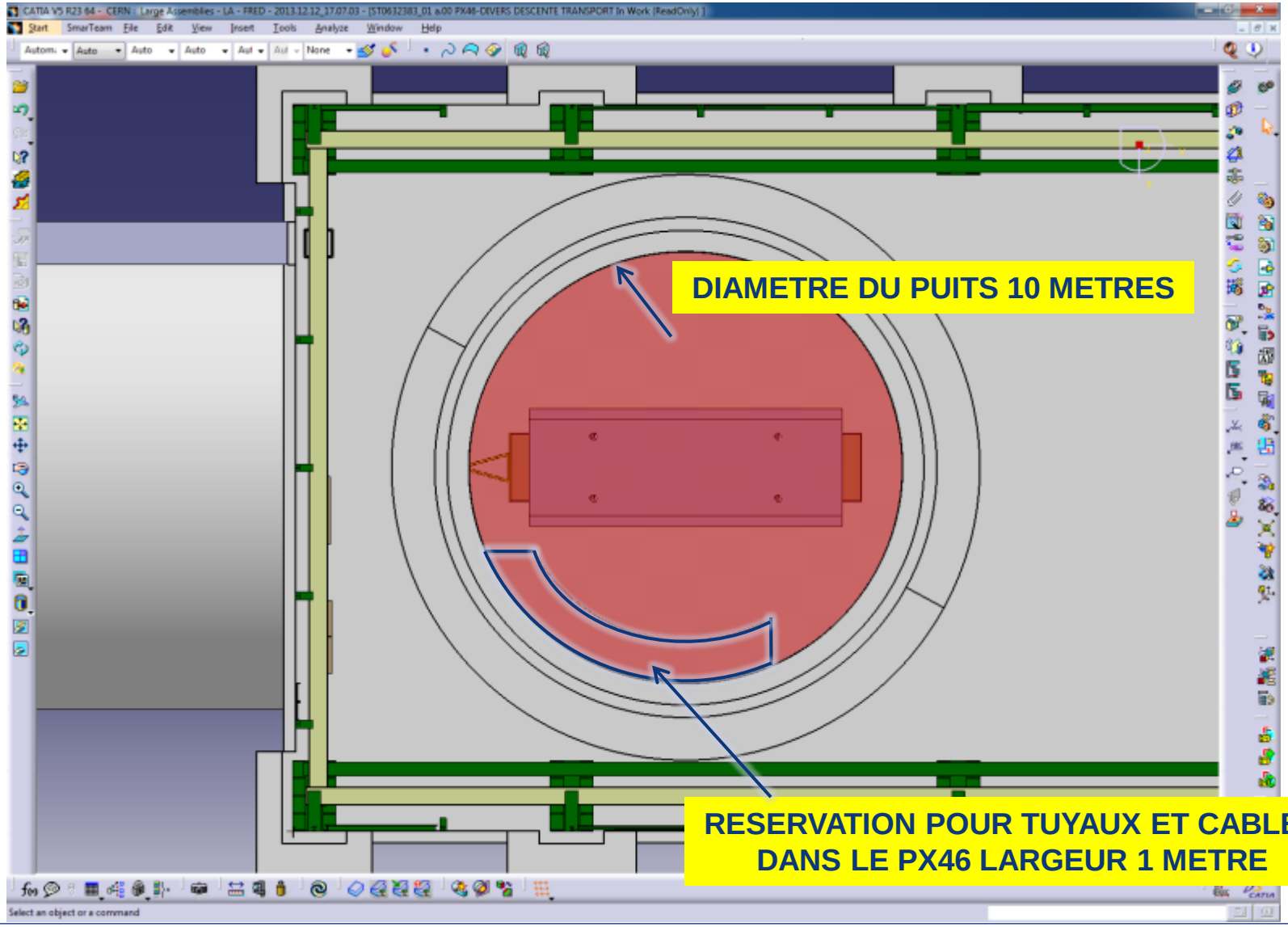


- The axe of the shaft and TX46 shall be preserved for transport
- Reserved volume includes both and is agreed by both parties (Cryo-transport)
- Frozen in Catia and documented in CDD

Overview of TX46



Overview PX46



Conclusion

- Reserved volume shall be respected by further installation of whatever nature in these zones to preserve transport functionality of the shaft
  - Whatever cryo-station to be installed in pt4, a row of pipes will be installed in the shaft
  - To prevent free rotation of the load during the lowering that will entail a limitation of the length of the elements to be handled up to 7m (10m-2x1m-2x50cm of safe margin), incompatible with actual SSS and shielding plates
- A rotational blocking of the hook will be installed before LS2, for a provisional cost of 15-20kCHF

Thanks