CRWG Plan

and CRP report for CR15

K. Yokoya

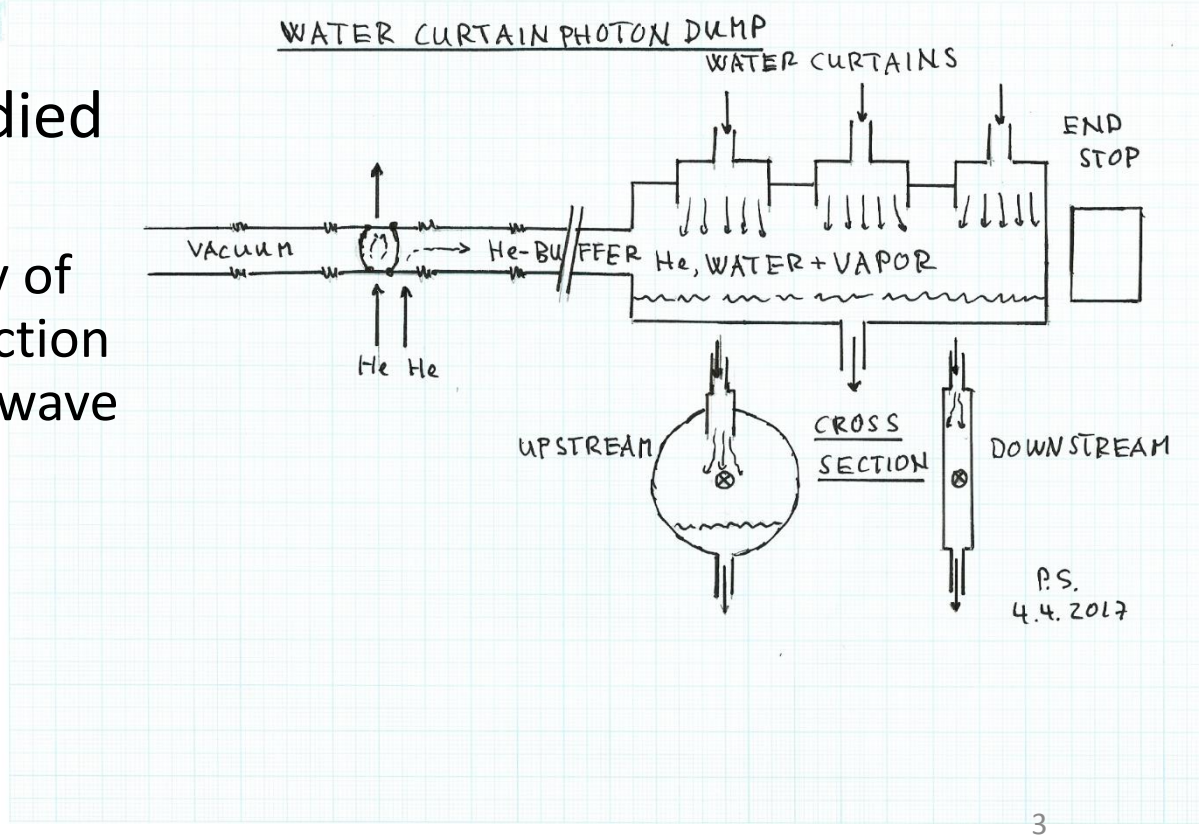
2017.6.27 AWLC

BDS Tunnel in Electron Wing

- Information we need (for now we still assume undulator scheme)
  - Positron target region
    - Target replacement scenario
    - Shielding of target region
  - Photon dump
  - Positron booster
    - Cryogenic system
  - Auxiliary positron source ?
  - Electron main dump and tune-up dump
- Among these, the target region is still quite unknown

Photon Dump

- Strongest candidate: water curtain with tumbling, thin window
  - Can avoid window to touch water
  - Can avoid heating/dpa problem
  - Easy replacement of window
- Problems to be studied
  - He or air
  - Detailed FEM study of beam-water interaction including pressure wave
  - Shielding
  - Tritium, Be^7, etc
  - Accident



Photon Dump (2)

- Location of the photon dump
  either ~50m from target or 1-2km
- The latter is preferred
  - Presumably, no boiling
  - Can use water system of the main dump (2km)
- Then, the line from the target are to the dump must be cleared
  - Need a pipe and vacuum system
  - Chicane of produced positron → dogleg

Commissioning

- Information we need
  - Construction schedule
  - Tuning dumps ---- we know already
  - Auxiliary positron source ---- we can decide
- The info on the construction schedule is totally missing now
- Can we assume that tunnel construction of all the regions finish at the same time? Then, we can somehow write a commissioning scenario.
- Detector group need to know the timing of roll-in

Construction Schedule in TDR

OBSOLETE

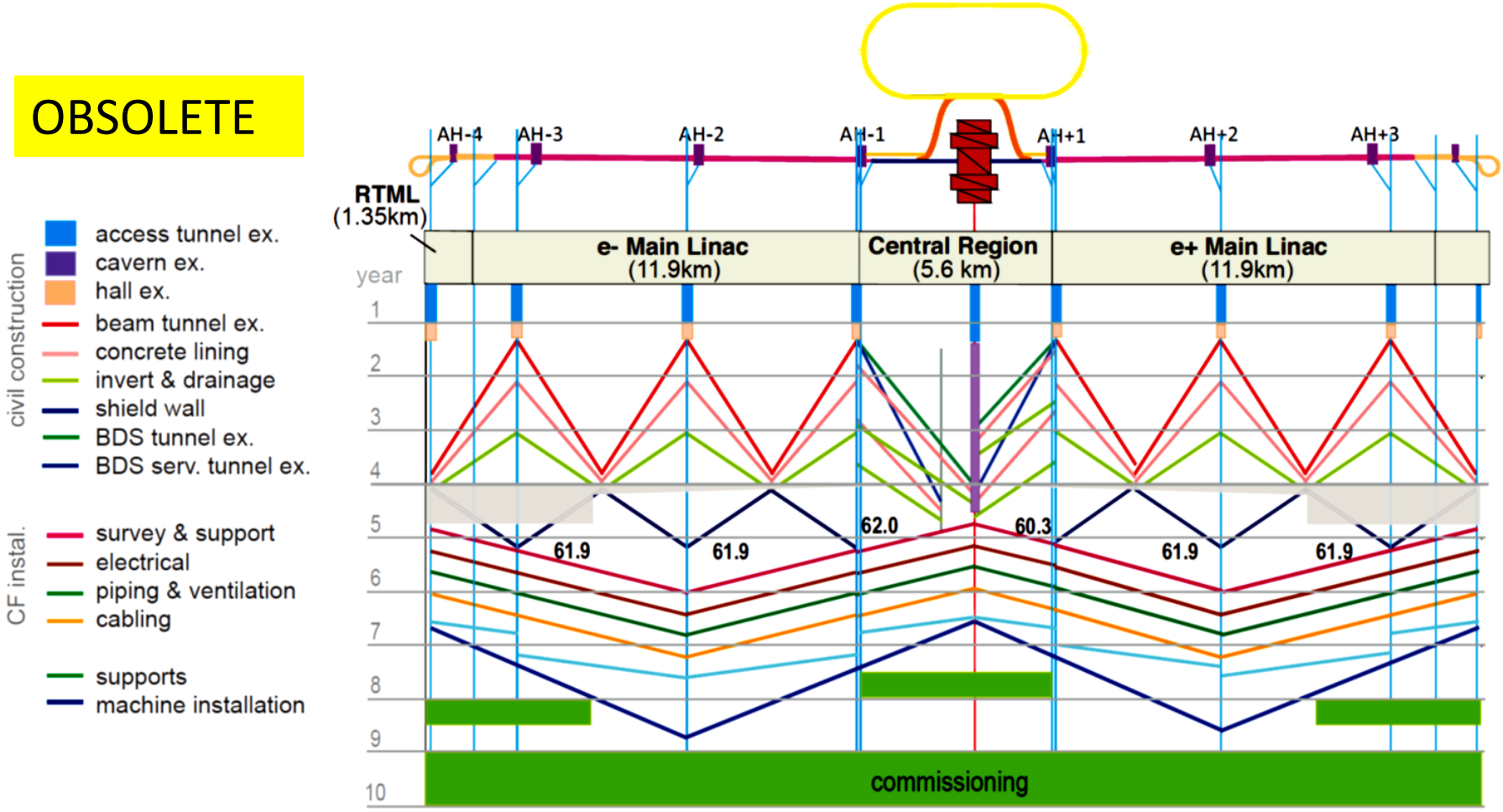
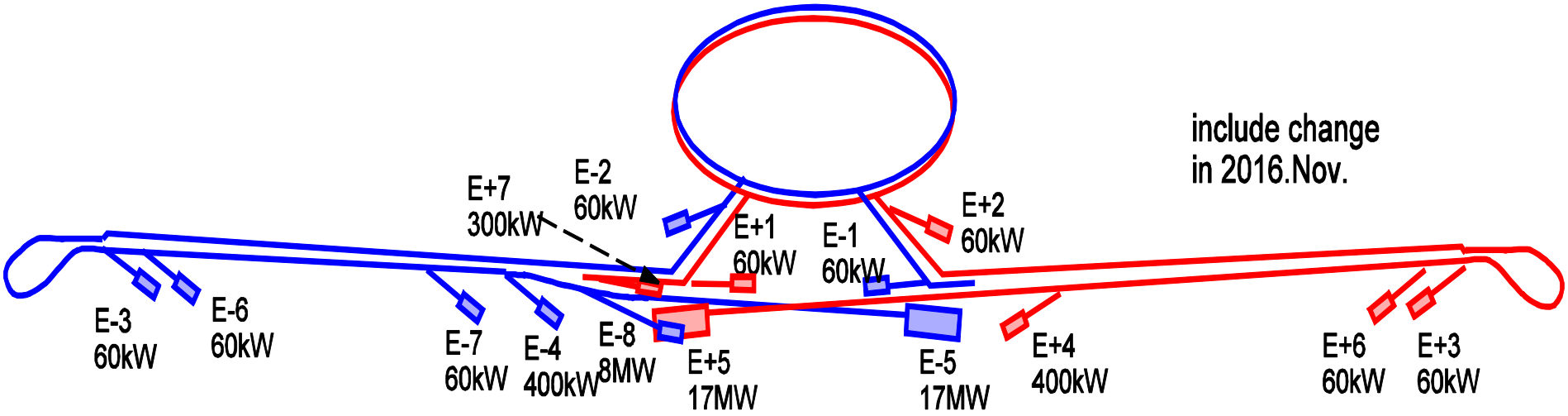


Figure 14.3. The construction and commissioning schedule for the mountain topography design variant. See Fig. 14.2 caption for details.

Beam Dumps


include change
in 2016.Nov.
E+7
300kW
E-2
60kW
E+1
60kW
E-1
60kW
E+2
60kW
E-3
60kW
E-6
60kW
E-7
60kW
E-4
400kW
E-8
8MW
E+5
17MW
E-5
17MW
E+4
400kW
E+6
60kW
E+3
60kW

Scenario (1)

- Electron source
  - Completion of positron BDS tunnel
  - Installation of electron beamline
  - Evacuate the region
  - Commissioning with weak beam using the dump E-1 (60kW)
- Positron source (if auxiliary source exists)
  - Same procedure as electron source (use E+1)
- Electron DR
  - Relatively independent from other areas (separate tunnel)
  - Weak beam using E-2 (60kW)
- Positron DR (if auxiliary source exists)

Scenario (2)

- Electron RTML (also positron if auxiliary source)
  - Weak beam
  - Use E-3, E-6, E+3, E+6
  - But, presumably, must wait for installation of main linac and BDS?
- Electron Main linac
  - Weak beam using E-4 (400kW)
- Positron source (undulator)
  - Weak beam using E-4 and E+1
- Positron DR and positron RTML
- Positron main linac

Scenario (3)

- Roll-in of SiD
- BDS
  - weak beam
- All system
  - Start from weak beam
  - up to full intensity beam
  - use the main dump E-5, E+5
- How many months before and after roll-in?

Can we start study now?

CR15 Positron BDS Tunnel

CRP Report on CR15

- ILC-CR-0015: KAMABOKO-SHAPED POSITRON BDS TUNNEL
- CR submitted on Mar.24
- Contents of CR
  - To change the tunnel layout from a two-tunnel configuration with separate machine and service tunnels, to a Kamaboko shaped single tunnel with shield wall, and extend the service tunnel up to the experimental hall.
  - To relocate the electron source upstream.
  - To change the cryogenic supply scheme for the electron source's 5GeV booster such that the booster is connected to the Main Linac helium supply rather than the experimental hall.

Change Review Panel

- Panel members
  Benno List, John Osborne, Masakazu Yoshioka
- Reviewed on June 12
- General Conclusion
  - “Overall, the CRP agrees that the change request is reasonable.”
  - “We recommend to accept the Change Request in its entirety.”

Recommendation : Kamaboko

- arrangement of 3 beamlines --- consider accessibility for installation and maintenance
- arrangement of the branch-off region --- crossing of service tunnel and LTR
- access requirements of, e.g., laser wires and electron source components
- detailed design of the dump hall region (access requirements and safety)

Recommendation : 5GeV Booster Cryogenics

- An updated cryogenic layout of the Main Linac when this CR is implemented
- A more detailed layout of the cryogenic supply (helium temperature, cryogenic loss, costs of additional supply line)

General Request

- Better quality figures for tunnel cross section