

# Minutes of the Meeting on CNGS Dismantling Pre-Study, 2 July 2020

Present: Claudia Ahdida, Philippe Bertreix, Marco Calviani, Edda Gschwendtner, Renaud Henry Jean Mouret, Elzbieta Nowak, Christelle Saury, Luisa Ulrici, Helmut Vincke, Mats Wilhelmsson

Excused: Ans Pardons

Indico: <https://indico.cern.ch/event/932158/>

## **RP studies for CNGS dismantling (Elzbieta Nowak)**

The main points of the presentation are the following:

- Changes in the CNGS tunnel (wrt 2008-2012): the separation wall (preventing crane usage in CNGS area), side concrete shielding next to the target and horn (covering 2 penetrations for surveys), collimator exchange and storage in the area
- Latest survey carried out on 16/06/2020:
  - very good agreement with the MC FLUKA predictions for the accessible parts of TCC4 where there is no change in shielding after 2012
  - max dose rate was measured next to the horn shielding: 110 uSv/h and at the 'openings for stripline' for horn and reflector: 100 uSv/h and 70uSv/h
  - next to that, dose rates vary from 50 to 6 uSv/h, from the level of the horn going towards the end of the helium pipe
  - end of helium pipe, end cup with Ti window, (measured 1.8 mSv/h at contact) will be investigated in more details by future simulations.
- Target max dose rates at 10 cm distance were presented for the most activated downstream part (last 60 cm) as: 25-30 mSv/h and 12-15 mSv/h in 2022 and 2025, respectively.
- The main activity for 2022 and 2025 of the target parts (carbon rods, carbon supports, Al 5083 tube and 'radiator') comes from pure beta emitter H-3 and then from Na-22. Tables with specific activity and total activity for all the internal components, integrated over 5 target tubes were presented.
- Horn maximal dose rates: close to the horn 'neck' on the axis at 10cm distance: 17 mSv/h and 6 mSv/h for 2022 and 2025, respectively.
- Reflector maximal dose rates: at 10cm from the front flange: 2mS/h and 0.9 mSv/h in 2022 and 2025, respectively.
- Specific and total activity for the target and horn was shown, with radionuclides inventory: mainly H-3 and Na-22.
- Concrete sampling of three samples: floor, wall and shielding block done on 16/06/2020 was discussed, together with preliminary conclusions on the gamma spec results. Verification of the FLUKA and ACTIWIZ assumed concrete composition is needed as traces of Co, Eu, Cs were found by gamma spec analysis in each sample. Possibly XRF analysis will be performed in order to determine content of other more abundant elements such as Si content.
- Future simulations by means of SESAME tool will be carried out in order to design the shielding for the target and horns, also to verify dose rates for separate parts of the shielding and the helium pipe.

## Discussion:

For the Cost and Schedule Review in spring 2021, person power as well as all costs (including final disposal) needs to be prepared.

### Waste elimination:

French criteria are used as baseline for RP-RW waste elimination.

Dose rate outside of the truck for public transport must be below 2mSv/hr. Therefore, the contaminated material must be accordingly shielded for transport.

For the Cost and Schedule Review in spring 2021, both cost estimates are needed: for the temporary storage at ISR as well as for the final disposal.

→ **Action: Luisa** will estimate the costs for the final disposal of waste (treatment, radiological characterization and transport to final repository), but needs as input:

→ **Action: Marco** to give dimensions, weight and dismantling possibilities of the hot elements (target, horns) to Luisa.

→ **Action: Mats/Sylvain** to provide dimensions, weight and dismantling possibilities of the other waste elements (pipes, blocks, cables etc.)

→ **Action: Luisa** will also study the re-use of the shielding blocks.

→ **Action: EN-HE** estimate of costs for the removal of the components from the current location and to transport them in the temporary storage at ISR.

Other input needed for waste study:

→ **Action: Mats** to check whether there is any Asbestos in the area (assumption of 'no').

→ **Action: Mats** to check the status of the inventory.

### RP calculations/measurements:

AWAKE has a physics program foreseen in the next years. Therefore, the earliest date of dismantling needs to be updated. Most probably the dismantling will not start before 2023.

→ **Action: Edda** to confirm the earliest date.

When the separation wall for AWAKE was installed in 2014, also the marble shielding side of the target was closed. Therefore, it is currently not possible to access the target through the penetration hole for additional RP measurements.

→ **Action: Christelle** to perform measurements through the opening of the horn/reflector.

→ **Action: Marco** to give input where the best location for these measurements is.

Bottom plates, real hardware and components should be included in the RP calculations; Technical drawings and material composition are required to calculate the dose rate for the single elements.

→ **Action: Marco** to send detailed drawings of the target and horns to Elzbieta

→ **Action: Elzbieta** to calculate the single element dose rates once she has this input

→ **Action: Elzbieta** to calculate the required shielding for transport

### Other points to follow-up:

- EN-HE: do they have the equipment to transport all the material?
- → **Action: Edda**: to check with Mats/Sylvain where best to store all information.