



# 2<sup>nd</sup> series of helium spill tests in the LHC tunnel

# 1<sup>st</sup> series of Helium Spill Test in LHC tunnel

## Proposed experiment

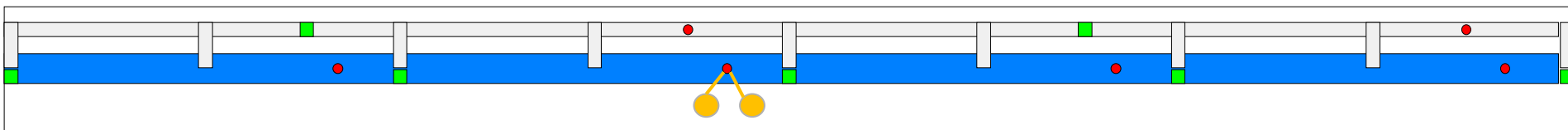
Liquid helium spill of 1 kg/s (MCI)

Total spill per test 125 kg (= 1000 liquid liters)

Ventilation flow in access mode: 18000 m<sup>3</sup>/h, about 0.7 m/s in tunnel

Total of 15 data stands, placed within 100m upstream and 200 meter downstream of spill point, measuring temperature, oxygen content, pressure, helium flow speed etc.

Direction ventilation



~100 m

~200 m



## Why a 2<sup>nd</sup> series of tests?

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The Working Group in charge of the follow-up of the helium spill test has concluded that the MCI at 1 kg/s can only take place during

- the cool down from 300K down to 80K or
- phase 1 of Powering.

However:

- During the cool down from 300 K to 80 K, access of personnel was/is forbidden.
- The current in the magnet circuits during Phase 1 of Powering, was statted in the past at 1 kA maximum, inducing an energy which could not generate a helium spill higher than the MCI.
- Measures decided by the Working Group aim to prevent exposure of personnel to this type of MCI:
  - Remote Control of racks will be used during Phase 1.
  - Current in magnet circuits during Phase 1 will be reduced to 1/3 of the previous current, bringing the helium spill rate in case of incident below 100 g/s;

## Why a 2<sup>nd</sup> series of tests?

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What could happen during presence of Personnel in the tunnel (MCI with presence of personnel in the tunnel):

- Analyses have shown that the helium spill resulting from a human mistake, only cause of helium spill in presence of personnel accessing the tunnel, will stay below 100 g/s,
- Calculations have shown that the dilution effect of a 100 g/s helium spill is such that the oxygen concentration should not go below 18%, not critical for personnel.
- To check these calculations, the Working Group has decided to execute a 2<sup>nd</sup> series of spilling tests, with a spills rate of about 100 gram/s, to validate this dilution effect, to check the reaction of the ODH system on these kind of spills and to study the visibility of such a cloud in the LHC tunnel.

## Where/When will the 2<sup>nd</sup> series of test find place

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Tests will find place between June 23<sup>rd</sup> and June 27<sup>th</sup> in sector 2-3, right of 2, with the spill point at DCUM 3730.

These tests will find place in the evening hours, during which period the sector will be closed for access.

Conclusions from the Helium Spill Working Group will presented shortly.



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