MICE LH2 system

CM40 – 28/10/14

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Recap

- **R&D tests over 2 years ago (!)**
- Subsequent review recommended minor changes to the hardware
- Also have recommendations from HAZOP 2 to complete
- System now has a new context, i.e. integration with the Absorber Focus Coil
- …though most of it remains unchanged and merely requires re-commissioning

Hydrogen system

Hardware progress

- Transfer line – delivered
- Vacuum line – out for tender
- New hydrogen regulator – ordered
- Pressure gauge – getting quote
- Charging station mods – in progress
- Jacketed charging line – being designed
- Glycol expansion tank – getting quote
- Relief leak fix – in progress
- Pump maintenance – in progress
- Control system updates – in progress

Absorber windows

- **4 windows successfully delivered to RAL**
  - 2 x absorber
  - 2 x safety
- A key part of upcoming review
  - Wing Lau repeating FEA using as-measured thicknesses
  - Testing and materials certification must be transferred to local regulations

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Absorber vessel

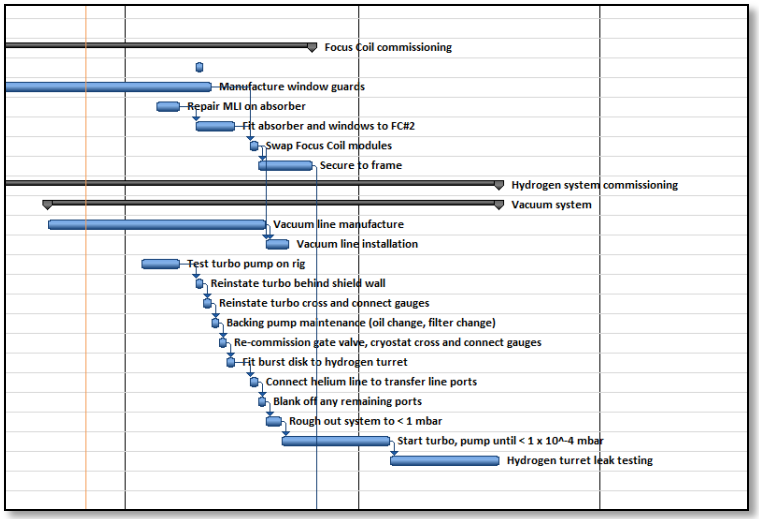
- **Both absorbers now at RAL**
- MLI needs re-wrapping
- Minor problems with connector wiring - very easily damaged
- Unknown if any chemical cleaning of interior is required or if gas purging and pumping is acceptable?
- Assembly of windows and absorber will be carried out in Cryo lab
- Insertion of assembled absorber into the FC will be carried out in R9

Review

- **Review requested by ISIS to study the impact of the AFC on the LH2 safety case**
- ToR not finalised yet but essentially:
  - Educate new members of safety responsible staff
  - Provide fresh insight into system modifications
  - Make recommendation as to route to safety sign-off
- Will take place in early December at RAL
- Attendees will include:
  - ISIS operational and safety staff
  - Johan Bremer and Jonathan Gulley (CERN)
  - David Howell (retired), chair of previous review
  - Matt Hills and Tom Bradshaw (ex-MICE)

Schedule

- **Heavily influenced by PRY schedule**
- Key is to get as much done before PRY installation commences as possible
- However, not feasible to achieve hydrogen sign-off by then…
- So:
  - December – vacuum testing
  - January – helium cryogenic testing
  - March – safety sign-off
  - April – hydrogen commissioning



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Risks

Technical risks

- Hydride bed capacity has degraded
- Hydrogen turret on FC does not work to specification
- Level sensor in absorber does not work
- No spare windows
- Leaking burst disk is a more complex fix than anticipated

Other risks

- Still some ambiguity over staffing
- Review may make unexpected recommendations (HAZOP 3 etc)

Beyond Step IV

- Building a second identical LH2 system is probably impossible