Discussion on MERIT Cryogenics Specifications

Outline

- List of questions & comments
- Possible roadmap

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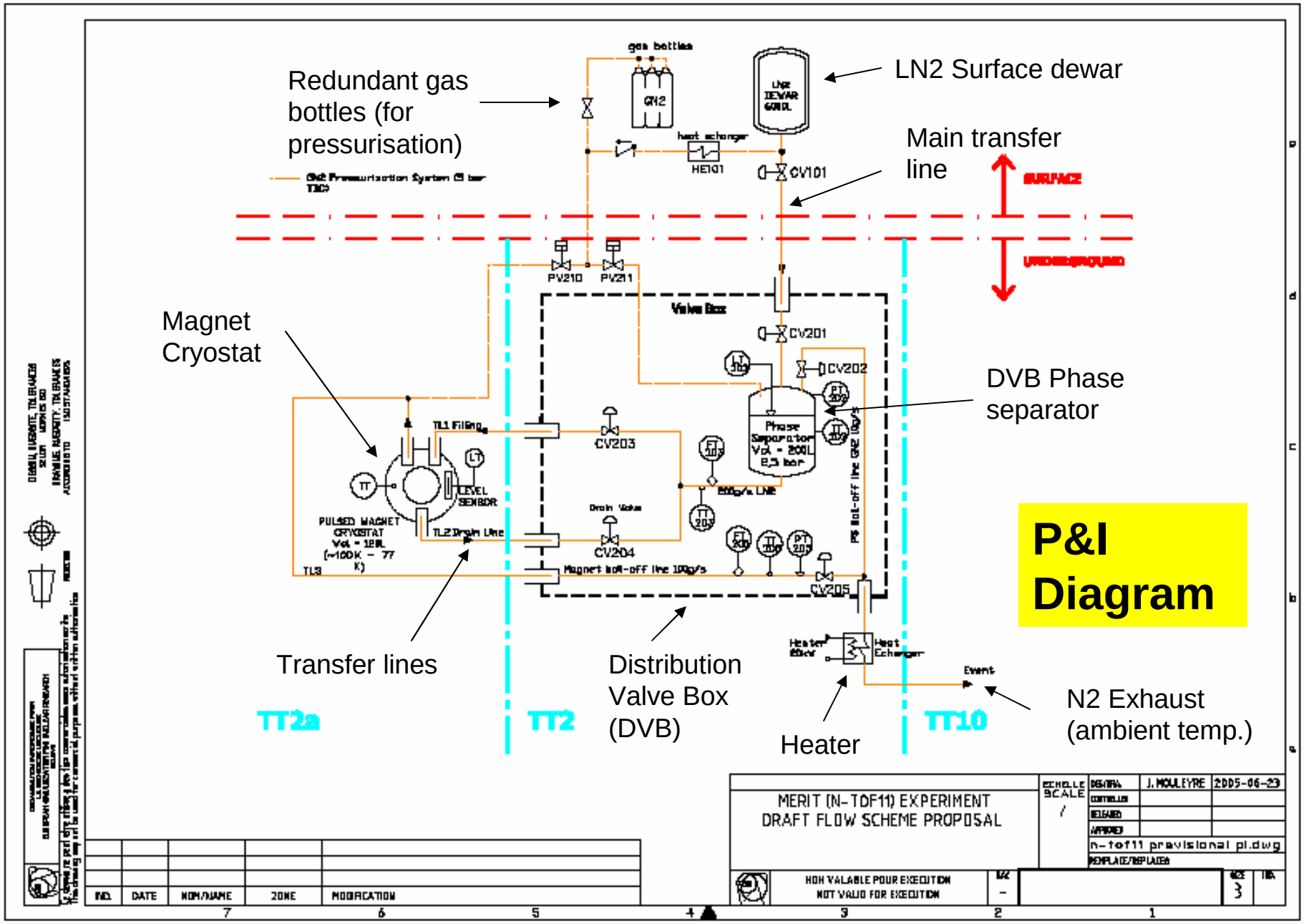
3. FLOW SCHEME, FUNCTIONALITY



Question #1

Filling of the magnet

- Fill the cryostat from the bottom rather than the top.
  - *If required by the magnet design, it should be like this.*
- The "He/LN2 port" will be used instead to support a room-temperature pressure relief valve for the N2 volume of the magnet
- The valve CV203 not in use and could be omitted

Question #2

Filling rate of the magnet

- The flow capability of the line between the phase separator and the drain port of the magnet to be increased from 200 g/s to 300 g/s.
  - To assure the 100 g/s boil off rate ➔ 20min cycle
  - As a consequence the size of CV204 should be modified accordingly
  - *The design of CV204 can handle 200 g/s which is a large quantity per time unit*
  - *Increasing flow specifications results in a cost increase*
  - *May risk to bypass the 100g/s boil off rate in which case we must close CV204 further → Can big valves control small flows?*
  - Can the magnet drains support that increase and what would be the corresponding pressure rise?
  - How important is to stick to 20min cycle? If it becomes 40min what we would really loose?

Question #3

Safety aspects

- Complete the design and indicate the pressure relieve valves and other safety items.
  - Where will the released N2 gas go?
  - Is there any risk to have activated gas spread into the tunnel?
  - As a consequence the size of CV204 should be modified accordingly

  - *It is mandatory and the design should show it that all the gas releases go to TT10 tunnel.*
  - *A collector will be installed somewhere → should be shown in some design*

Question #4

Pressure issues

- What will be the estimated supply pressure from the 6000L dewar source to the phase separator/valve box?

- Why is important to design for 20 bar when we may not exceed the 10 bar pressure?

  - *It is mandatory from the CERN standards for pressure vessels in underground areas*

Question #5

Detailed design

- Need to define all the engineering aspects for the system such as dimensions, physical space, weight limitations, interconnections, etc.

- Define the safety and other standards the system must meet.

  - *All these, and others, will be part of the specifications document that is currently under completion.*

A Possible Roadmap

Target date:

- Installation of the system underground in **November 2006**
  - The magnet arrives from US
  - The cryogenics system is lowered down from bat.180

- Count backwards:
  - 2 month setting up and testing at the surface with dummy load (bat.180)
  - 5 months production of CVB

  Milestone to place the contract to the company: **March 2006**

Today:

- Address the remaining open issues in the design; go ahead and complete the specs. ***Action: Friedrich Haug***

  Milestone to have the specs ready: **January 16, 2006**

A Possible Roadmap

Next steps:

- *Should we find it necessary after today's discussion:*
  - *Call an **Engineering Review** with external experts (3?) to validate the design in case we find it necessary after today's discussion*
    - *Agenda:*
      - *Magnet system by P. Titus*
      - *Cryogenics system by F. Haug*
    - *Organize it around **January 20***

- **>January 20**:
  - RAL takes over and does the tendering. ***Action: Y.Ivanyushenkov***
    - Follow-up production by Yury + Friedrich
    - Delivery at CERN in **September 2006**