



Comments from CERN's Safety Commission concerning:

NEUTRINO FACTORY /TT2A
CRYOGENIC INSTALLATIONS

- Supply of LN2 from a dewar installed outside between building 559 and 506.
- LN2 transfer line from the dewar to the magnet in TT2A.
- The magnet will contain 30 to 300 liters of LN2 (still not defined)

Documentation

1. Please provide P&ID's (Pipe & Instrumentation Drawing) for all the equipments, including date, version and drawing number.
2. Please provide a PFD (Process Flow Diagram) for all the different modes (filling, quenching, warming up etc).
3. Please provide a list of all safety valves, their position and their settings for all cryogenic equipment in this project.
4. The pressure vessels (magnet and dewar) and it's accessories shall be conform to Directive 97/23/EC (EC declaration plus manufacturing documents such as material certificates, welding procedure specification, method of welding, certification of welders, pressure tests etc). Please contact E. Jonker (SC/GS) directly in this matter.
5. Please provide the documentation for the safety valves as indicated in the Directive 97/23/EC. Safety valves are category IV.
6. Please provide the calculations for sizing the safety valves.
7. The dewar shall be conform with the applicable cryogenic standard (depending on size).
8. The cryogenic valves shall be conform with EN1626.
9. Complete documentation shall be provided for the instrumentation (manufacturer, model, operating range, maintenance etc)
10. Please provide implementation drawings of the dewar, the transfer line and the magnet.

Pressure build up

11. Please assure that there are safety valves wherever cold gas/liquid could be trapped: vessels & pipes between valves.
12. Please show that no liquid can be trapped in the valve when operating it (ball valves and gate valves).

Other

13. Please assure good insulation of cold parts, which could come in contact with the atmosphere. This is important to avoid condensation of the air, which could form droplets of water or even liquefaction of air. Water risk to drop on electrical installations. Liquid air can cause cold burns and enrichment of oxygen (amplifications of fire)
14. Assure that all the instrumentation is adapted for the correct pressures and temperatures. Valves designed for a warm temperature risk to block in an open position if used cold etc.
15. Please assure that there is no humidity in the cryogenic installations.
16. Please assure that no one can get hurt in the case of a safety valve/bursting disc blowing!
17. Please allow good access to all the instrumentation! Bear in mind that the safety valves are to be dismantled and checked by SC every second year and that maintenance/repairs of the installation shall be possible.

Oxygen Deficiency Hazard (ODH)

18. Please make a study on which parts of the tunnel that risk to be affected directly or via the ventilation system in the event of a big nitrogen spillage (equipment braking, safety valves blowing). If the ventilation system cannot cope with the spillage, other means of how to remove the excessive amount of nitrogen shall be studied. If the fire fighters do not have the equipment for this, the project will have to organize the necessary equipment in collaboration with the firefighters. This study has to be done rapidly (I propose before 2005). It would be a shame to find out 2006 that TT2A can't be used because there is no way to get rid of nitrogen spills. Please contact Michel Fressard TS/CV concerning ventilation in TT2 and P. Doebbeling SC/FB concerning the fire brigades capacities.
19. A complete study needs to be done concerning the ODH risk in the event of a big nitrogen spillage in the tunnel or elsewhere in the cryogenic system. The study shall include access rights and warning systems (O2 sensors, flashing panels, evacuation alarms, BIOCELLS etc). This study shall be finished at least 6 months before the commissioning of the cryogenic systems starts.

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