Infrastructure Meeting @ LNGS 05.03.2007

Begin of meeting: 9:10

Participants:

Karl-Tasso Knöpfle (KTK), Peter Grabmayr (PG), Bernhard Schwingnheuer (BS), Matthias Junker (MJ) (Minutes), Carla Cattadori (CC), Manuela Castagna (MC) (MarcoBalata (MB) is ill)

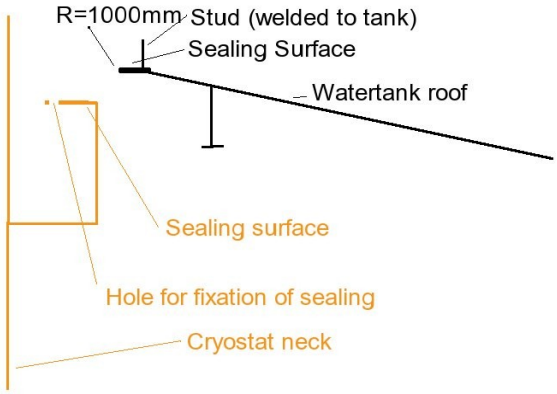
Topics:

1. Cryogenic requests by GERDA to LNGS:
   1. Cryovessels for GERDA and Gerda Detector Laboratory (GDL);
      (1) GERDA Main Site.
      a) **LAr**: 6000l Tank for first filling of GERDA Cryostat. After the filling the big tank can be exchanged with a smaller one, as the evaporation rate of GERDA is small due to LN_2-Cooling;
      b) **LN:**
         i. consumption: about 10kg/h = 240kg/d
         ii. We need a 6000LN_2 Tank
      c) Tanks **located at point C** (see figure above);
      d) Tanks and relative tubing must be **ready by 09/2007** to be in time with Cryostat testing;
   2. **GDL.** The Cryogenic design of the GDL is documented in separate note by Stefan Schönert).
      a) LAr Tank at point A or B for first filling of LArGe installation inside GDL;
      b) later LAr filling via 240l transportation dewar (used already now), which is filled at the LAr dewar at point C (see above);
      c) LN_2 dewar close to GDL (point A or B) needed for continuous LN_2 (liquid phase) cooling of Lar. Transferring LN_2 in liquid phase would double the consumption and does not seem advisable;
      d) Possibility to convert LAr dewar of first LAr filling to LN_2
         i. addendum: according to LINDE this would be this most reasonable solution, considering the overall crogenic consumptions of the GDL.
   3. **Cryogenic piping** for connecting cryovessels with GERDA and GDL;
      (1) MB is charged to ask offer from LINDE Italia;
      (2) BS will look for alternative offers;
      (3) as for the cryotanks, the piping must be **ready for 09/2007** (time given by cryostat delivery);

2. **Update on water tank project**
   1. **Start in summer** with bottom plate;
   2. time slot for **Cryostat installation starts beginning of October 2007**;
   3. **Restart of water tank construction foreseen for January 2008;**
   4. **Upper man hole of WT needs access from Top** (attention to Faraday Cage of electronics);
   5. The **safety implications of the heat exchanger** for the emergency release of cold Ar have been discussed specially the aspect of a heat exchanger tube breaking in the WT):
      (1) A **re-evaluation of the feasibility of the "outside heating"** was proposed.
      (2) In case of "outside heating" the **thermal stress** caused by the impact of the cold gas on the WT **must be evaluated**. Probably a "graded heat contact" between cold gas and WT would be needed;
      (3) The **clearance** between vertical beams of building and WT **must be checked** (MC);
3. **Pipings in GERDA Experimental Area**
   1. **Cryogenic tubing**
      (1) Sketch by BS attached
         a) **DN 200 pipe** (plus isolation) from Cryostat at 9100mm
            i. preferably **directly to Cry-Mu level** through hole in the 700 beam, MJ asks for feasibility;
            ii. after some valving/rupture disks it reaches gas heating system, at the moment foreseen to be inside the WT. This solution requires the exhaust tube to enter and exit the WT from the side (needs 2x DN300 flanges in WT (one in one out));
            iii. The safety implications of the heat exchanger have been discussed (details in section 2.5.);
         b) **DN 200 from vacuum** for emergency with rupture disks which goes to exhaust gas handling system;
         c) **CF150 turbo pump** mounted to the valve on site, **DN50 pipe** to fore line pump located remote;
         d) **DN 50 for exhaust** from 1st filling. Output goes to gas heating system;
         e) **Flexible tube O.D. 60mm for LAr supply** (comes from "cryo-corner" on cleanroom level);
         f) **Flexible tube O.D. 60mm for LN_2 supply** (comes from Cry-Mu level);
         g) **Tube DN20 (2x)** for N_2 gas exhaust;
         h) electrical connections for sensors, valves, etc.);
   2. **Tubings for the water system** (MB is asked to provide layout by end of April)
   3. **Cable Ducts** in the superstructure
      (1) for PMTs:
         a) Issue: Access to the "Feedthrough Tower" on top of the tank? How to deploy cables on top of WT to the Cry-Mu level?
         b) Action: **find out admitted load of WT roof and possible leader** (MC);
         c) **decide which corner of the cry-mu level is for the electronics and where the tower for the cable feed through is located** (until august by KTK and BS);

(2) **Cable Ducts** for
   a) 220/380V (UPS+Normal)
      i. On LVD motor generator the DAQ of HPGe and PMT's;
      ii. UPS for safety relevant equipment (TKT and BS to provide list of these items);
      iii. Normal for the rest (clean room);
   b) *Signals* (oxygen monitors,valve controls,etc);
   c) *Compressed Air* (for valve operation), water (closed cycle for air conditioning and cooling), clean gas (for detector handling);

4. **Compressed air:** pressure 4-5 bar. (LNGS provides 8bar);
5. **Closed Loop Water Cooling**, for environment air cooling and machinery cooling is available again (MC: verify cooing power available);
6. **Water cooing for HPGe electronics**: design aim: T stable within +-1 degree by a GERDA chiller/LNGS water cooling system (to be done by KTK and BS);
7. **Exhaust tube from Gerda to LNGS**
   1. Diameter must be DN400, otherwise to high pressure drop;
   2. **MC prepares document on the actual situation**;
      (1) LNGS provides the interconnecting pipings?
      (2) What is the procedure for activating the LNGS ventilation system;
      (3) Does LNGS system suck? at what underpressure;
8. **Access to the neck**
   1. Lift (or "basket") from open side with proper docking station. In the back stairs from LNGS equipped walls or from gallery of GERDA;
   2. Moving platform ("suspension railway") plus stairs on WT;
9. Discussion on **details of WT**:
   1. **Diam. of hole on top: 2000mmm**;
   2. **Sealing structure:** see sketch
   3. **Man hole width 800mm;**
   4. **define the precise "level Zero"** of the water tank/building to which our drawings refer. This is the level LNGS provides to the respective companies of WT and building when they start construction.
10. Some discussion on the progress of the NIER/LNGS Safety review.



End of meeting 15:00
Minutes: Matthias Junker

Follows attachment...

Attachment: Most bulky pipes of Cryo - Infrastructur as by BS