Gerda Water System

LNGS-meeting

(26-28/06/2006)

Balata M. Castagna M. Ioannucci L.

- Water system of Gerda:
  - Filling of the Tank
  - Final cleaning of the Demi water during filling
  - Keeping the Water clean in the tank

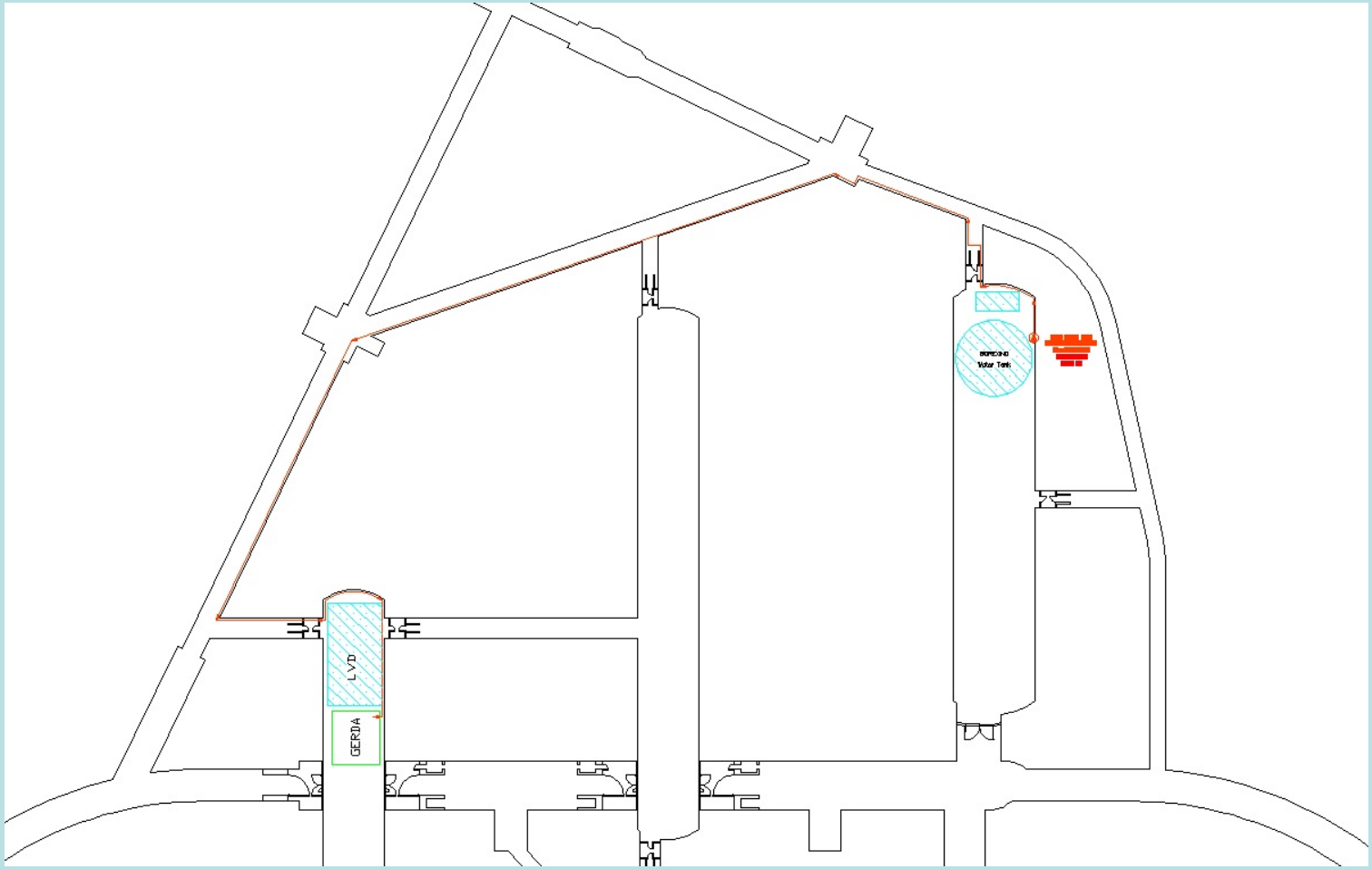
Filling the tank

We can use the Demi water produced by the Borexino: resistivity >15MΩcm; Rn stripping column

Max Flow rate: 2 m^3/h, we need 25 days for filling the tank (12h/day)

Piping from Hall C to Hall A (~500m)

Water piping from the Borexino Area



Final cleaning of the Demi water during filling

- We can perform a final cleaning of the water up to 18MΩcm (Ultra –Q filter of similar equipment)
- We can stop the dust particles by filtration (>1 μm)

Water system general features

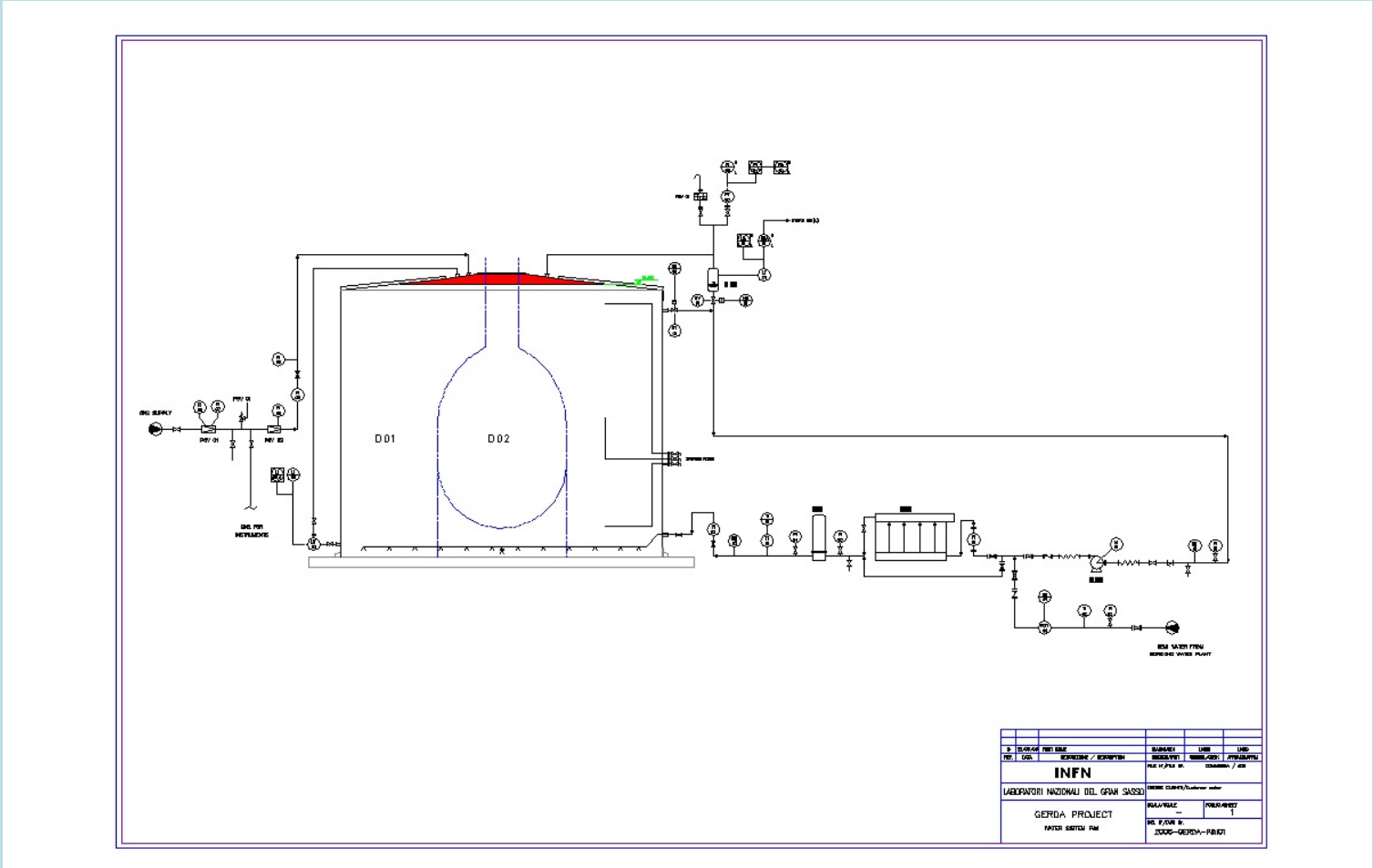
- Standard loop rate 4 m^3/h (~6 cm/h speed inside the tank)
- Each 6 days we exchange one tank volume
- Max loop rate 8 m^3/h (~ 2 tank volume/week)
- Water internal distributor to keep the water as homogeneous as possible

Keeping the Water clean in the tank

Water inlet up to 18 MΩcm (U, Th, K, Pb, …. better than ppt level) and TOC better than 1ppb

Particle removal > 1 μm (absolute efficiency)

Water system:



Water level control

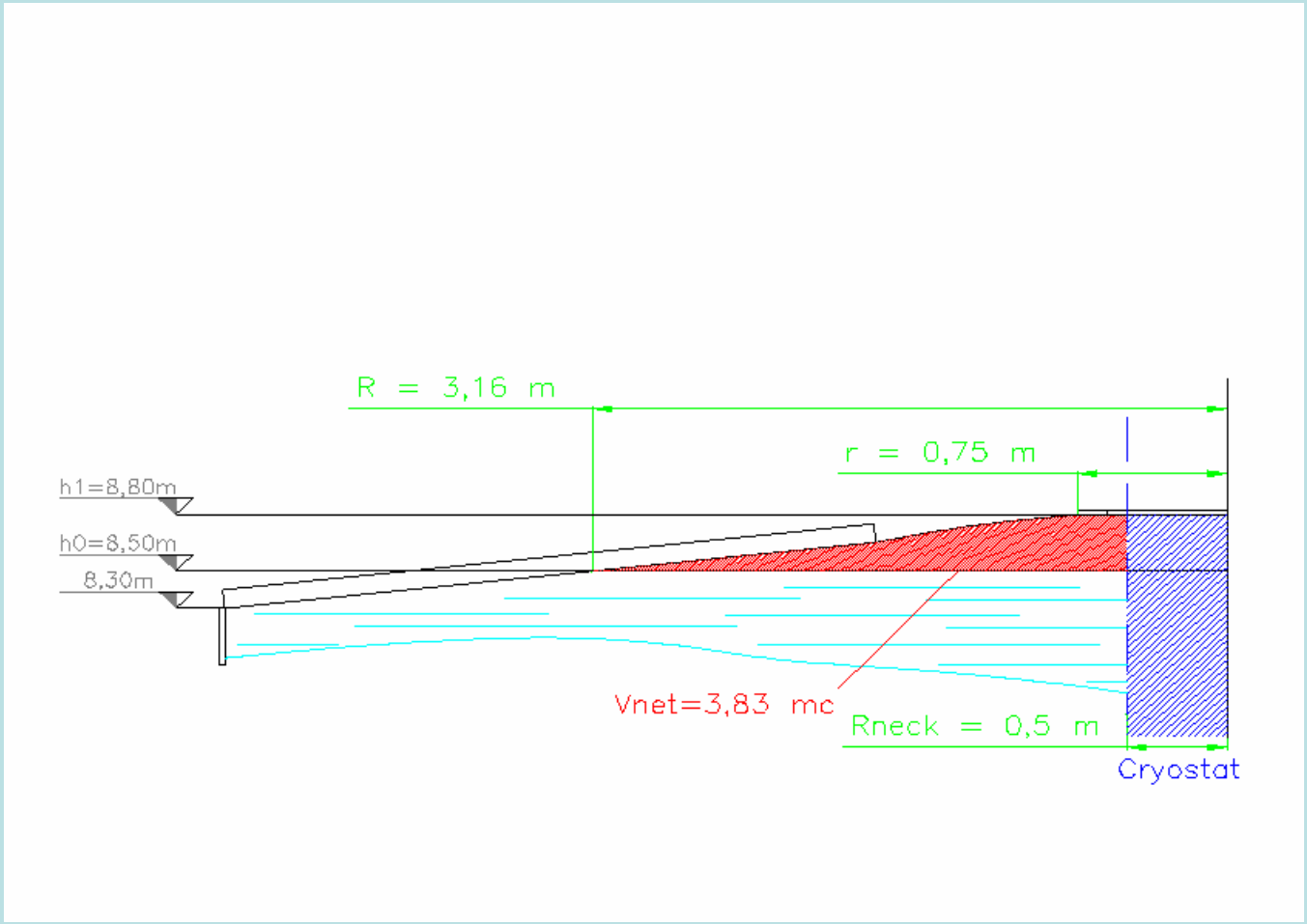
Water level inside tank might change with temperature

Standard water level is 8.50 m (Hall A room temp. ~ 20 ^{o}C)

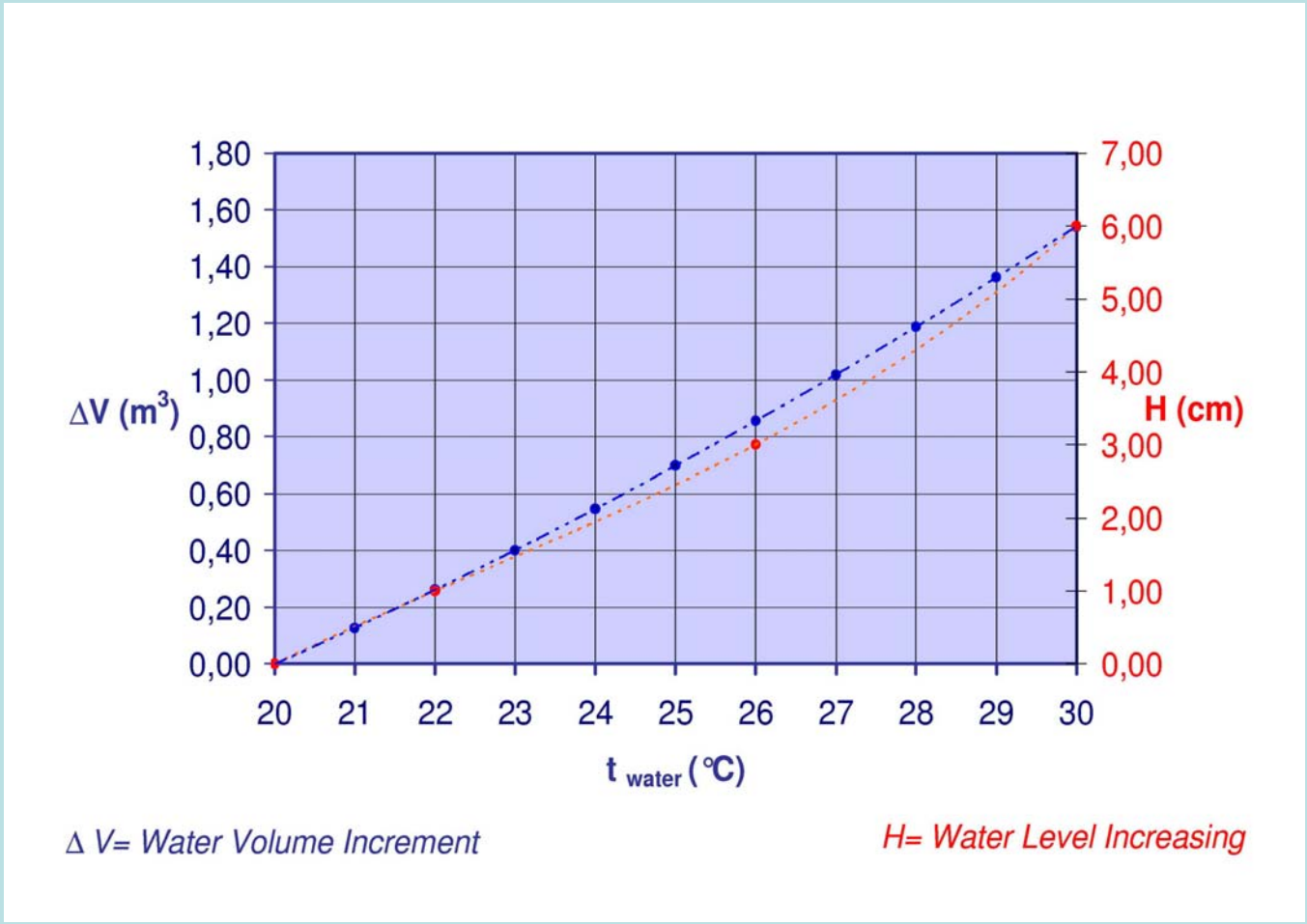
ΔT= 10 ^{o}C increment means 6 cm water level increment (ΔV~ + 1.5 m^{3})

We need a fine level monitor and control

Volume available for nitrogen gas purging



Water volume and Water level changes with temperature



What we need

- Piping Water filling line
- Water loop plant
- Nitrogen gas distribution line (from LN_2 storage area to Gerda structure)
- Temperature monitor (proposal)
  - Water inside tank
  - Air around tank