L.L. last update 19/10/2008

Input Data for Site Characterization/Feasibility Study

Notes:
- unless explicitly stated the data is for the final laboratory with the experiment running
- purple,s means that it is part of the work to obtain the corresponding data, and that it has to be done with the indicated company, institute etc. It deals mainly with the tank characteristics and construction

- red,s are to be defined by the physicists before the Feasibility Study starts
- (LL) means that it is the best guess by L. Labarga; it must be confirmed

Main Detector Cavern (MDC)

	Water Cherenkov	Liquid Scintillator	Liquid Argon
number of: Dimension cavern: Dimension Tank:	3 to 5 of 65m ∅ x 80m height 65m ∅ x 65m height	1 of ? / With Technodyne ? 30m ∅ x 120m height (vertical preferred)	1 of ? / With Technodyne 80m ∅ x 25m height
Relative Positions:	Aligned in direction to CERN? (LL) ?	N/A	N/A
Interaction with tank:	With Technodyne	With Technodyne	- Tank self-sustained - MDC base: reinforced concrete platform
Geological Stability:	?	?	Base platform stable [± ? cm] over 30 y.
Considerations in case of seismic activity:	?	?	?
tbd	?	?	?

Auxiliary Underground needs ⇨ Auxiliary Caverns (AC*n*)

	Water Cherenkov	Liquid Scintillator	Liquid Argon
Room1 (R1): Main Control	80 m^2 ⊗ 240 m^3 (LL)	80 m^2 ⊗ 240 m^3 (LL)	80 m^2 ⊗ 240 m^3 (LL)
R2: Office Space	40 m^2	40 m^2 (LL)	40 m^2 (LL)
R3: Electronics et al.	500 m^2	200 m^2 ⊗ 600 m^3	?
R4: Water Purification	500 m^2 ⊗ 5000 m^3	N/A	N/A
R5: Air Purification	?	?	N/A
R6: Liquid / gas handling	?	200 m^2 ⊗ 600 m^3	?
R7: Clean Room	?	500 m^2 ⊗ 1500 m^3	?
R8: Low Background Lab.	?	100 m^2 ⊗ 1000(?) m^3	?
R9: Storage space	200 m^2	200 m^2 (LL)	200 m^2 (LL)
tbd	?	?	?
AC0: for tank assembly	1000 m^2/ w/Technodyne	With Technodyne	With Technodyne
AC1	Rooms 1,2,3,9 ?	Rooms 1,2,3,7,8,9 ?	Rooms 1,2,3,9 ?
AC2	Rooms 4 ?	Room 6	?
tbd	?	?	?
MDC-AC0 relative positions	With Technodyne	With Technodyne	With Technodyne
MDC-AC1 relative positions	See below	?	?
MDC-AC2 relative positions	as close as possible; floor of AC2 at level of top of water tank (LL)	?	?
AC1-AC2 relative positions	Same level (LL)	?	?
tbd	?	?	?

Access Tunnel (AT) *[from main access shaft or tunnel]*
Interconnection Tunnels (IT) *[between caverns]*

	Water Cherenkov	Liquid Scintillator	Liquid Argon
AT: minimum width x height	?	?	?
AT: connecting to	?	?	?
tbd	?	?	?
IT[AC0-MDC] characteristics	With Technodyne	With Technodyne	With Technodyne
IT[AC1-MDC]	Sm-s: standard for transport of mid-sized equip. (LL)	Sm-s (LL)	Sm-s (LL)
IT[AC2-MDC]	Sm-s (LL)	Sm-s (LL)	?
tbd	?	?	?

Tank: Implications to the construction of the underground facility of procurement of parts + assembly + commissioning + ...

	Water Cherenkov	Liquid Scintillator	Liquid Argon

To be worked out with Technodyne

Methods of filling the detector Tank to be considered

	Water Cherenkov	Liquid Scintillator	Liquid Argon
1	Natural nearby water springs	Truck Delivery to filling pipe	Truck Delivery to filling pipe 7 trucks /day (150 tons/day) 7 days / week ⇒ 2 years
2		?	Production Plant at Surface 150 tons/day x 7d/w ⇒ 2 years

Main detector-related piping to be considered

	Water Cherenkov	Liquid Scintillator	Liquid Argon
1	?	1 x 1/2´´ *N-gas from Nitrogen Plant at surface to MDC*	1 x double-wall-vacuum-insulated *From LArg delivery place to MDC*
2	?	4 x 3 ´´ *From Liquid Scintillator delivery place to MDC*	?
3		4 x 3 ´´ *Water plant at surface to MDC*	?

Surface needs; Buildings to house them

	Water Cherenkov	Liquid Scintillator	Liquid Argon
R1: Main Control	80 m^2	80 m^2 (LL)	80 m^2 (LL)
R2: Offices + Meeting + workshops + etc.	145 m^2	1000 m^2	1000 m^2 (LL)
R3: Storage Area	1000 m^2 ⊗ 6000 m^3	1000 m^2 ⊗ 6000 m^3(LL)	1000 m^2 ⊗ 6000 m^3(LL)
R4: Specific 1	100 m^2 + 200m^2 *Storage+Assem. PMT*	200 m^2 ⊗ 1600 m^3 *Water Station*	*LAr production plant* ?
R5: Specific 2	?	100 m^2 ⊗ 300 m^3 *Liquid Nitrogen Plant*	*Cryogenics* + *Purification plant* ?
tbd	?	?	?
Buildings			
B1	R1+R2+R3+R4 (LL)	R1+R2+R3 (LL)	R1+R2+R3 (LL)
B2	?	R4+R5 (LL)	R4+R5 (LL)
tbd	?	?	?

Regular Operation of the Underground Facility

	Water Cherenkov	Liquid Scintillator	Liquid Argon
Typical / max. no. people	3 / 10 (LL: too few ?)	4 / 10 (LL: too few ?)	3 / 30 (LL)
Temperature of caverns	MDC: ? ± ? °C AC1: 22 ± 1 °C AC2: ? ± ? °C	MDC: ? ± ? °C (lower preferred) AC1: 22 ± 1 °C ?	MDC: ? ± ? °C ? ?
~ volume of air MDC / AC´s radon at MDC / rest_facility Ventilation: Time to change 1 volume of air MDC 1 volume of air rest facility	? / ? m^3 ~ 40 / ~ 100 Bq/m^3 ?´ ?´	? / ? m^3 ~ ? / ~ ? Bq/m^3 ?´ ?´	? / ? m^3 ~ ? / ~ ? Bq/m^3 ?´ ?´
Crane needs	?	?	?
Own-power-generation	? kW	? kW	? kW
Specific 1 Specific 2	? ?	? ?	Hot air forced flow [? m^3/h] between cavern' walls and tank Availability of hot air flow [? m^3/h] in the whole facility in case LAr leak
tbd	?	?	?

Regular Operation of the Experiment (underground)

	Water Cherenkov	Liquid Scintillator	Liquid Argon
Power needed:			
- experiment	? kW	5 kW	? kW
- Electronics et al.	? kW	100 kW	? kW
- Specific 1	? kW [air purification]	? kW [air purification]	?
- Specific 2	? kW [water purification]	?	?
Own-power-generation	? kW	? kW	? kW
tbd	?	?	?
Heat dissipation:			
- tank + ancillary in MDC	? kW	? kW	- 60 + ? kW
- Electronics et al. Hut	? kW	? kW	? kW
- Specific 1	? kW [air purification]	? kW [air purification]	?
- Specific 2	? kW [water purification]	?	?
tbd	?	?	?
Flow of liquids (pumping capacity) at pipes	?	Liq. N pipe: 20 m^3/h Liq. scintil.: 20 m^3/h Water: 20 m^3/h	LAr filling: 6 m^3/h LAr recirculation: 36 m^3/h
tbd	?	?	?