# Urgent Matters concerning shielding, platform, vessel, safety and operation at LSC

JJ

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# Platform

- Once ArDm starts operation, the "swimming pool" at the LSC becomes a safety-reservoir area. No one is allowed to walk in there.
- It implies that we must build our platform/shielding before ArDM starts operation (or else work out a schedule with them. First option is much preferred.
- The "no walk in the pool" is a LSC rule, not negotiable. The platform must elevate the detector at "ground level" (the edge of the swimming pool) and all necessary services must be located there.
- Please take a look to ArDM platform for inspiration.
- http://dl.dropbox.com/u/10977880/NEXT/TDR/ArDM-LSCstatusReport-May2011.pdf

# Platform and shielding

- LSC will cover the cost of the Platform.
- LSC will also buy a significant amount of lead. We can borrow about 40 tons from the lab. This is about what we need for the lead part of the castle assuming 20 cm bricks.
- My understanding is that we can build the platform and shielding structure (I assume that the lead shell is independent from the copper shell), as soon as we have a full constructive design and a seismic study.

# How much lead we need?

- For the purpose of illustration consider that the led shield is a box with 6 walls of 2m x 1.5 m, the thickness of all the walls is 20 cm.
- One of the standard bricks available has dimensions 20 x 10 x 5 cm3
- Suppose for simplicity that you use the side of 20 cm to provide the thickness.

# Canfranc dummy lead shield

6 walls of 2 x 1.5 m2 and 20 cm thick

Number of bricks per wall = 600.0
Number of bricks total = 3600.0

Mass of castle = 40.8 ton
Activity of castle = 2.1e+01 Bq

# Lead Bricks

- The above calculation is just a dummy example to illustrate the following points:
  - The mass of the lead castle, assuming 20 cm thickness is circa 40 tons. At a cost of 4 euros/kg, 40 tons cost 160 k€, close to what we can borrow from LSC.
  - There is a large number of bricks that can be chosen standard.

# Procedure

- Girona group to come with a more accurate estimation of the number and type of bricks that they need for the lead shield.
- Estimation to be discussed and blessed in Tuesday NEX100 meeting.
- First iteration, if possible next tuesday (21 June).
- A preliminary decision on number & type of bricks by 28th June.
- Also a decision on maximum activity allowed (I assume CDR numbers).

# Procedure

- Once we specify number, type & activity of bricks, LSC can proceed to tender.
- While tender process goes on we can refine our design and calculations, so we can include (small) corrections, but bulk order must be clear.
- It is necessary to move fast, since head times for tender, order, supply and cleaning are long.

# Bookeeping

- We should follow the progress of tender and the evolution of the order: This is best done by Gloria and Theopisti.
- Susana to coordinate with Iulian in order to measure activities of lead samples at LSC.
- Gloria & Theopisti to prepare a plan for cleaning the lead.

# Design

- Notice that design of shielding and platform must proceed together.
- Also, one has to solve at the same time the issue of chamber access and service. I assume that the design will further develop on optimizing access in place, using an ad-hoc clean room.
- Notice that the location of all needed services (gas, HV) must be clearly specified.
- Liubarsky & Theopisti to coordinate the integration of the system.

# Dead lines

- All dates are tuesdays (NEXT100 meeting)
- Preliminary shielding design: 28th June
- Preliminary shielding & Platform: 5th July
- First constructive design, including location of all services: 19th July.
- Constructive design: 2nd August.

# Seismic study

- Seismic study to be done by UPV (JLPA).
- Tentative dead line:  13th September.
- Shielding, services and access to chamber studies can be further improved during the period 2nd August to  13th September.
- Approval of design: 20th September
- Submit to LSC: 27th September.

# Risk Analysis

- LSC requires that we present a risk analysis (RA) of NEXT.
- It is my understanding that shielding and platform construction can progress while we carry on the RA.
- RA should proceed between October 2011 and December 2011, with the goal of seeking LSC approval by the meeting of December 1st.
- RA must be carried out by an external company.

# RA issues

- High Voltages
- N2 flow for radon flushing
- Xenon leaks,  including catastrophic scenarios.
- Earthquake.
- Chamber pressure issues, including catastrophic scenarios.
- Shielding issues, including catastrophic scenarios

# RA coordination

- Three parties:
- LSC (director, LSC safety officer)
- NEXT (spokesperson, TC --theopisti, Liubarsky--)
- RA company

# In-place personnel

- We may need engineers and mechanical technicians often at LSC.
  - From IFIC: Sara Carcel.
  - From Unizar: Juan Castell.
  - Technician from IFIC:  Manolo (mecanico)