

April 30, 2015

Halls A-B-C Cryogenics Discussion

Attendees: J. Creel, A. Freyberger, R. Ganni, J. Gomez, P. Knudsen, W. Oren, L. Wells

Javier sent advance documents in support of this meeting (attached to email):

- Load Vision FY'16 -> FY'19
- Directors Review of Cryogenic Capacity (Oct 2010) (from Arne)

Discussion focused on cryogenic needs for Halls A, B & C for FY16-19. Attendees reviewed the Load Vision spreadsheet showing each hall and target/experiment requirements by FY. All these loads are based on the currently envisioned experimental schedule. Support would come from the existing ESR and any boost available from the CHL. Based on initial 12GeV operational loads for the accelerator, the CHL boost appears to be available for use at the endstations. Discussion of each requirement by hall was completed and the group determined there should be no problem supporting the Halls as planned as long as the ESR doesn't fail and the CHL boost of up to 25grams/sec remains available.

- The cryogenic needs for the Hall C SHMS and the Hall B torus/solenoid are based on current estimates. These values should be checked as this equipment comes on line.
- The possibility of sub-atmospheric operation in Hall B to support the solenoid is still unknown with the design still evolving but would most likely not significantly affect the bottom line requirements.
- The 1200W target in Hall A for FY'19 may need special hardware to adapt to both ESR and CHL cryogenic services. The heat exchanger to recover refrigeration from the QWeak target is still in place. However, the new target plumbing should be coordinated between the target group and the cryo group to be sure that dual cooling streams can be utilized like they were for QWeak. The advantage is that this target will be used with the SBS/Big Hand program which utilizes room temperature magnets.

The Physics near term (FY16-20) cryogenic needs are solved as long as ESR remains operational. The only outstanding question is how to handle an ESR failure. It was asked if the old Standby Refrigerator could be used to provide backup but reconfiguring and moving it to service the endstations was deemed impractical. This effort would be equivalent or more than the effort to install the surplus SSC plant. However, it might be prudent to establish contingency experimental operations plans in case such a failure occurs. It was suggested that we could run Hall D as usual with the other Halls staging experiments that don't require SC magnets or cryogenics targets.

Discussion was also started on the Moller era program. The experiment should be conducted prior to 2021, as the science fades after that. A Director's Review is planned for this year and Javier needs realistic input with respect to cryogenic support costs for that review.

- It was agreed an ESR-2 (SSC surplus) with 1.5kW @15K along with a supplemental target refrigerator of 3.5kW @15K will be needed to support Moller level experiments and multi-hall running.
- While a 3.5kW refrigerator is the preferred solution we should look at other options including supplemental boosts from CHL. Establishing what the real need is for the Moller "era" which includes multiple hall support becomes more important as Moller comes closer to reality.
- The current Campus Strategy has ESR-2 planned for a FY17/18 start and a target refrigerator is not currently in the plan.

New Action items:

1. W. Oren: Add target refrigerator to the next revision of the Campus Strategy. This does not replace ESR2 which is still needed.
2. J. Gomez: SBS program – confirm if a 1200W target (ala QWeak) for 2019 is needed
3. J. Gomez: Validate SHMS and Hall B solenoid/torus loads.
4. J. Gomez: Further refine cryogenic needs for the Moller “era” to include multiple hall operations.
5. R. Ganni/J. Creel: Produce an estimated cost “rate” for the Moller transfer by linear foot.
6. R. Ganni/J. Creel: Produce “place holder” estimate for a target refrigerator and associated plumbing for insertion into the Campus Strategy document.

Old Action items:

1. J. Creel: evaluate currently available or soon to be available power and cooling water wrt operating ESR 1 & 2 simultaneously. – **Installed power is sufficient to simultaneously operate ESR 1 & 2. Cooling water is still an outstanding question.**
2. J. Gomez/R. Ent: complete load table for 3 halls for the next 2-3 years. **Complete**
3. J.Gomez/R. Ent: Hall A-B-C work – assess if there are other needs we have not captured. **Completed with “Load Table”**

Next meeting (May 14th at 10:30am, Bldg 89, Conf A) will concentrate on the Moller experiment cryogenic needs.