

Crab Cavities Technical Coordination XXXVIII



Location: 376/1-020
Date: 16th October 2017, week 42
Time: 10h30
Scope: coordination and alignment of tasks involved in the preparation of the cryomodule test, follow up of master plan.

Attendees: Aurelio Berjillos, Rama Calaga, Alick Macpherson, Ofelia Capatina, Marco Garlaschè, Kurt Artoos, Eduardo Cano, Karl Schirm, Giovanna Vandoni, Alejandro Castilla, Krzysztof Brodzinski, Mateusz Sosin, Simon Barriere, Olivier Pirotte, Frank Gerigk, Andrew Lees

Master schedule: EDMS 1747466

Logbook: <http://elogbook.cern.ch/eLogbook/eLogbook.jsp?lgbk=387>

Indico: <https://indico.cern.ch/event/672954/>

Master schedule:

Aurelio presents the last update of the planning. We are currently in step 3 of cryostating. In the presented planning, cryostating would be finished by the 15th of November and the cryomodule would then be moved to M7. Cryogenic preparation and tests would then start the 20th of November until the 13th of December. In this planning, the cryomodule warmup includes weekends as working days.

During warmup, warm helium is introduced in the lines during the warmup process. In order not to pollute the helium lines, warmup should be concluded before SM18 cryogenics stops to work on the 22nd of December. Therefore, all the liquid helium must be removed from the lines by Wednesday the 20th of December. The couplers may then be tested by E. Montesinos during the Christmas break. Giovanna proposes to test the couplers in week 2 after Christmas, during the stop of the cryogenic system of SM18.

Aurelio confirms that he discussed the cryo dates with Krzysztof. He will send the precise dates to have a clear picture of the cryo planning. The cooldown would start the 4th or 5th of December and, under the constraint of a maximum temperature difference between input and output of 50 K, 14 days are needed to reach 2 K. The 50 K gradient is a requirement from cavity and cryomodule mechanical integrity. At the same time, RF requests a cooldown as fast as possible from 150 K to 300 K. Ofelia asks for a dedicated discussion on the cooldown and the schedule, as there seems to be a mismatch between the presentation and the cryo planning. The cooldown procedure has to be exactly defined.

Marco confirms that they will make an effort to provide the cryomodule the first day it can be received in M7, i.e. the 15th of November. In this regard, Rama suggests that M7 should be ready to receive the cryomodule as soon as possible.

Krzysztof arrives and a discussion on the cryogenics planning takes place. He confirms that the cryo planning was elaborated one year ago and that the quoted durations have not changed since then. He also confirms that the cutting of the jumper lines can be done in January, which provides time for testing before Christmas. Regarding the cooling down of the cavity, Krzysztof mentions that in LHC

cryomodules are cooled down in one day, but the crab cryomodule is a prototype and good practice dictates the 50 K ΔT .

Aurelio presents the main activity blocks. If jumper lines cutting (activity 310) is postponed until January, cryomodule warmup (activity number 311) can be extended until the 21st of December. Also, Aurelio is asked to include an extra activity of “cold tests” in the activity block, with adjustable duration to match the fixed constraint of warm-up finished on the 22nd of December.

Progress on cryostating & Testing plan after jumper welds, in M7 and bunker:

Marco presents the progress on cryostating and the testing plan. He informs that the motorization of the tuner is ongoing. Today (16th of October) the temperature sensors will be installed on the thermal shield and, during the week, the assembly of the warm MLI and the assembly of the coaxial lines and the temperature sensor will take place.

Testing plan for the welds of the jumper has been worked out; it foresees the leak check with pressurization of the cryogenic lines, for localized testing of the welds.

Planning is ok and everything is on schedule.

Update on M7 preparation – report on preparation meetings:

Alick presents the progress on preparation of the M7 bunker. However, the planning presented in the slides is not coherent with Aurelio’s planning and in particular it is not when it comes to the durations of cooldown-warmup.

Alick presents the activities done during last week, which include the water distribution and cable protection, the installation of the He evacuation line, the OBS box and the re-flooring. He confirms that M7 would be ready to receive the cryomodule by the 15th of November. The installation of the valve box would be ready by the 15th of November. Alick wants to know if they can keep V3 cold while the valve box is installed and he receives a positive answer.

Rama asks if there is the possibility of having water and power during the Christmas break and after Christmas. Normally water and power are cut during Christmas break, so they would only have them if there are exceptional requests for RF conditioning during Christmas.

Concerning connection of the jumper, a discussion between Marco and Krzysztof has resulted in MME confirming that they will do the welding and cutting of the jumpers.

Regarding the transport of the cryomodule, the conditions have been worked out. On road transport the acceleration would be the same as that of the LHC dipoles: 0.15g under 20 Hz. The transport configuration to SPS is similar to transport into the bunker. The details of the transport choreography are summarized in the slides.

A discussion on the responsibility of the vacuum group is carried out. A memorandum on the responsibility of VSC and their intervention limits was issued. This document does a priori not concern SM18. Ofelia says that VSC should take care of the insulation vacuum. However, Krzysztof confirms that two weeks ago they said they would not. The key point would be that a representative of vacuum has to confirm pumping and leak test procedures, sign them and check their correct execution. The procedures have to be the same for M7 and SPS. Giovanna asks to have experts of vacuum sitting at

the table when procedures are discussed. Frank recommends to have a VSC representative at the coordination meeting in order to clarify their responsibilities.

Update on cryogenics delivery plan:

Olivier presents the planning, which has been conceived to be ready by the 15th of November. He presents two plans, a “plan A” with the valve box, and a “plan B” without it in case of a late delivery of the valve box. The second plan consists in connecting directly the service module to the service box. There will be a visit next week to Cryodiffusion to check if the valve box will be ready by the 30th of October and subsequently decide for either plan A or B. Olivier is asked why not to choose directly plan B, as it is simpler. Olivier answers that the Valvebox will be fully tested and validated by the supplier so there exist no technical risks but only planning risks: he would keep the baseline if there is no further delay. After the meeting Frank understands from Serge that the valve box will allow a better control and diagnostics of the cool-down and warm-up procedures. Therefore “plan A” is the preferred scenario.

Karl indicates that there are going to be cooling/ventilation interventions in SM18 and that there will be a hole in the wall and, in addition, no heating nor cooling. This could pose a problem, as dirt may come in the area in which the CM assembly takes place. In case there is an uncovered hole, Karl wants to be notified so that he can take action.

Regarding the helium evacuation. As in SPS, the pressure relief devices are on the service box. Olivier is the responsible of the pressure tests. There are evacuation lines of helium in the bunker, however, Krzysztof says that the service box should not be connected to these lines, as the additional pressure drop will lower the evacuated flux. He recommends not to connect the helium relief devices to the evacuation lines. This has to be checked by the responsible of the facility and with Safety, in relation to oxygen deficiency hazard in the bunker. Around 100 liters of liquid helium may be released, 700 times more of gas volume. The exact amount of helium is to be confirmed by Krzysztof.

SPS installation planning and issues:

Giovanna presents the cabler’s work-time scheme and asks for priority in BA6 when they pass the crab cavity zone. She presents a lists of added cables, with the cables for access control and RP RAMSES to be confirmed. The work-time scheme with night shifts permits to limit coactivity, but reduces the duration of the working day for other teams.

Rama says that, as the LHC is starting later, we should be able to recover one more week of full access to the tunnel and delay beam to the SPS. In the 3 weeks of hardware commissioning, there is no access to the zone except for short slots at lunchtime or night. Giovanna will explore the maximal extent of these time slots with the hardware commissioning team and OP.

Krzysztof says that cooldown in parallel with tunnel ongoing installation activities need to be clarified in terms of safety. A safe cryogenic commissioning procedures needs to be worked out.

AOB:

Alick will be meeting with cryo during the week. A meeting on vacuum procedures, equipment and tests, both for M7 and SPS, will be held Thursday with VSC and 4030 vacuum experts.

Next meeting: Monday 23th October 2017

Action list:

General and Planning:

| ID | Action | Who | Opened | Closed | Result, Comment |
|----|---|-------------------|------------|------------|---|
| 49 | Define detailed test sequence of Cryomodule in SM18 | Rama | 27.2.2017 | 16.10.2017 | Presented at the CC Review, Rama elaborates the details with all actors. To be presented at TCC, end Sept |
| 56 | Bottom-up planning of SPS activities for YETS | Giovanna | 8.5.2017 | | In work, deadline: SPS Coordination Meeting |
| 61 | Report on readiness of controls software and hardware | Rama | 30.8.2017 | | With Eric, Philippe, Andy, Luca, in 1-2 months |
| 62 | M7 integration plan and inputs/outputs from/to other groups | Alick | 11.9.2017 | | For the next CCTC on 2 October |
| 63 | Interlocks definition and strategy | Giovanna | 11.9.2017 | | |
| 64 | Cryogenic cooldown before/after Xmas break | Giovanna with CRG | 11.9.2017 | | |
| 67 | Operativity of SM18 during Christmas break | ? | | | |
| 68 | Details and priority of RF tests in SM18 (+SPS) | Rama | | | |
| 69 | Confirmation of the amount of helium to be released | ? | 16.10.2017 | | |

Documentation:

| ID | Action | Who | Opened | Closed | Result, Comment |
|----|--|-------|-----------|--------|--|
| 44 | MTF to be updated with actions on RF conditioning. RF test reports to be placed in correct node. | Carlo | 30.1.2017 | | Input needed by Alick. Karl will follow this up too. Reminder sent by Carlo. |

Space:

| ID | Action | Who | Opened | Closed | Result, Comment |
|----|---|-------------|-----------|------------|---|
| 57 | Follow-up of space in bldg. 2002 | Frank | 8.5.2017 | | B.2002 will be cleared (G. Mcmonagle) before Dec17, for SRF use |
| 65 | New storage space urgently required. Verify availability of bldg. 150 | Frank | 2.10.2017 | 16.10.2017 | No option to store anything |
| 66 | Storage space also needed for the DQW toolings | Frank, Rama | 2.10.2017 | 16.10.2017 | The temporary solution in 162 continues. The material which is there right now can stay. 2002 will be used to store tooling and material as soon as it becomes available. |

Minutes taken by Eduardo and Giovanna