**NPS ERR Report Responses**

**Charge #1**

***Comments:***

* Number of settings presented in the first talk were different from the number of settings shown in the radiation budget tables presented in the second talk.
* It was not clear how the quoted luminosities of 10E38 cm-2 sec-1 for electron runs and 1.5x10E38 cm-2 sec-1 for photon run group experiments were calculated. Neither number can be confirmed from the numbers (beam current and target thicknesses) presented in the radiation budget tables.

***Recommendations:***

* While based on the presented NPS construction schedule and presumed time for installation it is not likely that any of the NPS run groups will be scheduled to run before the fall of 2021, it is recommended to draft a run plan for individual run groups. The order of running of different settings will matter from a radiation point of view as activation of detector components will define the time needed for switching from one setting to another (see also recommendation for Charge 7). This will directly affect beam time scheduling, floor time vs. beam run time. Priorities between the settings of individual experiments must be defined, as possibly longer changeover between settings may not allow running of every setting.

**Charge #2**

***Comments:***

* for 2a (magnet) – Although there are power supplies that can be used for both coils of the magnet, it is advised to identify exactly which power supplies will be used early on. Some of existing (mentioned) power supplies have been reserved for other magnets/experiments

***Recommendations:***

* *for 2a (magnet)* – The test of the magnet in the hall to full current must be scheduled. It will require resources for installation, connecting to the power and LCW. As was discussed at the review it will be a month or more to complete this work. Therefore, it must be scheduled beforehand as with installations and running of the ongoing experiments such test will become challenging.
* *for 2a (magnet)* – Question of the high pressure LCW in the hall was not clear, operating parameters of the magnet must be provided as regulation of the LCW pressure for the magnet will be needed.
* *for 2b (Calorimeter)* – Collaboration has to perform radiation hardness test of dividers and LED, perhaps can be done together with radiation hardness tests of crystals.

**Charge #3**

***Comments:***

* No clear proof to include amplifier with low gain as an active element of the divider was presented.
* Calorimeter has to cover a wide energy range from 0.5 GeV to 7.6 GeV, but the linearity and resolution have been studied only for energies >3 GeV. Studies of performance must be extended to the full energy range.

***Recommendations:***

* Clarify what the threshold energy for individual modules should be for required energy resolution and what the rates of each channel is expected with that thresholds.
* Develop a commissioning plan for the calorimeter.

**Charge #4**

***Comments:***

* The electron experiments will require a polarized beam. It was not clear what will be used to measure the beam polarization, how often. From current run experience, Wein angle setting using presumed value for the beam energy is often incorrect. Depending on the degree of polarization needed, some kind of “spin dance” may be needed to set the Wein angle correct for the optimum polarization transfer.

***Recommendations:***

* Ownership and the controls of the sweeper magnet and the corrector coil are not clearly defined. Procedures, and who and how will control the magnet for safe operations must be provided.

**Charge #5**

***Comments:***

* Responsible groups/individuals are identified for all mission critical jobs. Manpower is adequate, most resources are defined for completion of the project.

***Recommendations:***

* While software tasks for integration of the NPS into Hall-C offline analysis software framework are few and should not take too long to complete, identifying people who will work on these tasks must be done soon.

**Charge #7**

***Comments:***

* RadCon department assistance will probably be needed to conduct/review some of the simulations. This should be coordinated with RCD as soon as possible.
* Final boundary dose estimates should be calculated taking the radiator into account.

***Recommendations:***

* Activation levels should be modeled to evaluate residual dose rate fields. Results of this simulation will help with:
  + decisions on the sequencing of the different configurations
  + final design of sweeping magnet support hardware; if the magnet is in a high radiation area, effort should be given to enhancing the hardware to reduce the amount of hands-on manipulation needed.
  + decisions to apply local shielding at the radiator or elsewhere for ALARA.
* Simulation was done and estimates were calculated for the integrated dose on the crystals. Specific simulations to evaluate the radiation dose to the calorimeter electronics should be conducted.

**Charge #8**

***Comments:***

* As NPS will remain in the Hall C equipment portfolio and may be used by other experiments in the future, it would be advisable to have well defined procedures and prescriptions for performing simulations of charged and neutral particles with the integrated use of simC and of the GEANT4 simulation of the NPS calorimeter.
* Even though the work involved is relatively limited, it is advisable to assign task for the remaining software development tasks and define a timeline to have the work completed by early next year and have sufficient time for tests and possible upgrades before the tools will be needed.
* The GEANT4 simulation of the calorimeter will be crucial to tune the reconstruction algorithms for neutral particles, determine acceptance and efficiency. Any remaining work to tune the simulations make this tool accessible to users should be completed as soon as possible. This will also be crucial to simulate the trigger readout: at this end, full simulation of the pulse shape, fADC sampling and FPGA algorithm will be necessary.

***Recommendations:***

* Define/present a plan for developing software for simulation of the NPS trigger and complete its validation during the NPS calorimeter commissioning

**Charge #9**

***Comments:***

* NPS part is missing from ESAD (just started to implement).
* No RSAD ready yet, but preliminary boundary dose calculations are complete.
* A list of new OSPs has been presented, most are in motion but not complete yet. Having OSPs approved in advance will ensure that no safety issues with running the detector and or performing the task.