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CBETA Commissioning Planning

The commissioning schedule has a portion for scientific plans and a portion for staffing. It can be found at https://docs.google.com/spreadsheets/d/1nP5D4fAEVallq92Z3_CX6nSXcbedaz9gaor77nh7CsE/. People not listed on this plan are generally not expected to be in the control room during a shift.

These documents codify the roles, responsibility, organization, and planning of the commissioning phase of the NYSERDA contract for CBETA. This could guide the planning of post NYSERDA running. The NYSERDA phase of CBETA is a tightly knit collaboration of Brookhaven National Lab and Cornell University. In a possible post-NYSERDA phase of operations the CBETA collaboration could be extended to include additional partners.

To a great extent the commissioning planning required a set of clear definitions of terms so that all can agree on roles and responsibilities, etc.

At CLASSE, safety is paramount and as host of the CBETA accelerator, CLASSE is ultimately responsible for safety of personnel and equipment during the commissioning phase. Safe execution of commissioning has to be cleared with CLASSE leadership, including the radion permit holder and the safety committee, overseen by Cornell University.

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Roles and Responsibilities

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Principle Investigators (PI)

They serve as primary contacts for the project to the outside world. Provide high-level scientific guidance and drive the physics program. PIs set project milestones and the long-term physics goals and approach at the project level (month to month) and supervise the creation of the commissioning schedule. The PIs coordinate the Friday 3pm collaboration meetings where results are disseminated and plans for the next week are made. The Cornell PM will use a section of this meeting to organize support for the upcoming shifts. PIs are responsible for building external collaborations with outside labs and issuing invitations to outside collaborators.

Project Director (PD)

- Works with the Project Manager and Deputy Project Manager to provide overall direction for the project.
- Is the primary project official and contact with NYSERDA and the Oversight Board.
- Provides a monthly financial report and a quarterly project report to the Oversight Board and quarterly reports to NYSERDA and maintains close communication with them.
- Works with PM and DPM to define the WBS structure and to establish intermediate milestones.

- Maintains the database of the project's baseline-design parameters.
- Coordinates with the Oversight Board and the PI's to organize reviews, including negotiating and communicating review scope, charge, dates, and committee membership.

Cornell Project Manager (Cornell-PM)

Beyond the regular PM responsibilities documented in CBETA's Project Management Plan, during commissioning the Cornell-PM (just referred to as PM below) has the following tasks. The collaboration meeting will be moved to Friday 3:00, the first part will be dedicated to discuss rung result, the second part to shift scheduling, covering scientific goals and personnel schedules. The PM will cover the weekly personnel organization in that meeting. The PM also acts as liaison with external collaborators and visitors that help with commissioning. He also helps CBETA-team members from BNL with their commissioning related arrangements. The PM is first point of contact if an operator cannot fill their shift, ensure that adequate shift staffing is available to meet commissioning needs, and tracks vacation and other absences for staff. The PM is responsible for safety regulations during commissioning, that all operators, staff, external collaborators, and visitors must follow. The PM arranges that CBETA team members, outside collaborators, and visitors get appointed appropriately into the CLASSE HR structure, allowing them access to Cornell facilities (i.e.: ID cards for building access) and the CU Learn safety tracking system. The PM assigns safety training requirements and ensures they are up to date. The PM provides reports and updates to the broader CLASSE community through the Tuesday resources meetings and via the CESR operations meeting.

BNL Project Manager (BNL-PM)

- Is responsible for coordinating [TSEs](#) for the technical components provided by BNL. For periods of time where a [TSE](#) from BNL is require in the control room, the BNL-PM will coordinate their visit with the Cornell-PM.
- Manages the execution of the WBS L2 subsystems for which BNL is the lead.
- Validates labor charges at BNL.
- Provides a monthly report that includes cost and schedule information, estimate at completion and milestone status to the PD.
- Work with the CAMs at BNL, the C-AD chief engineer and the C-AD chair to identify BNL staff for commissioning.
- Work with DPM, BNL and CU in maintaining the resource-loaded schedule and budget tracking.
- Ensures the preparation of drawings, specifications, procurement documents, installation and test instructions, and other documents to establish and record the project configuration, including as-built documentation, and makes them available to Cornell in mutually agreed upon formats.
- Enforces the rules in the Project Management Plan for contingency use in cost, scope, and schedule.

Commissioning L2 (L2)

Adam Bartnik is the L2 for commissioning. While he is also one of the lead operators, as L2 he has the additional responsibility (a) of training of new lead operators, (b) of maintaining the training documentation, (c) of administering the entry test for new support operators, (d) for setting administrative machine limits, (e) for seeking safety approval for these limits, (f) maintaining an online

document

https://docs.google.com/spreadsheets/d/1nP5D4fAEVallq92Z3_CX6nSXcbedaz9gaor77nh7CsE/ over the many months of the commissioning phase that is updated weekly with input from PIs, Scientific Coordinators, Lead Operators, and the whole CBETA team, (g) for adequate eLog documentation, (h) calling the daily shift-change meeting at 3:30, (i) giving presentations on CBETA commissioning.

Scientific Coordinator (SC)

Scientific Coordinators are assigned to each scientific problem under analysis. They lay out the scientific plan for the time allotted to their commissioning task. Works with the PM to ensure the right people are in the control room to achieve that scientific program. Often present in the control room and provides continuity from shift to shift during that scientific program. This means that the SC would have a shift that overlaps the day and evening shifts, but may not be there for the entirety of both shifts. Most importantly sets the short time scale approaches to be followed by the operators.

The Scientific Coordinator may or may not be directly involved as lead or support operator. The SC can be from the CBETA team, or could also an external collaborator. The SC needs to have visitor status.

Lead Operator (LO)

A lead operator is highly experienced at operating CBETA and is fully qualified for any CBETA operation. The lead operator has primary control over CBETA, their hands are on the knobs. They must be experienced in all aspects of debugging CBETA and its subsystems. The expectation is that LO requires extensive hands-on experience of many months to gain the background in the practical aspects of running CBETA.

Current Lead Operators (as of October 2018):

1. Adam Bartnik
2. Colwyn Gulliford (close to testing)
3. Nilanjan Banerjee (in training)
4. Jim Crittenden (in training)
5. Kirsten Deitrick (in training)

Support Operator (SO)

The support operator is a partner and in safety terms the second person to the LO. Typically the SO will provide operational support to the LO, and work under their general direction. There may be times were the SO has primary control of CBETA, or they may be focused on scripts, coding, improvements, or data analysis. Often they will be utilizing CBETA-V, the online model, to support the work of the LO. The training requirements for the SO are significantly lower than for the LO, but would include knowledge of most of CBETA subsystems. When two lead operators are shifted at the same time, one would serve as SO, though this distinction is not critical. The SO can be from the CBETA team, or be an external collaborator, as long as they have visitor status and have passed the SO training. The L2 for commissioning administers the SO acceptance exam.

Extensive work as an SO is the path to becoming a lead operator.

Technical Support Expert (TSE)

Technical experts on CBETA subsystem that may be required in the control room, but who are not directly running the accelerator. For example, RF or Cryo experts that are controlling subsystems during operations. They may be required during operations continuously, only for setup, or perhaps for a particular experiment. Hopefully their presence will diminish over time as the operation of their subsystem becomes automatic or integrated into the machine controls.

Examples: Robert Michnoff (BPM), Peter Quigley (RF), Dan Sabol (Cryogenics), Dwight Widger (Safety)

BNL Members of the CBETA Team (BC)

As part of the Cornell-Brookhaven collaboration, CBETA-team members from BNL can fill any role, provided they have received the associated training and examination. Some of the commissioning roles require a significant time commitment. It is estimated that regular control room experience is needed for several month before designation as an LO. However, SO or SC may only need several weeks of preparation and a BC might fill this role regularly.

External Collaborator (EC)

An EC is from an institution that is not part of CBETA. They are at CBETA to perform CBETA driven research. Participation of ECs is coordinated by the PIs and scheduled by the PM. The EC could fill many of the roles above but would primarily be either the SC or SO during their visit.

A short visit by an EC would most likely be in the role of an SC, since they would not have time to become a SO. A longer visit of several weeks would be required to take on the role of an SO. Teams of ECs would be expected to provide people to fill multiple roles. It is expected that each EC would typically contribute several weeks of effort to the CBETA project. This time is considered the minimum to be trained and integrated into the CBETA operations without posing a drawback to operations.

EC may at times function in the role of TSE in situations where they bring pieces of equipment or instrumentation for testing, or they may support and contribute to the local TSE staff.

It is expected that ECs contribute sufficiently to be included in the author list of papers written on work performed during their visit.

Visitor

Being a visitor is a status at CLASSE that one obtains by satisfying several safety and training requirements.

Observer

An observer does not participant in research or commissioning. They are welcome for networking reasons or to encourage them to become ECs in the future. Their primary role is to observe for their own benefit for a short period of time. Observers should be carefully considered and scheduled, since their participation can be a distraction in the control room. Typically the observers contribution would not rise to the level of being included on any papers.

- Observers may not participate in any work, and should not enter controlled areas unaccompanied, including the CBETA control room and the CBETA hall, [LOE](#)
- Observers do need to wear a visitor radiation badge while in the CBETA control room (can be signed out from the CESR operator).
- On their first day at Wilson Lab, observers should fill out a [Short Term Visitor Form](#) and receive basic safety orientation from a knowledgeable collaborator (two emergency exit routes, location of CESR Control Room, fire alarm, fire extinguisher).

(Safety requirements)

Communications and Organization

With a complex organizational structure how the team communicates will be critical. We have two teams of collaborators working over multiple shifts, so how we maintain clear, transparent information flow is essential. Further the collaborators at both BNL and external labs need to be kept informed of the progress and integrated into the commissioning before and after their on-site participation. The plan includes multiple communication channels to allow for different avenues of information.

eLog – Electronic Log Book – we will continue to use the existing eLog system, with the possibility of email updates to selected users. The eLog distribution list is controlled by John Dobbins and the IT group, but can be extended to external collaborators. It currently includes many collaborators from BNL.

Scoreboard – Cornell staff are used to seeing CESR scoreboards around the lab. Traditionally there were scoreboards in hallways and on desktop video monitors. These allowed staff to check the performance of the accelerator at a glance with a 24 hour view of the operation parameters and a short list of other status monitors. We plan to create a website that serves this purpose for remote checking on the status of CBETA and its performance. This website would be publicly accessible.

Collaboration (Physics) Meeting – The weekly collaboration meeting will be shifted to 3pm on Friday to accommodate weekly shift reports and plans. It is broad and open, and it provides general status reports, transmitted via Zoom to external collaborators. This meeting would be open to any interested external collaborators. Generally this meeting will cover:

- (a) Evaluations of previous physics studies, usually schedule by the PIs well ahead of time.
- (b) Update on recent commissioning studies.
- (c) Discussion of operational performance of CBETA during the previous week.
- (d) The scientific portion of the shift schedule are maintained in preliminary form several month ahead of time by the PIs, and they will be updated to the actual studies achieved or planned during this meeting.
- (e) During this meeting an update of the personnel portion of the shift schedule is lead by the C-PM.
- (f) As the primary collaboration meeting, time will be given for reports by external collaborators.

Daily Shift-Change meeting – 3:30pm or 4:00pm daily in the control room. This meeting provides continuity from one shift to the next. It is shared by the LO of the previous shift. All shifted operators for the day will be

expected to attend. It is expected that this meeting is open to relevant [TSE](#) and interested operators that are not shifted, but will not likely be broadcast to others.

Schedules

Daily operations are broken into three shifts.

Start up / Recovery Shift

This early morning shift, from roughly 7:00am-9:00am is intended to perform the routine operations to get the accelerator up and running. This is to maximize the productivity of the day shift staff. For example, this shift would include: unlock control room and turn on lights, turn on laser, turn on pump skids, SLAC Power Supply warm up, perform safety search and secure, set interlocks, turn on gun HVPS and generate beam through the ICM.

The end point of this shift is still under discussion. It could include checking beam with the diagnostics beamline, and storing beam parameters in eLog. Regardless, the shift will end with an eLog stating any issues, drifts, or changes to machine behavior and then control would be turned over to a lead operator.

A CBETA person would be the start-up operator, most activities would be written up on laminated cards so that “anyone could do it” with minimal but specific training. Discussions are underway to clarify that a second person is not required to be physically present for this shift, but that either the CESR or CHESS operator could act as a second cognizant staff person.

Primary Day Shift

The day shift runs from roughly 9:00am – 4:00pm ending with the daily shift-change meeting. The day shift should be used for the most urgent and scientifically relevant topics due to the presence of most [TSE](#) and other expert staff.

Secondary Evening Shift

The evening shift runs from the shift change meeting, i.e. 4:00pm to completion of the day's program. Training will predominantly be done during this shift. Shifts with a reduced need for [TSE](#) will also be scheduled in this shift, for example when large, repetitive series of data are taken.

Outstanding Issues

-- [KirstenDeitrick](#) - 16 Nov 2018

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