Criteria for proceeding with replacement cavity:

A decision to move forward with building a replacement cavity was outlined to AD management. The agreement of AD management and PIP management was to use the following guidance.

As already noted in previous reviews and PIP planning, the need to build a modern warm RF cavity that meets the PIP goals outlined above but also consistent with changes to HEP planning and P5. The decision was made to follow the agreed upon flow diagram. The general idea is to proceed but with options to verify continued alignment and allow for corrections at critical points.

Plan

Continue to develop a perpendicular cavity to be used in a second harmonic role.

As noted above: The use of a perpendicular cavity offers some significant improvement over the parallel designs used in the past and planned upgrades. However, the issues with the perpendicular design and timetable make any decision based upon its success difficult for PIP to follow in a sequential plan and still meet goals and timetable.

Continue with parallel biased cavity design.

Note: The recent knowledge gained over the past 5 years working on the Booster cavity refurbishment allows for improvement with minimal cost. The verification of simulations with actual cavity measurements allow for improvements to a new Booster cavity to proceed with reduced risk and cost.

Timetable with decision points and criteria:

FY17:

Milestones for decision point planning.

Perpendicular 2Nd Harmonic

October 2017:

Completion of prototype perpendicular 2nd harmonic cavity by end of FY17.

January 2018:

Room testing of 2nd harmonic cavity starting in fall of 2017 sand expected to last three months.

April 2018

Positive test results will then allow for installation of 2nd harmonic into Booster beam line for beam testing. Beam tests are expected to take about three months.

Parallel Biased:

Completion of approved drawings by December 2016.

Ordering of long lead item January 2017Completion.

Assembly is expected to begin in early Spring and expected to take three months.

Cavity testing will begin in July and last one month.

Installation into Booster for beam testing. It is uncertain when the summer FY17 shutdown will occur thus impacting this decision point/milestone.

Criteria:

* Does perpendicular cavity meet operational standards: Operational reliability, beam dynamics (power requirements and tuning) and laboratory engineering standards.
* Does parallel cavity meet operational standards: Operational reliability, beam dynamics (power requirements and tuning) and laboratory engineering standards.
* Does the perpendicular cavity allow for development of technology in a time line that fits the laboratory HEP objectives?

1. The first decision point is to proceed to the verification stage of two prototypes; one perpendicular and one parallel.
   1. The previously reviewed replacement specifications as documented in AD doc DB will remain and need to be demonstrated in the prototype testing.
2. The second decision point will occur after testing both styles of biased cavities. It is expected that in approximately one and half years from now both cavities will be in testing phases.
   1. After the testing is complete, a review of an updated RLS, based upon recent experiences, and test results will be done. If it becomes apparent that one of the two designs can't meet the PIP goals, budget and time line then alignment of resources may occur prior to the review.
   2. A decision post review provided by AD management will confirm production of replacement cavities and test results. The fully loaded budget for the task is set at 20M dollars. Any option needs to remain within the allocated funding amount.
   3. A resource generated schedule will be generated for both designs if neither has fallen out as an option.
   4. If both cavities offer a timeline that meets the PIP/Lab’s timeline, then based upon lab resources both in terms of labor and funding a choice shall be made.
      1. Risk needs to be included in cost estimated – as it is expected that a parallel biased route would be significantly lower.
      2. A shortage of OHAP will also need to be included in the decision and if possible names used in the generation of the RLS.