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8-GeV R&D plan for 2004 and 2005

Guidance for the plan - e-mail from B. Kephard of 6/5/03

The R&D items should include:

- 1) R&D necessary to demonstrate feasibility;
- 2) R&D required to produce a credible cost estimate;
- 3) other R&D that would be useful if there were money and people to support it.

We then need a plan for this R&D program with time scale, manpower, and M&S estimates.

I. R&D necessary to demonstrate feasibility

1. It is necessary to release a report on 8-GeV linac design study conducted in 2002 so that future work had a solid base. This work must be completed this year. Required manpower - ???
2. Because the linac make use of the existing accelerating systems, the feasibility of the injector is validated by working experience of SNS linac (ORNL) and TTF (DESY).
3. To be prepared for significant spendings in 2004, some management and organizational work must start this year.
 - make analysis of power distribution system and specify requirement for the system procurement
 - finalize concept of power distribution system

II. R&D required to produce a credible cost estimate

The next R&D tasks can be suggested for FY 2004:

1. To build a prototype of one element of RF power distribution system.
For this purpose it is necessary to procure a fast phase shifter based of specification developed in 2003 (cost estimate was prepared during the 2002 study by A. M. – lead time is 6 months ??). Using one of available at FNAL 805 MHz, 5 MW, 100 μ s klystrons, build a facility for testing the power distribution system. Time scale 1 year
Estimated M&S - \$75 k ???, manpower – 9 mm
Intellectual part of this work can be done by BD while technical help can be provided by TD
2. To explore other ways of building power distribution system (for example using ferroelectrics instead of ferrites). The goal is to contact a vendor that is making an R&D in this field and try to get a prototype. Potential benefits are faster response and absence of pulse magnets (cheaper in fabrication). Timescale of this work is 1 year. In the case of positive results, system testing to be made in 2005.
Estimated M&S - \$50 k, manpower – 3 mm

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Work can be done by TD personnel

3. To start R&D on optimizing input couplers for both SC parts of the linac. Initial stage (RF design) will take about 1 year. In the case of a positive results at this stage, the system must be built and tested in 2005

Estimated M&S - \$25k, - 6 mm

Work can be done by TD personnel

4. Analysis of benefits of increasing the accelerating pulse length from 1 ms to 2 ms.

Estimated manpower - 2 mm

Work can be done by BD personnel

5. Put together a proposal for accelerating sections test stand, including needed infrastructure, RF systems, and CryoSystem.

Estimated manpower - 4 mm

Work can be done by TD and BD personnel

Total for the FY 04 - \$350k

The next R&D tasks can be suggested for FY 2005:

1. To perform testing of power distribution system at specified power, pulse duration, and repetition frequency. ???

Estimated M&S - \$350k, manpower - 12 mm

2. Build and test a prototype of an alternative input coupler

Estimated M&S - \$50k, manpower - 6 mm

3. Negotiate klystron purchase. Build and test a modulator for a klystron

Estimated M&S - \$150k, manpower - 12 mm

Total for the FY 04 - \$800k

4. **If there is money:** Start procurement of a CryoPlant and RF system for the Test Stand, procure 805 MHz and 1.21 GHz klystrons

Estimated spending - TBD in 2004