ATTENDEES

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PRESENTATION

Ring Power Supply Controls
- Sheng Peng

Sheng presented an overview of the proposed Ring Power Supply Controls architecture and its use of a uniform design strategy to meet the control and monitoring requirements for all power supplies. There are over 250 power supplies included in the current SNS HEBT, Ring and RTBT design. They can be divided into three main categories according to their control requirements.

- **DC –** These supplies deliver constant current to focusing and steering magnets. The current values are relatively fixed and are subject to only occasional minor adjustments for a given beam energy. Most of the supplies fit into this category. Control architecture for these supplies is based on the standard Power Supply Controller (PSC) and Power Supply Interface (PSI). No additional components are necessary.
- **Injector –** There are a total of eight supplies that control the beam injection phase. They deliver current pulses with peaks of approximately 2000 A, and ramp times in the order of one millisecond. The shape of the ramp must be programmable in order to achieve optimum phase space distribution of the injected proton population. In addition to the PSC/PSI base control architecture mentioned above, these supplies require a programmable function generator to shape the ramp, and a digital oscilloscope to monitor the shape. The proposed design calls for a 12-bit function generator with a clock rate of 10 MHz and a 10-bit sampling oscilloscope with 1 Meg/second sample rate.
- **Extractor –** Beam extraction uses a fast kicker system consisting of eight ferrite core magnets, each driven by a fast current pulse with a peak of approximately 2800 A and a risetime less than 200 nanoseconds. Each magnet is driven by a pulse-forming network that is first charged from a high-voltage supply, then discharged through a thyratron tube to form the pulse. The power supplies must be capable of charging the network within 12 milliseconds, at the 60 Hz machine repetition rate. In addition to the base control architecture, a digital

oscilloscope with at least 8-bit accuracy and 200 Meg/second sample rate is required to monitor the pulse shape.