A 10-GeV, 5-MW Pulsed Proton Source for a Spallation Source and a Muon Collider*, Y.-C. CHAE, Y. CHO, E. CROSBIE, K. HARKAY, D. HORAN, R. KUSTOM, E. LESSNER, W. MCDOWELL, D. MCGHEE, H. MOE, R. NIELSEN, G. NOREK, K. PETERSON, K. THOMPSON, M. WHITE, ANL - A design study of a 5-MW pulsed proton source based on a 10-GeV rapid cycling synchrotron (RCS) has been completed. The RCS operates at a 30 Hz repetition rate. A 2-GeV, 1-MW RCS described elsewhere in these proceedings becomes, with a minor modification, a booster synchrotron. Two bunches from the booster are transferred into waiting buckets in the 10-GeV ring using single turn extraction. Proton source performance requirements for a 5-MW spallation source are identical to requirements for a 2-TeV on 2-TeV muon collider with a luminosity of 10^{35} cm^{-2} sec^{-1} except for the bunch length at extraction. The muon collider requires an rms bunch length of 3 nsec while there is no bunch length requirement for the neutron source. The short bunch length just prior to extraction can be obtained by means of a special rf system. Details of the design study are presented.

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