AbstractID: 7547 Title: A Periodic Machine QA Program for Proton Therapy

Purpose: To systematically investigate the contents and frequencies of periodic proton therapy system (PTS) quality assurance tests

Method and Materials: With the recent and planned opening of multiple new proton therapy centers in the US, experiences on a complete periodic QA program for PTS are urgently needed to ensure the safe and accurate delivery of this advanced radiation therapy technique. There has been no literature in this aspect for proton therapy. A PTS is a complex radiotherapy machine, with design and controls significantly different from conventional LINACs. We have established such a program, including daily, weekly, and monthly QA tests, based on our experiences of the past 6 months of proton therapy system QA and treatment delivery. This program incorporates fundamental concepts recommended by the AAPM TG40 report, and adapts them to our particular PTS.

Results: Our periodic QA tests have demonstrated high consistency and reproducibility of PTS performance, in the areas of dosimetry, localization system, safety systems, and mechanical systems. These tests have identified two system component failures/degradations that may significantly impact treatment delivery accuracy.

Conclusion: A program of periodic QA tests for PTS allows confidence in its highly accurate and reproducible performance, and serves to identify either system failures or performance degradation.