

AbstractID: 8323 Title: An overview of comprehensive proton machine quality assurance at the University of Texas M.D. Anderson Cancer Center

Purpose: Since the publication of ICRU-59, there has not been any dedicated report constitute to proton therapy machine quality assurance (QA). We present a comprehensive machine QA program that is implemented at the proton therapy center in Houston (PTC-H).

Method and Material: PTC-Hus es a Hitachi proton therapy machine for treatment of cancer patients. The machine consists of a synchrotron accelerator that delivers proton beams in range of 70-250 MeV to three gantries and one fixed beam rooms. The majority of the QA procedures are based on the AAPM TG-40. Specific tests include mechanical, beam quality, dose delivery system, imaging system tests, safety interlock checks and information flow to the Electronic Medical Record. Frequency of these tests depends on many factors such as safety requirements, availability of the treatment rooms, state regulations, consistency, and reproducibility.

Results: Analysis of our results for many tests for a period of one year will be presented. The dose outputs remained stable within 1%, Spread Out Bragg Peaks widths and proton ranges were consistently within 1-mm, the flatness/symmetry remained stable within 2%, gantry/treatment couch isocentricity were found to be within 1°, and mechanical limits were within 1-mm. Periodic issues with information flow have been discovered.

Conclusion: We have developed a comprehensive machine QA program at PTC-H. The QA program was gradually and cautiously developed at the beginning with numerous frequencies. It is hoped that by sharing our experiences in developing such a QA program, we will provide an insight to upcoming new facilities for proton therapy to establish their program.