

## AbstractID: 8630 Title: Comparison Between Siemens Standard MV-CBCT and the Investigational Imaging Beam-Line MV-CBCT

**Purpose:** To compare the image quality and dose delivered between the standard Siemens MV-CBCT and an investigational Imaging Beam Line.

**Methods and Materials:** Several MV-CBCT images of a heterogeneity phantom were acquired using the standard 6MV treatment beam on a Siemens Oncor machine. Subsequently, modifications were made to the linear accelerator. The major modifications consisted of replacing the Tungsten target with Carbon, removing the flattening filter and decreasing the beam energy by 25%. The modified imaging beam line (IBL) replaced the highest energy electron treatment beam. Additional MV-CBCT images were acquired with the IBL. The 6MV beam and IBL were modeled in the treatment planning system and ion chamber measurements were made to ensure proper dose calculations.

**Results:** Standard MV-CBCTs with isocenter doses of 9.1, 4.9, 3.0, and 1.1cGy were acquired for the 30cm diameter heterogeneity phantom. A 6.1cGy standard MV-CBCT was acquired for an 18cm diameter heterogeneity phantom. IBL MV-CBCTs with isocenter doses of 2.2, 1.8, 1.3, 0.9, and 0.4 cGy were acquired for the 30cm diameter phantom. An IBL MV-CBCT image of 0.6, 1.2, and 3.0cGy was acquired for the 18cm phantom. The contrast and signal to noise ratio (SNR) of the 9.1cGy standard MV-CBCT is similar to the 2.2cGy IBL MV-CBCT for the 30cm phantom. For the 18cm phantom, the 6.1cGy standard MV-CBCT and 1.2cGy IBL MV-CBCT have similar contrast and SNR.

**Conclusion:** The IBL produces a similar CBCT image quality to the standard method with a reduction in dose by at least a factor of four to five.

**Conflict of Interest:** Supported in part by Siemens Medical USA.