Purpose: The number of cone beam techniques available on LINACs and the large variation of dose with position means that a large number of measurements would be required to perform the annual QA as recommended by TG142. We evaluate the accuracy of a more efficient method of measuring the imaging dose of cone beam scanning modes using optically stimulated luminescent (OSL) (Microdot, Landauer) dosimeters.

Methods: Special inserts were constructed to hold OSL dosimeters at the 5 standard points of measurement (1 central, 4 peripheral) of a commercial CT dose phantom. The phantom was loaded with OSLs and scanned for each of four cone beam modes: two half-fan modes (pelvis, low dose thorax) and two full fan modes (head, pelvis spot-light). KVP and mAs settings were at default values, the head technique used 100KVP, the others used 125 KVP. All scans were then re-measured using a 0.6cc ion chamber positioned at the same points. Ion chamber and OSL results were compared. A single calibration point, the measurement with the highest dose, was used to convert the readout to cGy.

Results: Doses measured by the ion chamber varied from 0.17 cGy to 4.6 cGy. The correspondence between the PMT reading and the chamber reading (RADCAL 9096) was linear, the correlation coefficient being 0.996. The average absolute difference between the chamber and the OSL dose was 0.13 cGy.

Conclusions: The use of OSLs was found to be of sufficient accuracy to permit their use for the annual QA recommended by TG 142. The number of scans required for a comprehensive set of dose measurements for 4 scans modes and five measurement points was reduced from 20 to 5, including a single calibration scan. This is a significant reduction in the time needed for TG 142 QA.