The examination of the dosimetry of Varian’s enhanced dynamic wedge along the gradient direction of the wedge and the quantification of off-axis enhanced-dynamic-wedge factors (OA-EDWF) was studied. The convolution algorithm implemented by the treatment planning system, will over estimate the enhanced-dynamic-wedge (EDW) factors for points further away from the central axis of the wedged beam. This overestimation will result in an inaccurate dose administered to the patient. Quantification of the OA-EDWF’s were then measured by a 2D-diode array at 5 cm, 10 cm, 15 cm, and 20 cm using water phantoms. Wedge angles of 15°, 25°, 30°, 45°, and 60° were examined at each depth using the 21iX with incident photon energies of 6 MV and 18 MV.

The clinically useful range then of the EDW is 26 cm, where the percent difference is in a tolerable range of within a few percent. It can be concluded that any dose calculation calculated by the TPS, involving an EDWF on the periphery of a wedged beam, must be subjected to scrutiny.

These results were then compared to the convolution algorithm results with the same setup parameters by calculating percent differences. These percent differences were greatest at the periphery of the wedged field where the penumbra of the wedge was present, making the last
2 cm of the EDW to be clinically unacceptable. The clinically useful range then of the EDW is 26 cm, where the percent difference is in a tolerable range of within a few percent.

It can be concluded that any dose calculation calculated by the TPS, involving an EDWF on the periphery of a wedged beam, must be subjected to scrutiny.