Purpose:The goal is to demonstrate mathematically and experimentally an efficient Enhanced Dynamic Wedge (EDW) treatment planning system (TPS) commissioning using the PINNACE TPS; only open and 60degree EDW data are required for beam modeling.

Methods:A mathematical relationship is given in the Varian user manual in which the MU of a field consisting of both open and 60degree EDW beams can be converted to the MU for a different angle EDW field. TomoDose (Sun Nuclear Corp) was used to measure EDW profiles. The open-field PDDs, profiles and output factors(OFs) were measured using an ion chamber in water and EDW profiles were measured using TomoDose in solid water at 5 depths for all field sizes (FSs)up to 30×(20,10)cm2 for 6/16MV.Only open and 60degree EDW PDDs, profiles and OFs were imported to the TPS for the EDW commissioning. Measured and calculated PDDs, profiles and wedge factors (WFs) for the other 6 EDW angles were compared.

Results:The time needed to measure the commissioning data (open PDDs and profiles and 60degree EDW profiles) was approximately 3hrs. To validate replacement of the EDW PDDs with the open-field PDDs, maximum differences between the open and EDW PDDs were 0.6%.For the majority of the EDWs and FS geometries, differences between measured and computed PDDs were within 2%; for cross profiles, differences between measured (TomoDose and ion chamber) and computed values were<1%within the field,<2%outside the field except for 30×(20,10)cm2and<3%/3mm in the penumbra region. The WF differences were<1% for all FS and EDW angles.

Conclusions:TomoDose measurements for the EDW agreed well with the ion chamber data. This commissioning procedure greatly reduces routine quality assurance workload and time. Our results demonstrate theoretically and practically the superiority of the diode array device in the commissioning and only the 60degree EDW beam is commissioned in the TPS instead of all 7 EDW beams.