

Code of practice: Create a verification plan for OCTAVIUS in Varian Eclipse

Varian RapidArc™ Radiotherapy Technology

1. Generating the RapidArc dose calculation on the OCTAVIUS phantom

There are two different ways of obtaining a dose calculation from a patient plan on the Octavius phantom:

1) If the plan has been generated for a patient on the Eclipse database that is also being used for QA (typically the clinical situation...), the easiest way to generate the phantom dose is by selecting the 'Create verification plan' option from the 'Planning' menu.

The effective point of measurement is in the center of the chamber. 7.5 mm under the surface of the array, 160 mm from the top of the OCTAVIUS phantom.

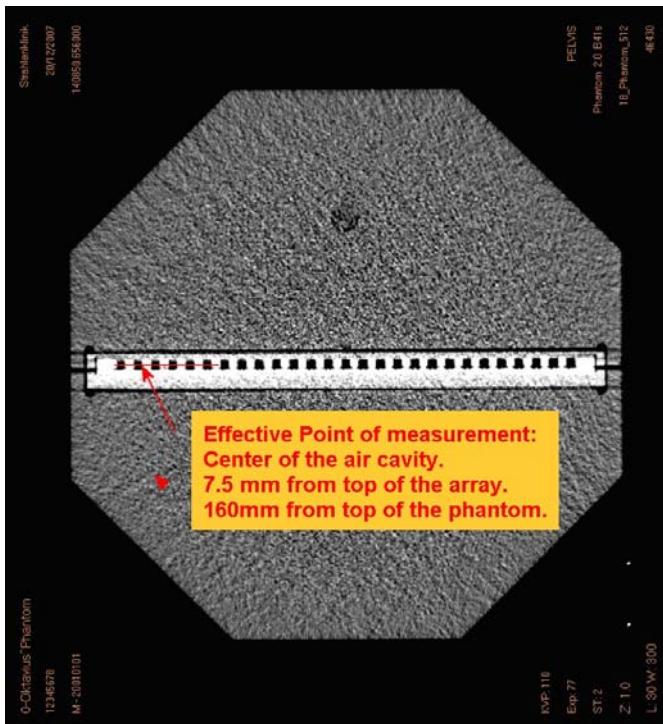


Fig. 1: Effective point of measurement

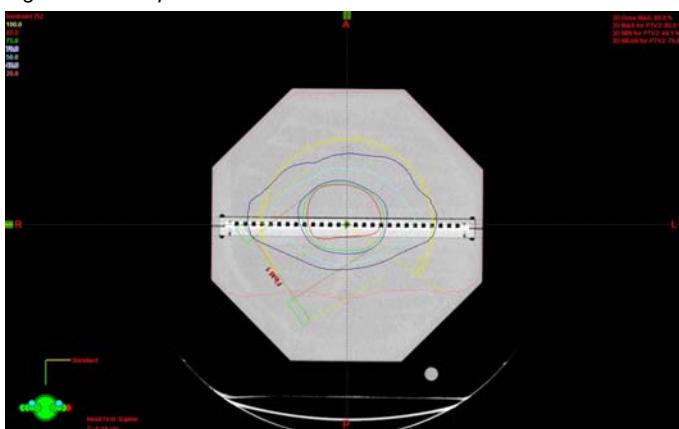


Fig. 2: Phantom plan

The couch could have a strong influence on the measurement and should be taken into account for the planning.

2) If the RapidArc plan has been generated on an external Eclipse and has been transferred to the used Eclipse through dicom RTplan export (typical the research or demo situation...), the easiest solution consists of importing the RapidArc plan within the Octavius patient. This is done as follows: open the patient containing the Octavius CT scan. Then import the RTplan into this patient. Assign the Octavius CT to this plan, set the isocenter and calculate the dose. When you calculate the dose, do this by selecting the 'Calculate dose with fixed MU' and make sure you set the correct MU (i.e., the amount of MUs you use during the measurement. Normally, these MUs should be filled out automatically when you immediately select the 'Calculate dose with fixed MU' option before performing any other dose calculation).

(You can not import the same RTplan twice, so if you also want the plan calculated on e.g. the vertical array position, the easiest way is to make a verification plan on whichever Octavius CT you want after having imported it on e.g. the horizontal position first...)

2. Exporting the dose plane for comparison between calculation and measurement

=> Make sure you have the plane you want to export in the active view in the Eclipse field setup view.. The easiest way to make sure is by maximizing this planar view.

=> Export the dose plane (right click on the 'Dose' icon: 'Export Dose plane...')

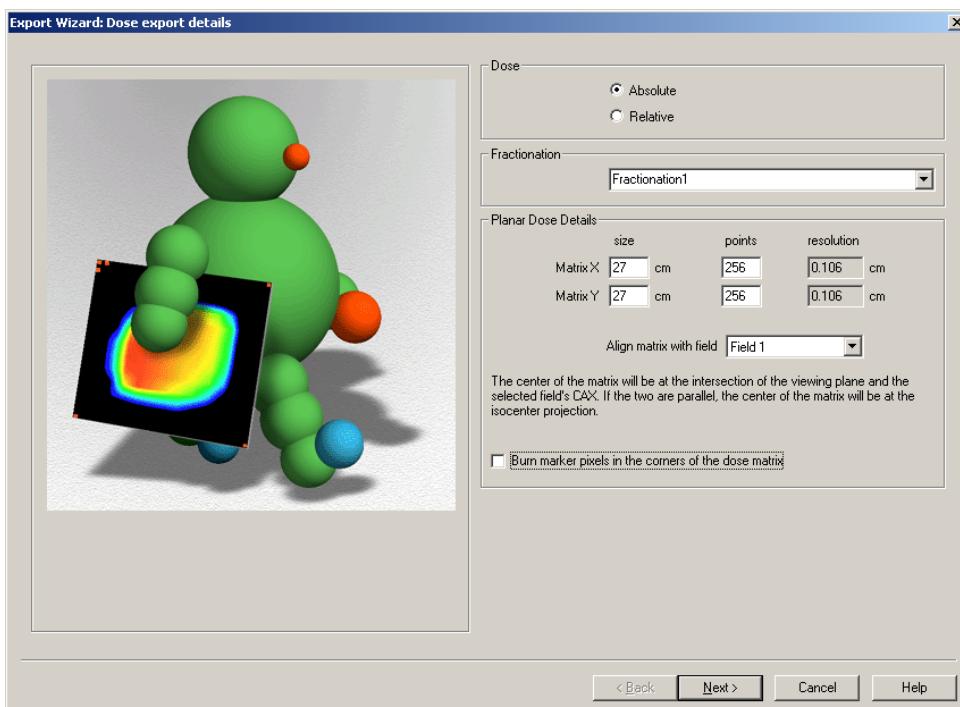


Fig. 3: Export dose plan from Eclipse

⇒ set the parameters typically as above.

Attention:

Make sure you untag the 'Burn marker pixel in the corners of the dose matrix' option. It is tagged by default. It puts a very high pixel value in the corner of the exported image, probably for orientation purposes.

=> Next

=> select the Dicom Media File export filter you prefer

=> with the image file highlighted, select 'Change for selected objects', then choose a nice location for your exported dose matrix and give it a sensible name as well (e.g. 'Field 1' instead of 46.352.71.265.007.5648524552145452145521145871.dcm')

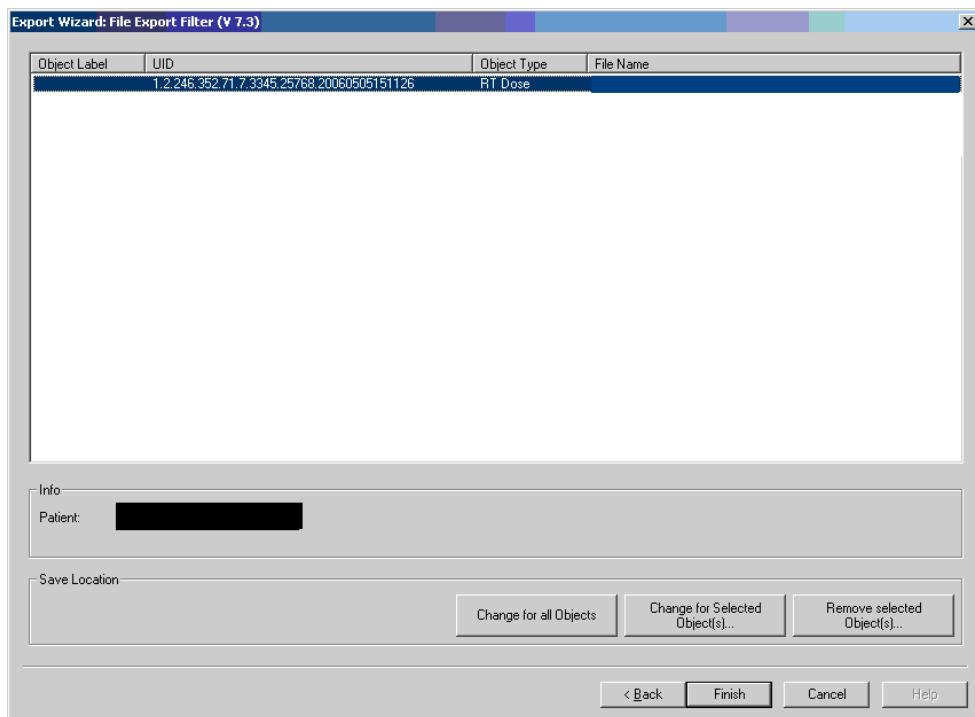


Fig. 4: Export wizard

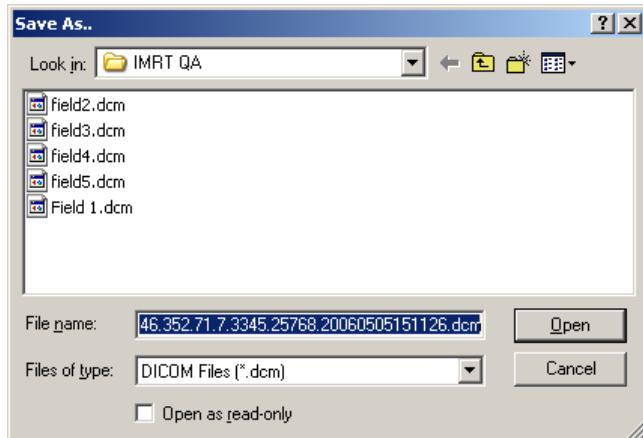


Fig. 5: Save data

2. Preparing the phantom QA setup for delivery

Set up the phantom at SID 100 cm using the laser lines on the phantom.

Prepare a simple check for yourself and for the machine:

In Eclipse, calculate the amount of MUs needed to deliver 1 Gy to the central ion chamber of the array with a static 10x10 field (e.g. gantry 0 for horizontal Octavius, gantry 90 for the vertical Octavius), for the same Octavius setup (e.g. 84 cm for isocentric setup) as used during the measurement. This setup can be used as a check for your setup and for your correction factors. Moreover, by simply using this 10x10 reference field as a cross-calibration, you easily correct for k_Q , k_{TP} and daily output fluctuations, all at the same time.

If you don't want to go through Varis (e.g. if you plan on delivering the fields a few times without wanting to schedule them multiple times, or without having to worry about reference points...), you can deliver the plan through DICOM import.

3. Measure the dose with the PTW 2D-ARRAY seven29

4. Analyze the data in VeriSoft

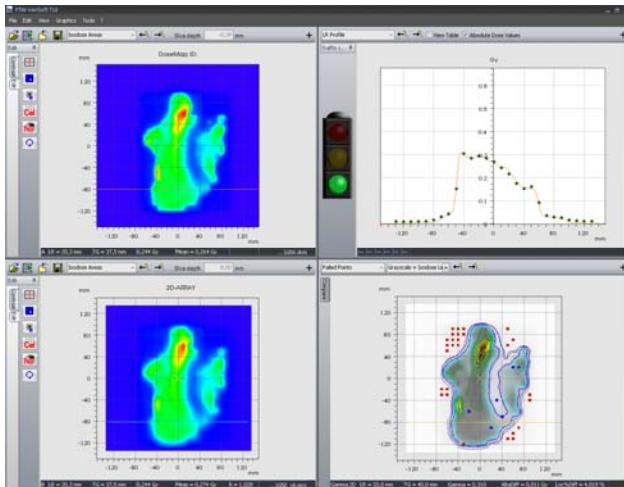


Fig.: 6 VeriSoft, Profil analysis

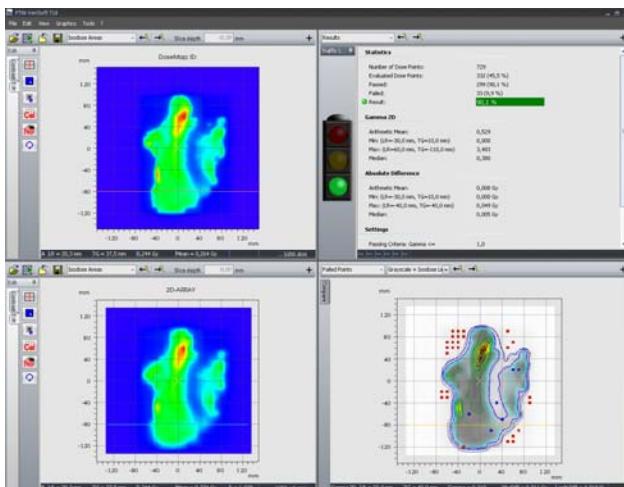


Fig. 7: VeriSoft Result

Thank you to Ann van Esch from 7Sigma, Belgium, who provided this information.

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