

## Lung Brachytherapy Reference Cases

Institution: \_\_\_\_\_

Address: \_\_\_\_\_

Person Completing This Benchmark: \_\_\_\_\_

Telephone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Please calculate isodose distributions for the two cases described below. Sources should be the model 6711  $^{125}\text{I}$  seeds from Oncura that comply with the AAPM prerequisites – see <http://rpc.mdanderson.org>), with source strength specified at the beginning of the implant. Do the calculations as you would do them clinically using the TG-43 dosimetry, detailing any assumptions necessary. The first reference case shall be submitted in hard copy format. The second reference case must be submitted digitally as DICOM RT.

**Case 1:** A single seed, strength 0.635 U ( $\mu\text{Gy m}^2 \text{ h}^{-1}$ ): If your software allows and you use a line source approximation, calculate both in the longitudinal and mid-transverse planes of the seed. Please submit isodose lines from 0.2 to 100 Gy. (Lines 0.2, 0.5, 1, 5, 10, 50, & 100 Gy are preferred.)

### Dosimetry Calculations:

Write below the equation that will be used for hand calculating the instantaneous dose-rate to an arbitrary point from a single seed in the TG-43 formalism. (If possible give notations used by your treatment planning computer). The intent is for you to be able to verify that the values of various parameters in your treatment planning system are the same as in TG-43.

Define the variables in the equation:

For each seed model used to treat patients on this protocol, submit the data used by your treatment planning computer for the following parameters:

- Dose rate constant ( $\Lambda$ )
- Anisotropy function ( $\phi$ ) and/or factors
- Radial dose function
- The units of  $S_K$  are : \_\_\_\_\_
- Do your  $^{125}\text{I}$  dose calculations agree with TG-43 to within  $\pm 5\%$  from 5-70 mm? Yes  No

**Case 2:**

A CT scan of a patient who has undergone a sublobar resection with lung brachytherapy is provided for this reference case. The scan is in DICOM format and may be downloaded from the ATC website <http://atc.wustl.edu/>. The CT scan shall be entered into your treatment planning system and planned as you would a patient on the trial in which you are participating. The target volumes shall be drawn on the CT scan by the radiation oncologist who will be treating patients on this study. Pay particular attention to the delineation of the CTV as the evaluation of this case will take the contouring of the CTV into account.

For this case the mesh technique was used. Forty  $^{125}\text{I}$  sources (model 6711 from Oncura) were implanted, and each source had a strength of 0.762 U (0.60 mCi).

**Institutions are required to submit this reference case in digital format.** Treatment planning data must be submitted as DICOM RT. Digital data shall include planning CT, as well as structure, dose, and plan files. The data may be submitted on a CD or sent electronically via sftp to the ITC. Instructions for digital submissions may be found on the ATC website at <http://atc.wustl.edu/>.

A list of commercial systems that are known to have the capability to export digital data in an acceptable format are listed on the ATC website ([http://atc.wustl.edu/credentialing/atc\\_compliant\\_tps.html](http://atc.wustl.edu/credentialing/atc_compliant_tps.html)).

**Submission Information:**

RTOG and ACOSOG packages are to be submitted to:

Image Guided Therapy QA Center  
4511 Forest Park Avenue, Suite 200  
St. Louis, MO 63108  
Phone: (314) 747-5415  
Fax: (314) 747-5423  
Email: [itc@wustl.edu](mailto:itc@wustl.edu)

Changing to a different treatment planning system requires re-credentialing, with resubmission of the reference cases.

For questions regarding data transfer and other technical issues, please contact the ITC.