

Radiological Characteristics of a Cyclotron Used for Production of ^{18}F

G. Asova, M.S. Yavahchova, N. Goutev, D. Tonev

Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, 72 Tzarigradsko shaussee Blvd., BG-1784 Sofia, Bulgaria

Abstract. The Institute for Nuclear Research and Nuclear Energy is preparing to operate a high-power cyclotron for production of radioisotopes to be used in nuclear medicine. Production of ^{18}F is the first goal of the project.

^{18}F is obtained by bombarding a target filled with water enriched in ^{18}O with protons. The nuclear reaction used is $^{18}\text{O}(p, n)^{18}\text{F}$. During the irradiation with protons strong fields of secondary neutrons and gamma rays are generated around the target. These fields of secondary particles induce nuclear reactions within the target, cyclotron components, beam lines, local shielding of targets, the walls of the cyclotron vault that become radioactive as time goes on.

The aim of the present work is to evaluate the radiological characteristics of the radioactive materials generated during the operation of the facility that are important for daily maintenance and decommissioning in future.

The research has been funded by the Program for Supporting of Young Scientists, Bulgarian Academy of Sciences under contract No. DFNP-52.