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Dismantling case study of the reactor block at the VVR-S nuclear research reactor Magurele, Bucharest

The VVR-S nuclear research reactor owned by Horia Hulubei-National Institute of Physics and Nuclear Engineering (IFIN-HH), has functioned between 1957 and 1997 at a nominal thermal power of 2 MW, using low-enriched nuclear fuel (10%) type EK-10 and highly enriched fuel (36%) type S-36. The VVR-S research reactor served as the basis for experimental research and radioisotope production. On average, the installation functioned 5 days per week at full or variable power. The total thermal energy produced until 1997 was 9.59 GWd. Between 2015-2016 different activities for dismantling the reactor block of the research reactor was carried out. To avoid high exposure at this high risk activity, it was taken into account the maximum hazard event probability from different part of the reactor block including internal parts. The maximum gamma dose was on the high activated automatic control rod at 3 Sv/h because of the stainless steel composition of the lower part and the positioning in the middle of the reactor core. The gamma dose rate varied from 285 mSv/h until 3 Sv/h and goes down again at 1.5 Sv/h. In the same manner, we did not forget about the beta gamma contamination that was very high; the maximum value was around 31.25 k over the background in the cps (count per second) values. We expected ^{90}Sr - ^{90}Y as fission product. We developed a case study where we systematized the steps in dismantling activities on the reactor block respecting the Alara principle.

Biography

Ioan Iorga is working from 2002 in several big projects like ROM 04029, BOA 3J0021 or EMERSYS. He is Senior Researcher in the decommissioning team from the NIPNE-HH Institute in Romania. Under his coordination, the dismantling of radionuclide effluent pipes between the reactor and the treatment plant was successfully completed. He has published more than 8 papers in reputed journals. He is one of main author of the VVR-S Decommissioning Plan. He is from 2013 batch of PhD students at Faculty of Physics, University of Bucharest with thesis on "Studies to Assess Nuclear and Radiological Installation Prior to Decommissioning".

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