DESIGN OF γ-RAY AND NEUTRON AREA MONITORING SYSTEM FOR THE IFMIF/EVEDA ACCELERATOR BUILDING

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International Fusion Materials Irradiation Facility (IFMIF) is an accelerator-based neutron irradiation facility to develop materials for a demonstration fusion reactor next to ITER [1-3]. For this IFMIF construction, Engineering Validation and Engineering Design Activity (EVEDA) have been started. IFMIF/EVEDA prototype accelerator consists of Injector (output energy;100keV), a 175MHz RFQ linac (0.1-5.0MeV), a matching section, the first section of Superconducting RF linac (5.0-9.0MeV), a high energy beam transport line and a beam dump(9MeV-125mA CW), and the acceleration tests by employing the deuteron beam of 125mA are planning at the BA site in Rokkasho, Aomori, Japan. For this purpose, the IFMIF/EVEDA Accelerator Building (Length; 58m, Width; 37m) has been constructed.

In this accelerator building (Fig. 1), an accelerator vault (Inside area; Length; 41.5m, Width; 8.0m) is surrounded by the concrete wall with thickness of 1.5m. For the controlled area (with no possibility of RI contamination), the effective dose rate has to be suppressed to less than 12.5μSv/h with no neutron leakage. For the development of this area monitoring system, neutron spectra by Cu(d,xn) reaction using a 9MeV deuteron beam have been measured. Effective dose rates have been calculated by Monte Carlo code using these experimental data. The design due to Si semiconductors and ionization chamber type γ-ray detector and ^{3}He counters for neutron, which are corresponding to the energy level of effective dose rates, is now in progress.

In this paper, calculating results for effective dose rates and the design of this area monitoring system for γ-ray and neutron will be presented in details.

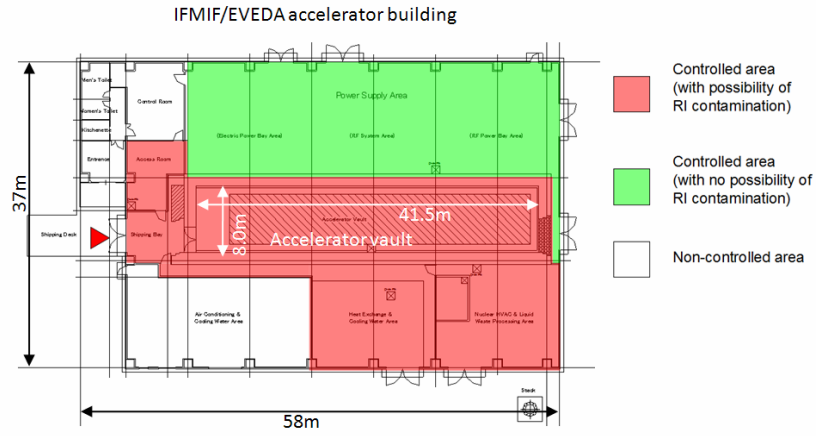

Fig.1 Layout of the IFMIF/EVEDA Accelerator Building

[1] IFMIF-CDA Team (Ed.) M. Martone, "IFMIF Conceptual Design Activity Final Report", *ENEA Frascati Report*, RT/ERG/FUS/96/17 (1996).
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[3]T. E. Shannon et.all., "Conceptual design of the international fusion materials irradiation facility(IFMIF)", *J. of Nucl. Mater.*, 106(1998)