§2. Radiation Monitoring Around the Plasma Heating Devices in Toki Site

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In Toki site, there are two plasma heating experimental devices, NBI (Neutral Beam Injector) and ECH (Electron Cyclotron Heater) which are emitting weak X-rays. Although they are not radiation generators, on operation weak radiation, called the line X-rays which are caused by accelerating electrons bombardment to structural materials, leak out. The energy is less than 200 keV. In July 1995, the ECH started to operate and it was found that weak X-rays were leaked. As one of the countermeasures the ECH device was covered by steel plates. To confirm the effect of the shield, radiation intensity inside and outside the shield were measured with TLD (thermo luminescence dosimeter). Many TLD pellets were set with the same interval on the shielding plates, of which size was 2 m width and 1.5 m height. After the ECH operation of that duty was 1 - 10%, the TLD pellets were moved and measured.

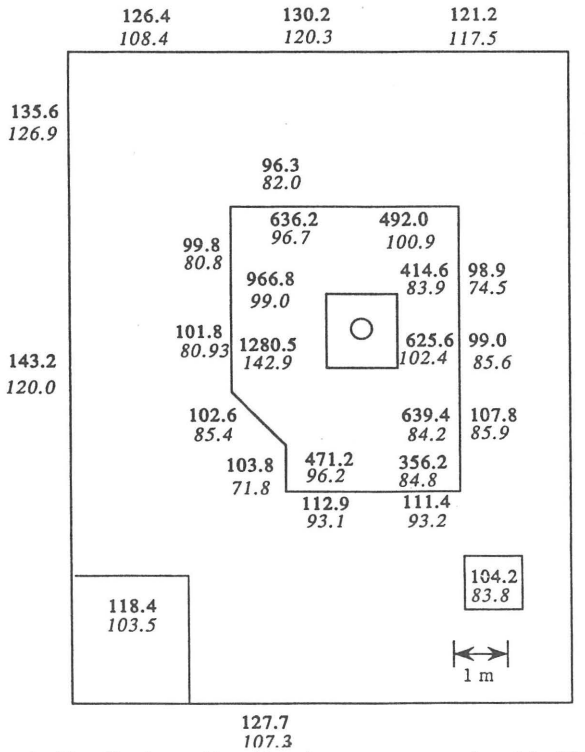

Fig 1 Radiation distribution measured with TLD inside and outside of shielding plates at the ECH. Maximum operation duty; upper data: 10%, lower data: 5%. (unit; mR/y)

The result is shown in Fig. 1. Radiation leak was found in one point, more shield needed to be made. Inside the shield was declared as radiation control area. and entrance of occupational was limited. Results of routine monitoring outside the shield represents constantly background level. At the same time radiation exposure to the occupational participants have not been found.

Shortcomings of the TLD measurement is time consuming, because many TLD pellets are needed to measurement the radiation distribution in large surface area. So we are planning to measure the large surface with a few plate type detectors, called imaging plates.

Weekly routine radiation monitoring has been done also in other buildings, which are large helical experimental building and plasma diagnostics experimental building.

Results of radiation measurement at some representative points are shown in Fig.2. Exposure rates increased when the ECH or the NBI operated. But the background levels at the heating devices experimental building was lower than those of the other two buildings. This difference may be caused by amounts of radioactive materials in concrete of the buildings.

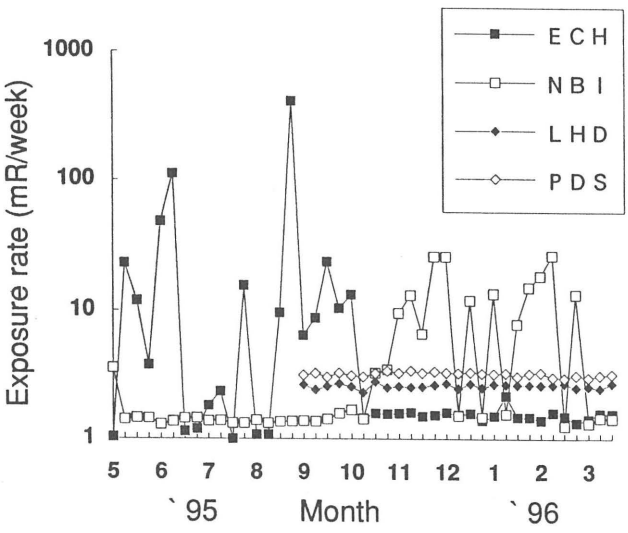

Fig.2 Results of weekly radiation monitoring with TLD in Toki Site. LHD; at the large helical experimental building, PDS; at the diagnostics experimental building.