§1. Background Radiation Levels Observed with RMSAFE

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RMSAFE (Radiation Moniotring System Applicable to Fusion Experiments) is an area-monitoring network system installed in the Toki Site. This is capable of accumulating the burst-like exposures due to plasma experiments as well as observing the continuous background radiation levels. The system has been brought into operation since 1992. Because no significant radiative experimental activities have been carried out as yet, the main interests in this test-run phase are given on the background databsae establishment and the reliability check of the system characteristics.

In the BG Mode of the system operation, signal counts from each monitoring sensor are sampled every 30 sec, and dealt with by a central processor. There are 7 points of observation (Fig. 1) and for the environmental investigations the data from Ar ionization chambers are of main concern.

There are several factors governing the variations of natural background radiations. For the short time period up to a few hours, local climate conditions, such as rainfalls, wind directions and atmospheric temperature profiles, are very important. We have found growths in exposure rates at rainfalls, and also typical diurnal changes in radiation levels to be most likely dependent on the wind and temperature profiles. These may be related with environmental behaviors of radon.

Figure 2 shows the general evolutions of the background radiation levels in the Toki Site from September 1992 through March 1994. Here the biweekly averaged levels, short term variations being omitted, are plotted. A typical statistical deviation of $\pm$ 1 nSv/h should be taken into account. It is seen that there are three classes of radiation levels (a) ~60 nSv/h, (b) ~65 nSv/h and (c) ~70 nSv/h, until the end of 1992, while after June 1993 a fourth level appears:(d) ~75 nSv/h. These levels seem to reflect topographical and geological characters of the observing points. Class (a) represents the levels on the hill ridge, (b) is typical on the roadside area, and points of class (c) are belonging to either the places of land construction or bare rock zone. Remarkable changes to upper classes are seen at IB[(c) to (d)] and WD[(b) to (c)]. As shown with a heavy line in Fig.2, construction of the LHD building (70 x 45 x 40(H) m, concrete wall 2m thick) took place largely in the first half of 1993, and at the same time the infrastructures nearby WD were also constructed. These changes in environmental conditions could cause such growths of radiation levels as to shift their classes.

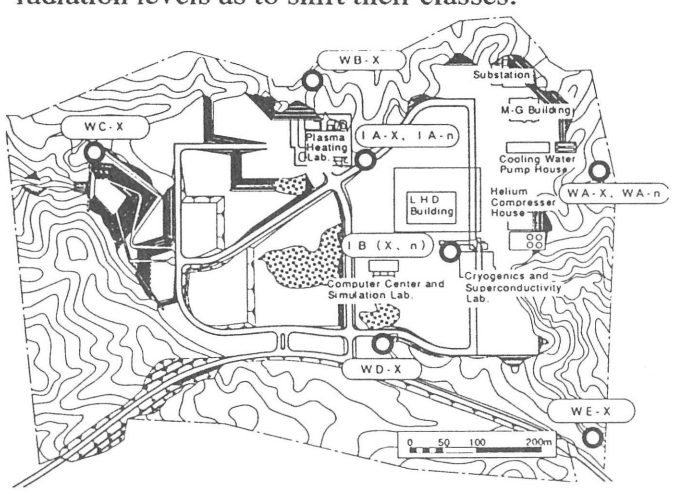

Fig. 1 Monitoring points in Toki Site.

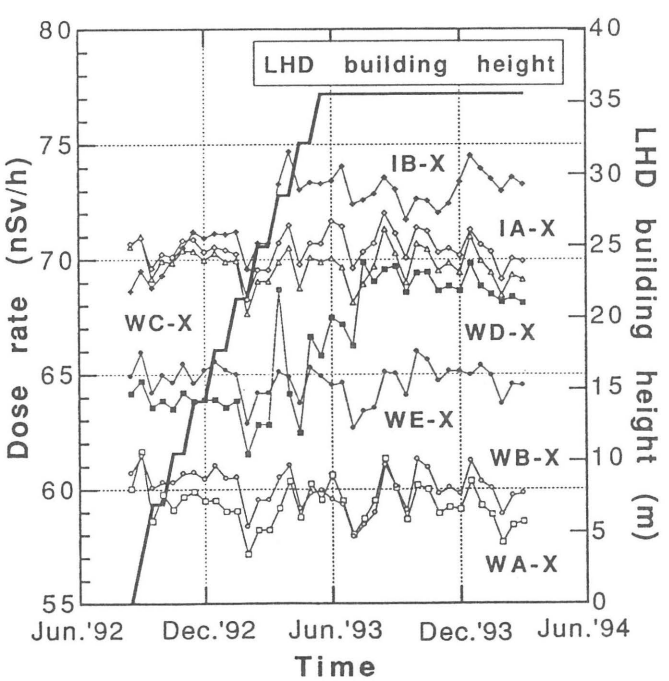

Fig. 2 Background radiation levels in Toki. (Sep. 1992~Mar. 1994) Heavy line shows the LHD building height under construction.