

§1. Radiation Monitoring with RMSAFE

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RMSAFE (Radiation Monitoring 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. Total 45 radiation detectors are now installed at 34 points in Toki site and the experimental buildings. For the environmental investigations, 14 points of monitoring posts are settled as shown in Fig. 1, in which 9 points are at the boundary of the site, and 5 points are near the experimental buildings. In the experimental buildings, we set at 2 points for monitoring the NBI test stand in the plasma heating laboratory, 2 points for the CHS in the R&D laboratory, 16 points in the LHD building. The detectors are selected as pressurized argon ionization chamber or air filled ionization chamber for X-rays, He-3 proportional counter for neutrons. In the BG Mode of the system operation, signal counts from each monitoring sensor are sampled every 30 seconds, and dealt with by a central processor.

The data processing mode of RMSAFE changes to the BURST or the TIME PROFILE mode, when count at one monitor exceed burst detection level. The burst detection level is set by total count per 50 msec. It has been determined for each zone in consideration with the efficiency of the radiation detector and the shielding effect of the building and so on. The burst detection level is 100 nSv / 50 msec in the CHS hall and in the NBI hall, 200 nSv / 50 msec in the LHD hall, 0.3 nSv / 50 msec in the outdoors, respectively. Generally, burst-like radiation is detected with the monitors

in the experimental hall. Considering concrete wall shielding, we can detect and evaluate the dose of site boundary less than 0.2 nSv per 10 seconds experiment shot. On the other hand, less than 60 nSv per one shot can be recorded by only outdoor monitors.

The radiation due to NBI experiment was detected by "NBI monitor" and outdoor monitoring points IA and WB. The NBI test stand was operated in August and September. In the relationship between the data of NBI monitor and IA-X monitor, there is a clear correlation between the data of NBI monitor and IA-X. According to the inclination of the regression line, the dose at IA-X is 4 decade lower than NBI monitor. It is suggested the effect of radiation shield by concrete wall and the distance. The annual dose due to NBI operation was resulted as 5 nSv at IA, 2 nSv at WB.

The radiation due to CHS experiment was detected by "CHS monitor" and outdoor monitoring points WN, WB and others. When the X rays were detected by CHS monitor, WN-X monitor also observed the radiation due to experiment. The CHS was operated from April to March. The total number of radiation detection was 87 in this year. The annual dose due to CHS operation was resulted as 44 nSv at WN, 27 nSv at WB. The doses are negligible small in radiation protection.

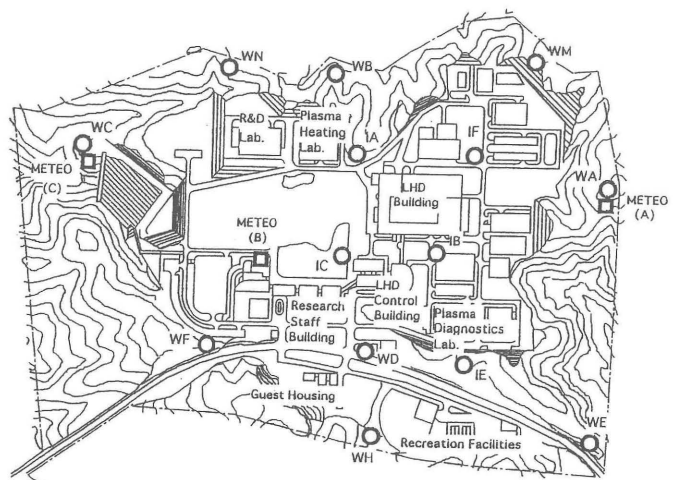


Fig. 1. Points of monitorin observation.