

3.23. RADIATION ENVIRONMENT CONTROL BASED ON GAMMA-LOCATOR REMOTE MEASUREMENTS DATA

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Gamma locator is an automated system of remote radioactive contaminations measurement, designed for radiation environment estimation at hazardous facilities, areas of rehabilitation operations for liquidation of temporary radioactive waste storages, atomic energy facilities etc. This system is also can be used for radiation environment monitoring at these facilities and their premises. Application of remote measurement methods decreases radiation exposure on personnel providing radiation control of the above mentioned facilities, since it eliminates the necessity for personnel to be present inside hazardous facilities.

Measurement unit of the Gamma-locator consists of a spectrometric detector with protection and a collimator. The measurement unit is located at the swing unit that provides scanning of the whole surface of a hazardous room. Scanning is performed with a set angular pitch by means of a rotating sensor placed at both ends of the spherical coordinate system – polar and azimuth. The measurement unit is equipped with a video camera that provides video image of an element of an object under evaluation at each angular position of the collimated sensor. In rooms (facilities) with an unknown (incomplete) information on internal structure (e.g. as a result of an emergency situation) the application of the gamma-locator is possible using a laser distance gauge that defines a distance from a surface under evaluation with a certain (angular) orientation of the collimated sensor in the process of measurement. Current data of the swing unit, sensor signals, and video images are transferred to a PC. The whole operation of the system is controlled by a PC with specially designed software that holds a definite script of contamination measurement of a facility.

A radiation dosage rate picture can be reconstructed and evaluation of surface activity of a contamination can be carried out on the basis of contaminated facility scanning results, which is a necessary piece of information for radiation environment evaluation as a whole and further planning and optimization of rehabilitation operations at a hazardous facility [1].

Examples of application of such systems in examination of facilities (IV block of Chernobylskaya NPP) and performance of rehabilitation operations for liquidation of temporary nuclear waste storages are given in the present paper [2].

References

1. **Потапов В.Н., Чесноков А.В., Щербак С.Б.** Расчет распределения мощности эквивалентной дозы на основе данных, полученных с помощью гамма-локатора // Атомная энергия. – 2002. – Т. 92. – Вып. 4. – С. 324 – 332.
2. **Potapov V.N., Kononov N.K., Ivanov O.P. et al.** The system for monitoring of main dose rate sources for application at rehabilitation works / WM'04 Conference, February 29 – March 4, 2004, Tucson, AZ, USA.