

RADIATION CONTROL OF WASTEWATER DURING RADIOLOGICAL RESEARCH IN VIVO BASED ON TC - 99M

Bezdenzhnykh I.V., Bryanskiy K.S.

Scientific director: Bezdenzhnykh I.V., director of department radiation safety tomsk oncology centr

Tomsk polytechnic university, 634050, Russia, Tomsk city, Lenina Avenue, 30

E-mail: i.v.bezdenzhnykh@tomonco.ru

On a based Tomsk regional oncology center in the department of radionuclide diagnostics conducted research using radiopharmaceuticals, in particular solution is used for preparations Tc – 99m, derived from technetium generator.

The use of this isotope is associated with such methods as scintigraphy and single photon emission computed tomography. The decay of Tc - 99m emits gamma - quants with an energy of 140 keV and a 90% relative probability. Half-life is 6.04 hours. Radiopharmaceuticals based on Tc - 99m are open radionuclide sources (ORS). As a consequence, all the requirements of regulatory and technical documentation for working with ORS also apply to radiopharmaceuticals.

Radiation safety (RS), necessary component when conducting radioisotope research. Radiation Safety Measures must be in strict accordance with federal law. Federal law № 3 «about radiation safety of the population» and federal law № 52 «about sanitary and epidemiological welfare of the population » and next regulatory document as «radiation safety standards» 99/09, « basic sanitary rules for radiation safety » 99/10, « sanitary rules for radioactive waste management » 2002, and other [1-6]. The reports of the International Commission on Radiation Protection are taken into account.

in accordance with paragraph 11.3 guidelines 2.6.1.1892 – 04 radiation control in the department of radionuclide diagnostics in depend of volume and characters of working with radiation source must include:

1. Individual dosimetric control of external exposure of personnel;
2. Individual radiometric monitoring of the level of incorporation of radionuclides by personnel in the event of a radiation accident;
3. Measurement of levels of radioactive contamination of working surfaces, clothing and skin of workers;
4. Measurements of the absorbed dose rate of photon and beta radiation at workplaces of staff, and when working with radioactive gases;
5. Measurements of the volumetric activity of radioactive aerosols in the air of the working room;
6. Control over the collection, storage and disposal of solid radioactive waste;
7. Radiometric control of wastewater;
8. Radiometric control of filters ventilation systems.

Of particular interest is the need for radiation monitoring of wastewater. Carrying out such control on the territory of radioisotope laboratories presupposes the presence of an autonomous special sewage system with sewage treatment plants and septic tanks. Equipped with radiometric equipment.

But paragraphs 3.14.5 [3] same document, asserts that for laboratories class II or III allowed output wastewater from the sinks and toilets directly into the domestic sewage. The presence of special sewers with septic tanks in in vivo radionuclide diagnostics units is not required.

The purpose of this work is actualization of guidelines regulatory document [3] for department of radionuclide diagnostics. This work will allow to understand exist a real need for radiation monitoring of wastewater.

The study consisted of measuring power of ambient dose equivalent from the sewer drain pipe during operation of the radionuclide diagnostics unit and a comparative analysis of the results. And verification of compliance with wastewater safety criteria.

BIBLIOGRAPHY

1. Federal law № 3 «about radiation safety of the population» [text], M.: Omega-L, 1997. – 134.
2. Federal law № 52 «about sanitary and epidemiological welfare of the population » [text], M.: Russian newspaper, 1999. – 86.
3. Guidelines 2.6.1.1892 - 04 «Hygienic requirements for ensuring radiation safety during radionuclide diagnostics using radiopharmaceuticals» [text]. – M.: Omega-L, 2004. – 112.