



## THE LIQUIDATION OF LIQUID RADIOACTIVE WASTE ON NUCLEAR MEDICINE DEPARTMENTS

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One of several factors which limits the service of nuclear medicine departments is the liquidation of radiation waste in accordance with environmental protection law. One can release the liquid radioactive waste to the public sewage or to the natural stream only when the following conditions are satisfied:

a) to the public sewage system

$$\sum_{i=1}^n (a_w / l_{pi}) < 1 \quad (1)$$

b) to the natural stream

$$\sum_{i=1}^n (a_w / l_{pi}) < 0.01 \quad (2)$$

where  $a_w$ - specific activity of i-th radionuclide in waste water [Bq/m<sup>3</sup>]

$l_{pi}$ - annual limit of intake of i-th radionuclide by ingestion [Bq].

The condition a) is almost always satisfied for diagnostic nuclear medicine departments, where the dilution with non active trash is common. The waste from the therapeutical applications have to be stored temporarily in decay storages until the radioactive waste is possible to dilute. The storage time depends on the total radioactivity, the volume of waste and also on the amount of the available water for dilution. These factors determine the technical solution of storage spaces, of monitoring of specific activity and also the direct dispersal of liquid wastes.

The most serious problem for Clinic of Nuclear Medicine - NOI - St. Elis. Hosp. - Bratislava is the localization of Clinic in the downtown, inside the hospital area with the dilution water deficit. This department is the only one in Slovak Republic performing therapeutical applications.

To be able to perform the necessary amount of therapies and also to introduce a new therapeutical methods, in 1992 - 1994 the old liquidation waste disposal station /LWDS/ was reconstructed with the aim to satisfy the newest requirements of radiation hygiene.

LWDS is the 5 - floors object partly underground which satisfied the requirements for liquidation of radioactive liquid waste from diagnostic procedures (annually 5000 patients) and also from 200 therapeutical applications annually (15 beds, 720 GBq <sup>131</sup>I). The capacity of LWDS is able to store about 90 m<sup>3</sup> liquid radioactive waste.

Part of the underground spaces are used for the storage of solid radioactive trash.

The liquid waste from Clinic of NM is collected through isolated metal (rustproof, iron) sewage system to the storage with continuous observation of water specific activity. According to the activity, the liquid waste is placed to the 5 decay storages with the volume about 15 m<sup>3</sup>. The sixth one serves for the case of technical accident. When the activity declines, the liquid waste is diluted with non active medical trash to the level which is acceptable by law about radiation hygiene protection. The storage walls are made from Ba - concrete 25 - 50 cm thick which is enough for sufficient protection of operation staff and also for walking around persons.

Double-layer high quality chemical material prevents the water leak and diffusion of radionuclides into the concrete.

Technology consists of cast-iron drains, powerfull slush pumps, operation valves, regulation technology from dosimetric system for continuous monitoring of specific activity , for managing system with powerfull industrial computer.