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Regulatory Approach for Dilute and Disperse or Concentrate and Store of the Patient's Excreta after Iodine Therapy.

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The disposal of the patient excreta containing radionuclides after Iodine therapy needs special consideration. The criteria and options for the selection of appropriate technology for either discharge of liquid radioactive effluents into the sewer system directly or after decay is a very important regulatory decision due to the exposure raised, costs involved, the potential complexity of technical, environmental considerations and avoiding contradiction in cost-benefit balances.

The “delay- stored” and “dilute- disperse” approaches have been investigated. The production source term (P) was used as a computational model by assuming that the production of the patient excreta is constant and continuous over time. The buildup activity ($A(T)$) during a period (T) will depend on the total removal rate (K) which is equal to the physical decay rate and any other removal factor if any. In this case, the buildup activity would be increased up to a certain value and reach equilibrium while the activity concentration is most likely to remain the same if not combined with an additional dilution, and would be substantially decreased when the dilute and disperse approach is applied. The decrease in the activity concentration depends on the dilution volume and hence decreasing in the occupational exposure in the facility. Usually, a large amount of diluted volume is available for direct discharge due to mixing it with other liquid effluent or water streams. By the time the effluent reaches the environment, concentrations of the radionuclides would be reduced to acceptable release levels.

The production rate term is a simple model that can be used to estimate the discharged activity to the final effluent destination as a fraction of the administered activity. The estimated discharged activity and its relevant resulted exposure is mainly depending on the dilution volume. Also, it is easy to obtain and determine the adequacy of the sewage system that can achieve exempted criteria, ensure no radiation risk, and warrant no regulatory concern. Furthermore, it can apply and manage of discharge of low-level liquid radioactive waste generated in other medical activities, educational, research, and Industrial Facilities. In the presence of appropriate sewage infrastructure, it would be better to dilute and disperse the waste activity in a continuous sewage system rather than concentrate and store for decay in order to avoid unnecessary occupational exposure to workers at the facility during the storage period. In addition to reducing the potential of occupational exposure due to contamination also. Moreover, achieve the best cost-benefit balance. The dilute and disperse approach is desirable for managing the patient excreta containing radionuclides since no occupational exposure is raised to workers in the sewer system or treatment plant at no additional costs. In addition, consentient with ICRP and, IAEA recommendation and RPII conclusions where both they recommended that do not require to urine to be stored and no need to provide and install delay tank.

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