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Modeling and assessment of Radioactive Iodine dispersion inside Egyptian Radioisotope Production Facility

Indoor Air Quality (IAQ) is very important topic in any radioisotope production facility. It is mandatory for some operators to be available behind hot cell that produce radioisotope to practice some tasks concerning maintenance, dosimetry and operation. One of these tasks is redundant transferring Radioiodine from cell to quality control lab and vice versa for measurements. Contam3.2 is a simulation model from NIST (National Institute of Standards and Technology) is used to study and predict I131 concentration in air in hot cell and area of operator behind the cell in emergency case. Emergency is described by dropping small amount of I131 on cell floor. The model predicts the elapsed time to remove contaminants by extraction ventilation system to deposit these contaminants in the dedicated filters and protect operators from inhalation. An emergency situation is also studied in case of opening I131 cell door hole (20 cm) by operators to pick the sample for quality control tests. Pressure interference occurs in this situation permitting some Iodine traces to be available in the areas under consideration. Ventilation system is responsible for removing all radioactive contaminants to settle it inside dedicated charcoal filters to clean the area and keeps it in permissible safe limits.

Key words: Contaminants, activity, simulation, air concentration, extraction air, Kinetic Reactions.

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