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

Abstract

Air quality is very important topic in radioisotope production facility. It is mandatory for some operators to be available behind hot cell to practice some activities concerning maintenance and operation. One of these tasks is redundant transferring Radioiodine from cell to QC lab and vice versa for measurements. Contam3.2 is a simulation model from NIST (National Institute of Standards and Technology) is used to 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 for exhaust system to remove contaminants to dedicated filter and protect operator from inhalation. An emergency statue 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 in the area under consideration. Ventilation system is responsible to evacuate and remove all radioactive species 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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