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A Computer Simulation to Assess the Nuclear Material Accountancy System of a MOX Fuel Fabrication Facility

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SimMOX is a computer programme that simulates container histories as they pass through a MOX facility. It performs two parallel calculations:
• the first quantifies the actual movements of material that might be expected to occur, given certain assumptions about, for instance, the accumulation of material and waste, and of their subsequent treatment;
• the second quantifies the same movements on the basis of the operator's perception of the quantities involved; that is, they are based on assumptions about quantities contained in the containers.

Separate skeletal Excel computer programmes are provided, which can be configured to generate further accountancy results based on these two parallel calculations.

SimMOX is flexible in that it makes few assumptions about the order and operational performance of individual activities that might take place at each stage of the process. It is able to do this because its focus is on material flows, and not on the performance of individual processes. Similarly there are no pre-conceptions about the different types of containers that might be involved.

At the macroscopic level, the simulation takes steady operation as its base case i.e. the same quantity of material is deemed to enter and leave the simulated area, over any given period. Transient situations can then be superimposed onto this base scene, by simulating them as operational incidents. A general facility has been incorporated into SimMOX to enable the user to create an 'act of a play' based on a number of operational incidents that have been built into the programme. By doing this a simulation can be constructed that predicts the way the facility would respond to any number of transient activities.

This computer programme can help assess the nuclear material accountancy system of a MOX fuel fabrication facility; for instance the implications of applying NRTA (near real time accountancy).

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