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Design and Implementation of Equipment for Enhanced Safeguards of a Plutonium Storage in a Reprocessing Plant

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The Nuclear Security unit (NUSEC) of the Institute for Transuranium Elements (ITU, JRC) was entrusted by DG ENER to design and implement equipment in order to achieve enhanced safeguards of a plutonium dioxide storage located on the MAGNOX reprocessing plant in Sellafield (UK). Enhanced safeguards must lead to a win-win situation for all parties involved. In this case the DG ENER inspectorate will save inspection time, manpower and future financial resources and the operator will have the right to access its storage without the need for inspector presence.

To reach this goal, while at the same time taking into account current budget constraints, NUSEC developed applications that use equipment commonly used in the safety and security fields but so far have not been used in safeguards. For instance, two laser scanners are used to detect entry/exit events into and out of the store and to provide the necessary information to an algorithm in order to categorize objects/people passing the scanners, e.g. a Fork Lift Truck, a trolley used to bring in PuO₂ containers, a system used for the dispatch of cans, people etc. An RFID reader is used to identify equipment duly authorized to access the store. All PuO₂ containers arriving from the production line must be weighed, identified and measured using gamma and neutron detectors before they can be transferred to the store. For this purpose an Unattended Combined Measurement System (UCMS) was designed and manufactured by the JRC in order to do all verification activities using a single instrument.

This paper describes the design features of the equipment and its implementation with the support of the Sellafield Ltd in the framework of the MAGNOX store project.

Country or International Organization

European Commission - Joint Research Centre

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