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25 years of NRTA as an IAEA Safeguards tool

In order to address large flows and inventories of sensitive nuclear material, Near Real Time Accountancy (NRTA) was introduced in the mid 1990's, as a complementary safeguards verification method for MOX facilities in Japan, and, to a lesser extent, for some fuel fabrication plants.

This move was possible once computational capabilities reached a sufficient level to allow on site calculation prior to inspection. A special expert system associated with Q+E (Database editor) was designed.

Although NMAX (an NRTA program that produced sequential statistical evaluation of the MUF, the operator-inspector difference statistic D and the IMUF) was satisfactory for those facilities, the proprietary aspect of NMAX, the lack of new developments, the ageing Q+E and the concomitant development of new Windows platforms soon rendered it obsolete.

In 1997, it was decided to move to a more integrated replacement of the NMAX software system using Oracle/SQL/PL-SQL, and in 1999, the NRTA software for the two Japanese MOX facilities were redesigned internally by the IAEA.

This move to an integrated software tool (also called NMAX) opened the scope for further development and, for the first time, complex algorithms specific to the Tokai Reprocessing Plant (TRP) could be put in place, taking into account the measurement error covariance matrices associated with the vessel calibrations.

Various developments took place and are still on-going to cover the Rokkasho Reprocessing Plant (RRP) in Japan.

A specific NRTA system was also designed to address the downblending of high enriched uranium associated to the START agreements in the United States.

The experience gained, particularly on specific signatures and ad-hoc algorithms, is presented in detail.

Which "Key Question" does your Abstract address?

TEC3.1

Which alternative "Key Question" does your Abstract address? (if any)

TEC3.4

Topics

TEC3

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