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## Evaluation of a blockchain based nuclear materials accounting platform in Australia

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To explore opportunities in nuclear materials accounting on a shared ledger platform, a blockchain based solution to reporting nuclear materials was developed, and compared to a materials reporting portal on a centralised platform. A blockchain is a type of shared ledger technology, which enables an immutable, objective electronic record to be established by and read by parties who do not necessarily have mutual trust. Detailed encryption key privileges control access to different types of information and simple automated judgements or pre-agreed transactions can be executed automatically through smart contracts. Two inherent features of a blockchain are consistency and immutability of electronic data held between multiple parties, which may improve trust and transparency between licensor/licensees participating in nuclear materials accounting. However, many perceived advantages may actually relate to associated benefits of transitioning paper, or email based reporting practices to electronic, online portal-based solutions, and not directly to the blockchain technology itself. The purpose of the present research was to perform a trial while separating this important confounding factor. Australia has recently transitioned its Nuclear Material Balance Tracking System (NUMBAT) to a new database that allows permit holders to record nuclear material inventory and inventory changes through an online portal. As a centralised platform, NUMBAT provides a useful point of comparison for evaluating the potential of a shared ledger platform. The shared ledger system was built to hold materials-accounting data conforming to Code-10 XML on a permissioned blockchain and, besides the unique features arising from its blockchain file structure and permission control, to otherwise match user requirements of NUMBAT, the centralised solution. This presentation and article will share the results and conclusions of comparative evaluation of the two systems, performed during trials at the University of New South Wales, Sydney, by nuclear safeguards professionals and other nuclear experts.

### Which "Key Question" does your Abstract address?

TEC4.2

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

TEC4.1

### Topics

TEC4

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