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## Using machine learning and natural language processing to enhance uranium mining and milling safeguards

*Tuesday, 6 November 2018 11:14 (7 minutes)*

The recently developed IAEA Content Reification Engine (ICORE) is used to examine open source reporting and utilise machine learning algorithms to help identify indications of undeclared nuclear fuel cycle activities. At present, when observing mining and milling processes, ICORE does not have a discreet discriminator between uranium mining, and other mining processes apart from the obvious terms 'uranium' or 'nuclear'. Therefore, in a in an Australian Safeguards Support Programme project, machine learning can be used to evolve safeguards technologies within the uranium mining and milling fields. This will be through the identification of unique discreet terms that differentiate uranium processes from other mining processes. The intent is to support ICORE through natural language processing rules for mining and milling in support of detecting undeclared nuclear activities.

Advanced analytics through machine learning can support current safeguard mechanisms by improving automation and thus increasing the size of the dataset analysed. However, this analysis is dependent on the quality of the training data sets developed to support the machine in its learning. Therefore, a thorough understanding the language used in the mining sector for uranium mining and milling processes and discriminating this language to the processing of other minerals is required to have the detail to build a natural language processing algorithm.

Australia has approximately one third of the world's recoverable uranium sources and also has a responsible mining sector. Therefore, in bringing together Australian academia, the mining industry, the Australian Safeguards and Non-Proliferation Office (ASNO) and the IAEA, an interrogation of literature, open source documentation and industry engagement can assist in building a solid natural language processing data set to employ within ICORE and support the enhancement of IAEA tools to strengthen safeguards and maintain the peaceful uses of nuclear technologies.

### 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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