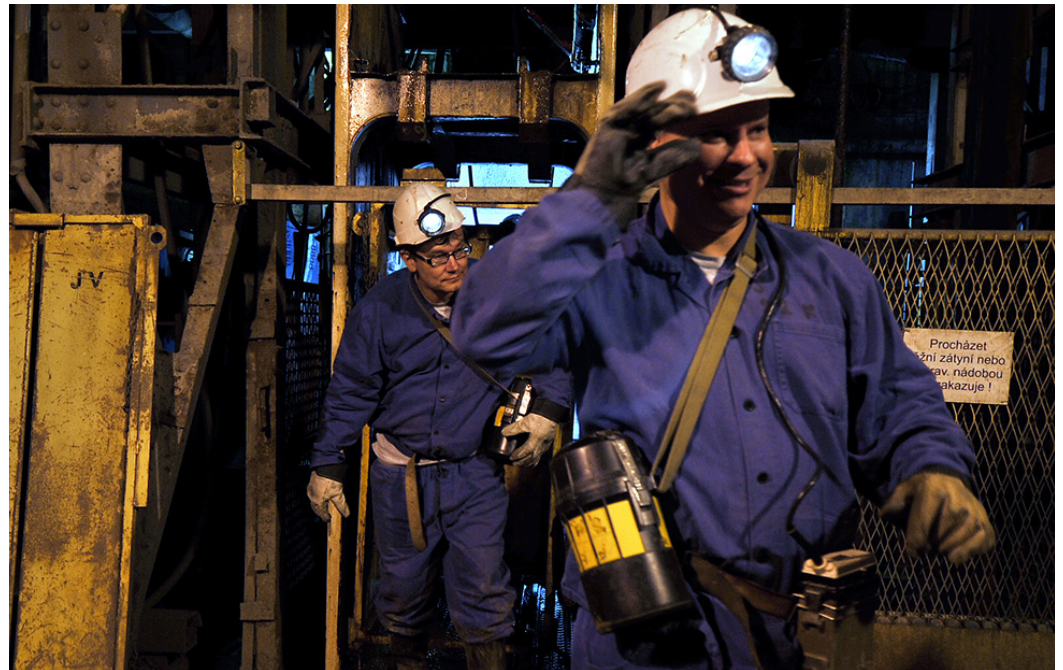


IAEA safeguards at uranium mines provide more complete picture of countries' nuclear activities

By Matt Fisher



IAEA safeguards inspectors visit a uranium mine.

(Photo: D. Calma/IAEA)

IAEA safeguards play an indispensable role in preventing the spread of nuclear weapons by ensuring that nuclear material remains in peaceful use. Uranium mines and milling facilities handle large amounts of uranium; they are subject to IAEA verification in States with additional protocols to their comprehensive safeguards agreements.

“Verification at uranium mines is performed in the context of consistency analysis,” said Russell Leslie, an IAEA safeguards expert. “The information that is obtained during IAEA inspectors’ access to uranium mines and mills is checked against State declarations and compared with all of the other safeguards-relevant information available to the IAEA, including inspection activities in the State, to assure that it is meeting its safeguards obligations.”

States accept safeguards through the conclusion of safeguards agreements. Safeguards inspectors only conduct verification at uranium mines in countries that have brought into force an additional protocol to their comprehensive safeguards

agreement. The additional protocol strengthens the IAEA’s verification capability by introducing additional measures — such as increased information about a State’s nuclear fuel cycle activities and physical access to relevant locations in the State — to improve the effectiveness and efficiency of safeguards. To date, 132 States have an additional protocol in force — including all countries with operational uranium mines.

These countries are obliged to provide the IAEA with expanded information about their activities related to the nuclear fuel cycle and provide access to relevant locations, including uranium mines and uranium and thorium concentration plants. This enables the IAEA to build increased confidence in the peaceful nature of the country’s nuclear programme.

Under the additional protocol, inspectors gather information on the location and operational status of uranium mines and mills and estimate the total annual production capacity of uranium concentration plants. To verify the accuracy of this information, the IAEA may undertake what is known as

complementary access to relevant mines and mills to provide further assurance of the absence of undeclared nuclear material and activities.

“Reasonable estimates of the scale of production are the goal of complementary access,” Leslie said.

In Australia, one of the world’s largest producers of uranium, the IAEA has carried out on average one complementary access to one active uranium mine each year. During a complementary access, national inspectors from the Australian Safeguards and Non-Proliferation Office accompany the IAEA inspectors as they visit the uranium mines and mills. Prior to the inspection, IAEA inspectors are briefed about the mine’s status.

During complementary access at uranium mines and mills, the IAEA inspectors may conduct visual observations, collection of samples, non-destructive analysis and examination of uranium production and shipment records. These activities can be conducted by the IAEA with as little as 24 hours’ notice to national authorities.

Visual observation includes an examination of the mine as well as the plant infrastructure. Sample collection involves taking small amounts of both uranium ore and the processed uranium ore concentrate for analysis, as well as taking environmental

samples, which consist of applying cotton swipes to various surfaces at the mine and sealing them for verification in a laboratory for any traces of illegal activity.

“Analysis of the ore concentrate provides more useful information than analysing the unrefined product, the purity of which can vary widely depending on where in the mine it is taken from,” Leslie said. The ore concentrate provides crucial data important for consistency analysis and for a better overall understanding of a country’s nuclear activities, he added.

Non-destructive analysis is a technique used to analyse the radioactive ‘signature’ of nuclear material, and involves instruments such as gamma detectors. Through this technique, inspectors can confirm on-site the specific nature of nuclear materials found around the mine.

The examination of records, conducted together with the mine’s staff, includes a review of past mining activity as well as information on current operations. Satellite imagery may also be used in the verification process, Leslie said.

In addition to further confirming the absence of undeclared nuclear material and activities, complementary access to uranium mines is used to confirm the status of mines slated for decommissioning or to verify whether a mine is still open and in operation.

Safeguards inspectors visit a uranium storage facility.

(Photo: D. Calma/IAEA)

