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Phosphate Fertilizer and Nuclear Proliferation –Food for thought

Phosphate fertilizers are produced from phosphate rocks that is one of the most mined materials, by quantity, on this planet. Phosphate rocks can contain considerable amounts of accompanying natural uranium that can exceed concentrations found at commercial uranium mines. Recovering uranium from phosphate rocks during fertilizer production is a technically mature process that was used on an industrial scale in the United States and elsewhere before decreasing uranium prices made this practice unprofitable in the 1990s. Soon, technical improvements, potentially rising uranium prices, and anticipated environmental regulations may make uranium extraction from phosphates profitable again in the United States and emerging phosphate rock mining centers in Northern Africa and the Middle East.

On the one hand, extracting uranium during phosphate fertilizer production is desirable in a way that otherwise lost resources are conserved and fertilizers with reduced radiotoxic heavy metal content are produced. On the other hand, phosphate rocks have also been subject to clandestine uranium acquisition for military programs in the past, and it can be argued that the practice is continued by some state and non-state actors to circumvent sanctions or avoid attention from the international community.

Uranium is found in low to medium concentrations in various materials worldwide. In fact, uranium is considered to be more plentiful than antimony, beryllium, cadmium, gold, mercury, silver, or tungsten and is about as abundant as tin, arsenic or molybdenum. Research on uranium extraction from seawater has a long history and once these technologies succeed to become economically viable uranium will be available to any state on non-state actor with a shoreline.

What makes uranium in phosphate rocks unique are (1) the relatively high concentrations that can exceed those of commercially operating uranium mines, (2) the relatively large quantity of uranium found in phosphate rocks globally that exceed half of the presently known commercial uraninum resources and (3) the technical maturity of extracting uranium at commercial scales during wet-phosphoric acid processing for phosphate fertilizer production. The large quantities of phosphoric acid, phosphate rock and phosphate fertilizer traded globally makes imposing controls challenging to say the least and the importance of fertilizers for a countries food security poses equally large challenges on imposing sanctions or otherwise restrict a countries access to phosphate fertilizers.

This work will present a balanced view on the latest discussion about the importance of uranium from phosphates for nuclear proliferation that aims to be the start of a larger international project on this topic.

Gender

State

Germany

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