URANIUM RESOURCE POTENTIAL IN NEW MEXICO

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ABSTRACT

Mineral resources are the naturally occurring concentrations of materials (solids, gas, or liquid) in or on the earth’s crust that can be extracted economically under current or future economic conditions. The mineral-resource potential of an area is the probability or likelihood that a mineral will occur in sufficient quantities so that it can be extracted economically under current or future conditions, including the occurrence of undiscovered concentrations of metals, nonmetals, industrial materials, and energy resources. The mineral-resource potential is not a measure of the quantity of the mineral resources, but is a measure of the level of certainty of occurrence. Facts that could preclude development of the resource, such as the feasibility of extraction, land ownership, accessibility of the minerals, or the cost of exploration, development, production, processing, or marketing, are not considered in assessing the mineral-resource potential. Mineral-resource potential is a qualitative judgement of the probability of the existence of a commodity and is classified as very high, high, moderate, low, or no potential according to the availability of geologic data and relative probability of occurrence.

The evaluation of mineral-resource potential involves a complex process based on geologic analogy and relative probability of occurrence. Very high potential class was added by the senior author to emphasize producing mines, high, moderate, low, or no potential according to the availability of geologic data and relative probability of occurrence. The evaluation of mineral-resource potential is a category reserved for a specific type of resource/commodity in a well-defined area with available information suggesting the level of mineral-resource potential.

DEFINITIONS OF LEVEL OF RESOURCE POTENTIAL

N: No mineral-resource potential is a category reserved for a specific type of resource/commodity in a well-defined area with no evidence of mineral resources. A high level of certainty is implied.
L: Low mineral-resource potential is assigned to areas where geologic, geochronologic, and geophysical characteristics indicate a geologic environment favorable for mineral-resource occurrence. A moderate level of certainty is implied.
M: Moderate mineral-resource potential is assigned to areas where geologic, geochronologic, and geophysical characteristics indicate a geologic environment favorable for mineral-resource occurrence. A high level of certainty is implied.
VH: Very high mineral-resource potential is assigned to areas where geologic, geochronologic, and geophysical characteristics indicate a geologic environment favorable for mineral-resource occurrence. A very high level of certainty is implied.

DEFINITION OF CERTAINTY

A: Available information is adequate for the determination of the level of mineral-resource potential.
B: Low available information is suggestive of the level of mineral-resource potential.
C: Minimal, available information precludes a general conclusion regarding the level of mineral-resource potential.
D: High available information clearly defines the level of mineral-resource potential.

URANIUM PRODUCTION

Uranium production from 1947-2002 by type of deposit from New Mexico (McLemore and Chenoweth, 1989, 2003; production from 1988-2002 estimated by the authors). Type of deposits refers to Table 2 in McLemore and Chenoweth (in press). Total U.S. production from McLemore and Chenoweth (1989) and Energy Information Administration (2010). Production rounded to the nearest 1,000 pounds. There has been no uranium production in New Mexico since 2002.

MINERAL-RESOURCE POTENTIAL FOR URANIUM DEPOSITS IN NEW MEXICO

DEFINITIONS OF LEVEL OF RESOURCE POTENTIAL

URANIUM RESERVES

Specific details on each mining district or prospect area, including mines, are in McLemore (1983) and McLemore (2017).

URANIUM DISTRICTS

Specific details on each mining district or prospect area, including mines, are in McLemore (1983) and McLemore (2017). Deposits with uranium resources in New Mexico (McLemore and Chenoweth, in press). Only major mines and deposits are included here.

REFERENCES


McLemore, V.T. and Chenoweth, W.C., in press, Uranium resources; New Mexico in the Grants district and elsewhere from New Mexico, including: Hack, Steve Raugust, and Amanda Rowe) over the years have aided in compiling and checking uranium occurrences and uranium production data. The first compilation of uranium districts, occurrences, prospects, mills, and mines was funded by the U.S. Department of Energy and the NMBOGR, and released by McLemore (1983). Funding for updating uranium data into a GIS computerized database was provided in part by the U.S. Environmental Protection Agency (McLemore et al., 2001). The New Mexico Bureau of Mines and Mineral Resources funded a mineral resource assessment of New Mexico in 2006-2017. Part of this assessment was also funded by the New Mexico EPSCoR Program, which is funded by the National Science Foundation (NSF) award 1313000.

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SUMMARY

New Mexico has future resource potential for uranium. Sandstone and limestone uranium deposits in New Mexico have played a major role in historical uranium production, and likely will again in the future. Although worldwide, other types of uranium deposits are higher in grade and larger in tonnage, the Grants uranium district has been a significant source of uranium and has the potential to become an important future source, as low-cost technologies, such as in situ recovery and heap leach techniques improve, and as demand for uranium increases, thereby increasing the price of uranium. Some communities, especially the Navajo Nation communities, do not view development of uranium properties as acceptable. Closure plans, including reclamation, must be developed before mining or in situ recovery begins. Modern regulatory costs will add to the cost of producing uranium in the U.S. Currently, all conventional ore must be processed by the White Mesa Mill near Blanding, Utah, or heap leached on site. New infrastructure will need to be built before conventional mining can resume. Authorization to resume in situ recovery and conventional mines and mills will take years to complete. Uranium mining and milling costs will add to the cost of producing uranium in the U.S. Currently, all conventional ore must be processed by the White Mesa Mill near Blanding, Utah, or heap leached on site. New infrastructure will need to be built before conventional mining can resume. Authorization to resume in situ recovery and conventional mines and mills will take years to complete. Uranium deposits in Canada and Australia and the large low-grade deposits in Kazakhstan are sufficient to meet current international demands; however additional resources will be required to meet long-term future requirements.