DECEMBER 7, 2017

TO: **DEMOCRATIC MEMBERS AND STAFF**
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

FROM: **ENERGY AND MINERAL RESOURCES SUBCOMMITTEE STAFF (X5-6065)**

RE: **OVERSIGHT HEARING ON MINERALS AND WITHDRAWALS**

The Subcommittee on Energy and Mineral Resources will hold an oversight hearing on **Tuesday, December 12, 2017, at 2:00 PM, in Longworth House Office Building Room 1324** on, "*Examining Consequences of America's Growing Dependence on Foreign Minerals*."

WITNESSES

Dr. Murray Hitzman
Associate Director, Energy and Minerals
U.S. Geological Survey

Dr. Richard Silberglitt
Senior Physical Scientist
RAND Corporation

Ms. Carletta Tilousi (*minority witness*)
Council Member
Havasupai Tribe

Additional witness expected

BACKGROUND

According to the National Research Council and the Department of Energy, minerals are considered "critical" if they satisfy two conditions: they are at high risk of a potential supply disruption, and they perform essential functions for which there are few if any satisfactory substitutes.[1] Rare-earth elements such as lanthanum and neodymium often fall into this category as they have highly specialized applications but zero domestic production, with over 70 percent of the U.S. supply coming from China. While there has been widespread consensus that developing new critical mineral alternatives and sources should be a national priority, House Republicans have attempted to broaden the definition of "critical minerals" to the point of meaninglessness as a way to speed the permitting of all types of mines, including for common materials such as sand and gravel.[2]

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[1] National Research Council of the National Academies, *Minerals, Critical Minerals, and the U.S. Economy*, http://www.nma.org/pdf/101606_nrc_study.pdf; U.S. Department of Energy, *2011 Critical Materials Strategy*, http://energy.gov/node/349057.

[2] For example, see H.R. 1937 (114th), the National Strategic and Critical Minerals Production Act (Amodei, R-NV), and the dissenting views in H. Rept. 114-253.

Republicans have also used concerns about critical mineral supply to decry mineral withdrawals, one of the few tools available for federal agencies to protect public land from new mining claims. One withdrawal potentially at risk is the 1 million acres around the Grand Canyon put off limits for new uranium mining claims in 2012.

WITHDRAWALS

Under the Mining Law of 1872, which still governs hardrock mining on public lands, all lands are open for the staking of new mining claims unless they are specifically withdrawn by an Act of Congress or an administrative action, typically taken by the Secretary of the Interior under the authority of the Federal Land Policy and Management Act of 1976 (FLPMA).[3] In addition to banning new mining claims, mining operations on existing mining claims in withdrawn areas are only allowed if there has been a discovery of a valuable mineral deposit on the claim.

Section 204 of FLPMA provides the authority and lays out the procedures for making withdrawals.[4] In general, withdrawal proposals are made by the Secretary of the Interior either on his own initiative or at the request of a non-Interior federal land owner and temporarily withdraw the land for up to two years while the Secretary analyzes the proposal. FLPMA allows the Secretary to withdraw land for up to 20 years; for withdrawals greater than 5,000 acres, the Secretary must perform a significant amount of analysis and provide for public involvement before the withdrawal can be made. The Secretary has almost unlimited latitude to withdraw areas smaller than 5,000 acres for up to 20 years, although withdrawals made to protect areas included in legislative proposals can be no longer than 5 years.

The Obama Administration initiated 36 withdrawals covering a total of approximately 2.8 million acres; 26 of those were less than 5,000 acres, and some of the largest were to protect military training areas or base expansions. The large withdrawals by the Obama Administration that have drawn the most criticism from Republicans are:

- 1,006,545 acres around the Grand Canyon to protect the watershed from uranium mining (January 9, 2012);[5]
- 303,900 acres covering 17 solar energy zones in six states (June 27, 2013);[6] and
- 101,022 acres in southwestern Oregon in support of legislation from members of the Oregon delegation (January 13, 2017).[7]

The entire list of withdrawals, including extensions, modifications, and terminations, is available at https://www.blm.gov/programs/lands-and-realty/land-tenure/withdrawals/public-land-orders.

[3] A list of some of the other existing authorities for withdrawing land can be found at 43 C.F.R. Part 2300.
[4] 43 U.S.C. 1714
[5] 77 F.R. 2563
[6] 78 F.R. 40499
[7] 82 F.R. 4415

Grand Canyon Withdrawal

The area around the Grand Canyon saw a considerable amount of mining exploration and some development beginning in the 19th Century, but the mining industry was largely dormant in the region until the discovery of uranium deposits on the South Rim in 1951. The Orphan Mine shipped uranium ore from 1956 through 1969, while other deposits in the region were developed until a uranium price crash in the late 1980s resulted in the remaining operating mines shutting down in the 1990s. A large spike in the price of uranium between 2001 and 2007 led to over 11,000 new mining claims in the area and approvals to reopen several of the mothballed mines, raising concerns about the potential impacts to groundwater, the Colorado River, and Grand Canyon National Park.

In 2008, Ranking Member Grijalva introduced the Grand Canyon Watersheds Protection Act, which would have protected slightly more than 1 million acres around the Grand Canyon from new mining claims as well as oil, gas, and coal leases. The bill received a hearing but did not advance any further. In July 2009, Secretary of the Interior Salazar published a proposal to withdraw roughly the same amount of land,[8] initiating the development of an Environmental Impact Statement (EIS) that led to a decision to withdraw just over 1 million acres from the mining law for 20 years starting in January 2012.[9] The EIS found that even with the withdrawal, a total of 11 uranium mines could be developed in the withdrawal area, including four mines that had approvals predating the withdrawal; in the absence of the withdrawal, it was likely that 30 mines would be developed. The record of decision concluded that the withdrawal was justified in order to ensure the protection of water resources in the area, to ensure sustainable long-term uranium development, to continue to monitor and study the impacts of uranium mining on the Grand Canyon watershed, and to protect the ability of local tribes, including the Havasupai, to continue their traditional uses of the area.[10] The legality of the withdrawal was upheld by the District Court of Arizona following a challenge from a coalition of mining interests,[11] and an appeal is now pending in the 9th Circuit.

While the withdrawal does not block valid uranium claims from being mined, local groups, Indian tribes, and Ranking Member Grijalva continue to fight to protect the Grand Canyon from the impacts of uranium mining. Mr. Grijalva has introduced H.R. 360, the Greater Grand Canyon Heritage National Monument Act, which would create a new national monument on approximately 1.7 million acres north and south of the Grand Canyon, and permanently withdraw that land from new mining claims. The Havasupai Tribe and a number of environmental groups have sued the U.S. Forest Service (USFS) over the approval of the Canyon Mine–a recently reopened uranium mine six miles from the South Rim–based on a 1986 mine plan; the District Court ruled in favor of the USFS, and this case has also been appealed to the 9th Circuit. The broader issue of the withdrawal returned to the news recently when the U.S. Department of Agriculture published its final report on, "Promoting Energy Independence and Economic Growth," under President Trump's Executive Order 13783, on November 1, which

[8] 74 F.R. 35887 (July 21, 2009)
[9] 77 F.R. 2563 (January 18, 2012)
[10] Available at http://bit.ly/2ATX6Yt
[11] *Young et al., v. Salazar et. al.* (D. Ariz; 3:11-cv-08171)

included a recommendation to lift the Grand Canyon withdrawal as a way to promote development of uranium resources.[12]

On September 28, 2017, Chairman Bishop wrote to Secretaries Zinke and Perdue and requested an "expedited" review of "all mineral withdrawals executed in the past eight years to determine those of merit and those whose purpose served only to block appropriate development under FLPMA."[13]

CRITICAL MINERALS

The increasing number of technologies that require critical minerals are generating a rising demand for these materials world-wide. This development has led to concerns over supply disruptions due to a number of issues, including production difficulties and geopolitical issues.

To better understand the minerals that are most critical to the US economy, the National Research Council in 2008[14] sought to identify the most critical minerals based on two parameters:

1) If the mineral performs an essential function for which few or no satisfactory substitutes exist ("importance in use"), and
2) If there is a high probability of its supply being restricted ("supply risk").

Using these parameters, the NRC identified the 6 platinum group metals (platinum, palladium, rhodium, iridium, osmium, and ruthenium), indium, manganese, niobium, and the 15 lanthanide series rare earth elements as being the most critical to the overall U.S. economy. In 2010 and 2011, the Department of Energy (DOE) applied a similar methodology as the NRC, focusing only on clean energy applications, and found that five rare earth elements (dysprosium, europium, neodymium, terbium, and yttrium) were critical, with an additional five elements (cerium, indium, lanthanum, lithium, and tellurium) being near-critical in the short- to mid-term.[15] The NRC also identified copper, iron ore, and construction aggregates as three examples of materials that are essential but not critical due to their low risk of supply disruption.

Supply of Rare Earth Elements

Despite the name, rare earth elements are not particularly rare; however, they are present in such low concentrations throughout the Earth's crust that they are difficult to extract economically. Between 1960 and 1995, most of the global supply of rare earths minerals was mined at Mountain Pass, California. After 1998, Mountain Pass rare earths mineral production declined substantially—due to competition from China and a series of environmental contamination incidents—and closed completely in 2002. Mountain Pass was reopened by Molycorp, Inc., in 2010, but low mineral prices and other operational factors caused Molycorp to declare

[12] U.S. Department of Agriculture, USDA Final Report Pursuant to Executive Order 13783 on Promoting Energy Independence and Economic Growth, available at https://www.fs.fed.us/sites/default/files/eo-13783-usda-final-report-10.11.17.pdf
[13] https://naturalresources.house.gov/uploadedfiles/bishop_letter_on_mineral_withdrawals.pdf
[14] See Reference 1, NAS report
[15] See Reference 1, DOE report

bankruptcy in 2015. Earlier this year the Mountain Pass mine was sold to MP Mine Operations LLC, a consortium that includes the Chinese rare-earth processing company Shenghe Resources Holding Company, Ltd.[16]

In recent decades, the production of rare earth elements has been dominated by China, which in 2010 was responsible for over 95 percent of the world's supply of rare earth oxides (Figure 1). In 2009, China began restricting exports of rare earth minerals, and global prices skyrocketed in response, rising nearly fourfold by 2011 (Figure 2).[17] The U.S. and other countries filed a complaint with the World Trade Organization for the export quotas, and a ruling was made against China in 2014. More recently, rare earths mineral markets have stabilized and prices for some minerals have fallen by as much as 80 percent. Yet while China's dominance of the market has been reduced slightly, it is still responsible for approximately 83 percent of the world's rare earth elements.

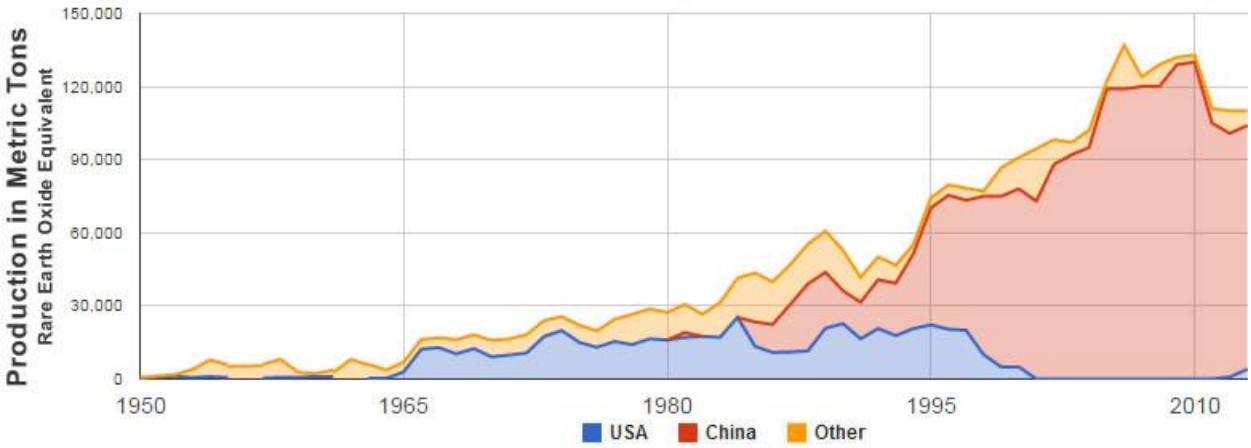

Figure 1. Rare Earth Element Production Trends. Source: Geology.com[18]

[16] P. Brickley, *Mountain Pass Mine Approved for Sale to JHL, QVT, Shenghe*, Wall Street Journal, June 23, 2017.
[17] "Supplies Squeezed, Rare Earth Prices Surge," http://www.nytimes.com/2011/05/03/business/03rare.html
[18] http://geology.com/articles/rare-earth-elements/

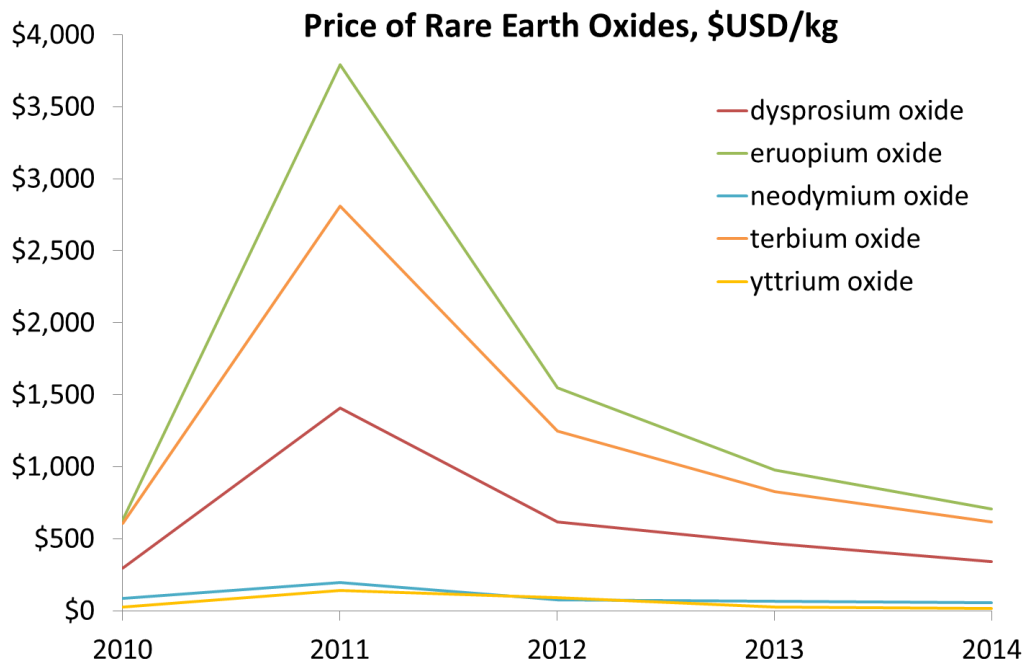

Figure 2. Prices of Select Rare Earth Element Oxides 2010-2014. Data via USGS[19]

In response to the high rare earth element prices and supply concerns, the federal government intensified research into alternative sources and substitutes for these elements. In 2013, the Department of Energy (DOE) founded the Critical Materials Institute, which is focused on diversifying supply, developing substitutes, improving reuse and recycling, and conducting crosscutting research. DOE also conducts a Rare Earth Elements research program from within their Fossil Energy division, funding projects to identify and extract those elements from coal and coal ash. The U.S. Geological Survey, in addition to their traditional mineral surveys, is also looking for alternative sources for rare earths, such as searching old mine tailings for critical minerals that may have been overlooked at the time the ore was processed.

U.S. URANIUM SUPPLY AND PRODUCTION

Although uranium is an important fuel mineral that the U.S. is 89 percent import-dependent on, uranium is not classified as a critical mineral by either the NAS or DOE, in part because world supplies are robust and uranium resources are heavily concentrated in friendly countries: Australia has the largest amount, with 29 percent of identified resources, while Canada has the third largest, with 9 percent.[20] Those two countries provided 44 percent of U.S. uranium imports in 2016, with another 43 percent coming from Kazakhstan (the leading producer in the world), Russia, and Uzbekistan.[21] The remainder came from Brazil, Bulgaria, China, Czech Republic, Germany, Malawi, Namibia, Niger, South Africa, and Ukraine. The U.S. is currently the 9th

[19] 2015 Rare Earths Mineral Commodity Summary, USGS
[20] Nuclear Energy Agency and International Atomic Energy Agency, *Uranium 2016: Resources, Production and Demand*, March 2017.
[21] U.S. Energy Information Administration, *2016 Uranium Marketing Annual Report*, June 2017.

largest producer of uranium in the world, providing approximately 2% of world supplies in 2016.[22]

U.S. uranium production fluctuates significantly with prices. In 2012, U.S. mines produced 4.3 million pounds of U_3O_8 from 12 mines at an average sales price of $52.36 per pound; in 2016, when the price had fallen to $38.22 per pound due to a global oversupply of uranium, production dropped to 2.5 million pounds from 9 mines.[23] Annual purchases by domestic nuclear power plants were 50.6 million pounds in 2016.

From the late 1940s until the early 1980s, the U.S. was the largest uranium producer in the world, partially driven by government subsidies from the U.S. Atomic Energy Commission. Production peaked in 1980 at roughly 43.6 million pounds of U_3O_8 then fell sharply, to just over 11 million pounds by 1985, and continued to trend downwards until 2004, when production hit 878,000 pounds, before rebounding due to higher uranium prices. Most current U.S. production comes from Wyoming and Nebraska, with Wyoming holding roughly 29 percent of U.S. uranium reserves. New Mexico, Utah, Arizona, Colorado, and Texas also have significant uranium resources and histories of uranium production, although the largest known undeveloped uranium deposit in the U.S. is in south-central Virginia.[24]

Uranium mining in the U.S. has left a significant legacy of pollution, particularly in the Navajo Nation, where thousands of abandoned mine and mill sites have contaminated homes and drinking water with high levels of radiation. In 2007 Congress directed the Environmental Protection Agency (EPA) to develop a comprehensive health impacts study and cleanup plan for the Navajo Nation; EPA instead has developed two five-year interagency plans in consultation with the Navajo to address contamination, but not study health impacts..[25] EPA and the Justice Department have been attempting to hold companies accountable for the abandoned mines, with a settlement reached in 2014 to provide nearly $1 billion in cleanup funds and a settlement in January 2017 for over $300 million.[26] Even with these settlements, however, significant funding needs remain.

[22] World Nuclear Association, *World Uranium Mining Production*, July 2017.
[23] U.S. Energy Information Administration, *2016 Domestic Uranium Production Report*, May 2017.
[24] Ref. 20
[25] https://www.epa.gov/navajo-nation-uranium-cleanup/cleaning-abandoned-uranium-mines
[26] https://19january2017snapshot.epa.gov/newsreleases/justice-department-epa-and-navajo-nation-announce-settlement-cleanup-94-abandoned_.html