

**Statement of  
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Before the  
Subcommittee on National Parks, Forests and Public Lands  
and the  
Subcommittee of Water and Power,  
House Natural Resource Committee  
United States House of Representatives**

**April 8, 2010  
Concerning  
Challenges Facing Grand Canyon National Park**

Chairman Grijalva, Chairwoman Napolitano, members of both subcommittees and members of the House at large, thank you for the opportunity to appear before you today to provide my perspective on “Challenges Facing the Grand Canyon”. As a Doctoral graduate of Arizona State University in 1983 I traveled the Grand Canyon and have had extensive opportunity to appreciate its grandeur and beauty. More recently I have traveled the Canyon’s north Rim and inspected many of the recent uranium pipe discoveries as well as mines from previous uranium mining that have been reclaimed. My area of expertise and research is in the development of a national natural resource strategy. I am presenting testimony relative to “The Economic and Strategic Benefits to the United States of America for an Extractive Resource Policy: A Case Study in mining Northern Arizona’s Uranium.”

Arizona’s Palo Verde Nuclear power plant is the largest nuclear generating facility in the United States. It has supplied clean electricity for 4 million customers in Arizona and California for the past 22 years. The plant’s three reactors, completed in 1988, have experienced 85% to 95% availability and annually produced ~3.2 gigawatts of electricity. Palo Verde was originally designed for 5 reactors. Three reactors were eventually built for a total cost of \$5.9 billion. In 2008 the operating cost to produce 1 megawatt of electricity at Palo Verde was 1.33 cents, 50 percent of average energy cost in the U.S. southwest, cheaper than both coal and gas fired electricity - and cleaner than both. The plant employed 2,386 workers during construction and today employs 2,055 directly. Another 3,943 are employed indirectly in the Maricopa County and the Arizona economy. In 2002, for example, the Palo Verde facility contributed \$868 million to the local economy.

In the past 30 years Arizona has been a leader in nuclear energy technology, safety and most important clean energy generation. Each year the Palo Verde “burns” about half a million pounds of uranium fuel to produce its great legacy of energy and wealth creation in the Western U.S. Palo Verde is licensed to produce cheap and carbonless energy through 2026.

In the United States the entire fleet of 104 U.S. reactors uses approximately 55 million pounds of uranium each year. 95 percent of this uranium fuel is imported increasing the U.S. trade and budget deficits by \$2 billion per year at current prices and \$5 billion per year at peak uranium prices. The United States is also becoming more dependent on countries such as Russia, Kazakhstan, Canada and Australia for our critical nuclear fuels.

Arizona’s Uranium Riches are significant. Between 1980 and 1990 the Energy Fuels Company mined uranium ore both north and south of the Grand Canyon. A God-given legacy of a high grade uranium ore resource surrounds Arizona’s Grand Canyon. 88 percent of this energy legacy is already off limits to the mining industry based on the Arizona Wilderness Act of 1983. Prior to the recent Interior Department order 56% of the land in Arizona had been withdrawn from mineral entry. Fortunately the deposition and geology of these remaining (12%) uranium ore resources allow environmentally responsible extraction, subsequent carbonless energy generation and significant job creation in an economically challenged area of Arizona, Utah and the west. Energy Fuels mined 19 million pounds of uranium oxide ( $U_3O_8$ ) from 7 mines in the area (the Arizona Strip) with no discernable environmental impact on region. This is the energy equivalent of 1 billion barrels of oil - \$84 billion dollars that would have been spent with Nigeria, Canada, Mexico, Venezuela or Saudi Arabia. At today’s spot prices the mined uranium would be worth \$1 billion.

The “Arizona Strip,” a land area of 1.7 million acres, immediately north of our meeting today, contains one of the richest uranium resources in the world – and its clean energy benefits belong to the people of the United States and the State of Arizona. Existing known, and as yet unmined, resources of about 20 million pounds of  $U_3O_8$  contained in several “breccia pipes” has been discovered. The pipes contain compact, high-grade uranium mineralization located well above the water table. Individual pipes have been known to contain more than 7 million pounds of  $U_3O_8$  with an average grade of ~ 0.68%  $U_3O_8$  (14 pounds of uranium ore per ton of extracted rock).

The United States boasts the fourth largest uranium resource in the world. The U.S. Geological Survey estimates that 678 million pounds of uranium resource may exist in collapsed breccia pipes in the area. Of this amount 365 million pounds were removed by the Secretary of the Interior's July 2009 order excluding certain Arizona Strip lands from exploration for two years and, pending further study, possibly 20 years.

The USGS estimates that northern Arizona may contain 42% of all U.S. uranium ore. It is the highest grade uranium in the country and the cheapest and easiest to mine. Energy Fuels ore graded .68 percent, about 14 pounds per ton of ore worth \$588 at today's uranium spot price of \$42 per pound. The total cost to produce of one ton of ore is \$355. Therefore this resource is extremely economic and profitable and creates significant value for our state and country.

These pipes are easily mined with an extremely small environmental footprint. Mining each pipe requires a 20 to 25 acre surface footprint – miniscule in terms of modern mining efforts. It is smaller than a Wal-Mart parking lot. The underground mines are accessed with shafts that are 10 feet by 16 feet in diameter. The mines are mined out and completely reclaimed in at most 6 to 8 years. In addition the ore bodies are compact, high grade and located above the water table – so little or no pollution occurs due to water contamination.

In a major study released in February (2010), the USGS reported that they found no elevated uranium in 95% of all drainages on the northern Arizona Strip where these mines had been located. Andrea Alpine, acting director of the Southwest Biological Science Center at U.S. Geological Survey, in Flagstaff summed up the issue,

“We looked at springs and seeps and wells. Ninety-five percent of the 1,000 samples were below the EPA drinking water standard (for uranium) ... We found a few samples that were greater than the drinking water standard. We were unable to discern the source of that. We're going to continue our work to find the source of that.”

Many uranium pipes are exposed in the walls of the Grand Canyon and eroded naturally over millions of years it is possible that anomalous uranium readings are natural in origin, not anthropogenic. The following picture shows a naturally eroded breccia pipe in the wall of the Grand Canyon (Exhibit 1).

The USGS report of February 19, 2010 notes,

“High concentrations may be defined as greater than 20 µg/L; they compose about 5 percent of the observations in the dataset. Some samples with concentrations above this high threshold may be unaffected by anthropogenic (editor: mining) activities and, in fact, reflect natural geochemical conditions favorable to elevated dissolved uranium concentrations.”

More than 2/3 of the anomalous readings appeared to be natural in cause. Only 20 of the 1014 samples were be anomalous in uranium and may be connected with mining and these levels, while exceeding standards, were not significantly higher. This sub sample represents less than 2% of the total sample. Pam Hill of American Clean Energy Resources Trust said.

“The USGS report (editor: September 2009) validates what industry has said all along -- that mining uranium outside the Grand Canyon National Park is not only compatible with protecting the Grand Canyon but is crucial to providing a stable domestic supply of nuclear fuel for our resurgent nuclear power industry The continually improving mining and reclamation practices have proven to be very effective at protecting the environment.”

There are significant benefits to the regional economy of Northern Arizona, surrounding western states and the economy of the United States.

Historically, actual benefits of 10 years of Energy Fuels’ mining uranium-bearing breccia pipes on the Arizona Strip are:

1. Positive local economic impact on employment.
2. Increased domestic energy independence.
3. U.S. deficit reduction.
4. Strategic energy metal production.
5. Reduction in carbon release through nuclear energy and
6. Support for a high tech nuclear industry and development of a domestic mining industry – which we have allowed to decay and gravitate to China, France and the UK.

Today unemployment in the Fredonia / Kanab (Coconino County) area is 12.5 percent - 31 percent higher than the official national average unemployment rate of 9.7%. During the height of uranium exploration and mining between 1977 and 1990, the economy of the region was buoyed by the Energy Fuels’ mining investments. Records from Energy Fuels show

that the company spent \$425 million in direct investment (Wages, -Federal, State and FICA taxes, Severance and Property taxes, exploration acquisition, exploration, operations and reclamation), Typically economists apply a multiplier of two to four times for indirect economic impact in a region. (See Regional Input-Output Modeling System (RIMS II) developed by the Bureau of Economic Analysis (BEA). The 12 year positive regional economic impact in the Kanab / Fredonia area was estimated by Energy Fuels to be \$1.7 billion. If exploration and development of the remaining uranium pipes were actively supported, jobs would be created amongst many of those families who actually worked in the area three decades ago.

A second major research study conducted by Tetra Tech for the American Clean Energy Resources Trust, estimated (2009) that the average annual benefit to the local economy would be \$700 million (each year) from mining the remaining available uranium pipes for the project duration of 42 years. Widespread regional benefits would accrue from mining of the uranium pipes on the strip to neighboring states of Utah, Colorado and New Mexico.

The potential of the discovery and development of this economic, clean domestic fuel source could produce 375 million pounds of uranium which could power the three reactors at Arizona's Palo Verde for 208 years replacing 13.3 billion barrels of crude oil and removing millions of tons of carbon dioxide produced from conventional energy sources such as coal or gas fired power plants.

For example, one pound of  $U_3O_8$  makes ~10 pellets of enriched fuel. One fuel pellet is about twice the size of a pencil eraser. This fuel source is so efficient that one pellet provides as much energy as:

- . 149 gallons of oil,
  - . One ton of coal, or
  - . 17,000 cubic feet of natural gas,
- without any of the increased carbon footprint these fuels emit.

Mining the Arizona Strip lands proposed for withdrawal by the Secretary of the Interior would produce other specific, significant economic benefits to the local area, to Arizona, Colorado, New Mexico and Utah, and nationally:

- . 1,078 new jobs in the project area
- . \$40 million annual payroll impact

- . \$29.4 billion in output impacts over the 42-year life of the project
- . \$2 billion in federal and state corporate income taxes
- . \$168 million in state severance taxes
- . \$9.5 million in claims payments and fees to local governments
- . \$1.6 billion to trucking firms transporting ore
- . 150 jobs at White Mesa Mill in Blanding, Utah, plus indirect jobs.
- . Increased business for regional and national mining support vendors
- . Increased property taxes for local governments
- . Increased state and local sales taxes

Perhaps most important is a growing realization in Washington and throughout the country on the part of everyday Americans that development of traditional domestic fuel sources is necessary in the immediate and foreseeable future as our country moves closer to a renewable energy economy. On April 1, 2010 President Obama said,

“The bottom line is this: Given our energy needs, in order to sustain economic growth, produce jobs and keep our businesses competitive, we’re going to need to harness traditional sources of fuel even as we ramp up production of new sources of renewable, home grown energy”

While the President was referring to opening off shore oil leases for exploration and development, his edict clearly applies even more directly to the potential for development of the uranium resources on the northern Arizona lands that have now been removed from active exploration.

Last January 28<sup>th</sup> the president also endorsed a nuclear energy renaissance in his State of the Union Address. He said:

"But to create more of these clean energy jobs, we need more production, more efficiency and more incentives. And that means building a new generation of safe, clean nuclear power plants in this country. It means making tough decisions about opening new offshore areas for oil and gas development.”

These recent statements by our President are highly significant. If we are to develop more carbon-based energy resources (such as off-shore oil and gas) as an interim measure to a cleaner energy future, and if we are to embrace nuclear energy as a national policy then it follows that we must also develop the domestic fuel sources for that nuclear renaissance just as we drill for new sources of American oil and gas. If these uranium resources may be

extracted with minimal environmental impact (as we have asserted based on recent research by the USGS) then Congress and the Administration must act to allow responsible uranium mining in these recently restricted areas.

A growing number of State leaders and representatives express similar views. Senator Lisa Murkowski (R-Alaska) the ranking member on the Senate Energy and Natural Resources Committee recently presented a Congressional briefing on our pending resource dependence. In her briefing, she focused on clean energy,

“Over the long run, however, our most difficult challenge may be our most fundamental: ensuring a stable supply of the raw materials needed to manufacture clean energy technologies in the first place.”

“According to the U.S. Geological Survey, our nation’s reliance on foreign minerals has “grown significantly” over the past several decades. Last year, we imported more than 50 percent of our supply of 43 different minerals and materials.”

“We’re left with quite a paradox. Even as many political leaders take steps to limit mining, a reliable supply of minerals has become essential to the manufacture of clean energy technologies. If allowed to continue, we will simply trade our current dependence on foreign oil for an equally devastating dependence on foreign minerals.”

“I understand that many people do not want land used for mineral extraction and a wide variety of other purposes. The truth, however, is that those views are both short-sighted and counterproductive. Our standard of living requires us to generate a significant amount of energy, and that energy must be produced somewhere. All resources carry some cost to the environment, whether in carbon content or the raw materials and physical area needed to tap their potential.”

Those with the most at stake perhaps are the citizens of the western states. Governors of Arizona, Utah and Virginia support the development of responsible uranium mining in their respective states. On October 30, 2009 Arizona’s Governor Janice Brewer wrote to the Secretary of the Interior decrying the ruling to remove almost 1 million acres of Arizona land from exploration. She noted the excellent safety record of the industry and said,

“In terms of the economic impact of uranium mining on federal in northern Arizona, we estimate that the industry will generate more than \$10 billion to the local economy over the life of these mines. This will include hundreds of jobs in a rural economy that desperately needs employment ... Finally I must urge the Department to consider national security and energy independence as an additional basis to vacate the proposed withdrawal of lands for uranium mining. Arizona and the United States have a tremendous national security resource in Northern Arizona ... A secure domestic supply of uranium is a crucial element for continued use of this energy resource ... to remove this source of energy forces our nation to rely more heavily on foreign nations to meet growing energy needs.

Utah’s Governor Gary Herbert also commented on the Interior Secretary’s withdrawal of the land from uranium exploration. Governor Herbert said,

“As you know, according to the United States Geological Survey, it is estimated that geological formations in northern Arizona contain nearly 42% of the nation’s undiscovered uranium. The regulatory tools are available to protect the land and environmental resources while allowing the nation’s need for uranium to be satisfied. Wholesale withdrawal of these lands for an extended period of time is an overreaction to the nature of uranium mining in the area. Additionally, I respectfully ask that you consider the economic benefits that responsible mining can provide to the area, including the residents of Utah. The industry can provide stable good paying jobs for many years. The proposed plan for the development of the mines envisions phase developed throughout many years thereby keeping the threat of boom and bust cycle to a minimum. Mining will properly diversify the local economies building stability in partnership with in partnership with tourism. Other businesses such as trucking, materials production and the nearby uranium mills will also benefit.”

There is a strong and growing realization in the United States that much more is at stake in this decision regarding the historic and beautiful Grand Canyon and its bountiful uranium legacy. President Obama believes, as do I, that Nuclear energy must play a key role in our clean energy future. That seems clear. It is also becoming very apparent that we have the uranium fuel in this country to displace the purchase of foreign energy sources and hence reduce our staggering trade and budget deficits, our public debt load and our long-standing dependence on unreliable foreign supply of critical commodities.

What we desperately need in this country is a fair extractive resource policy based on the Mining Law of 1872. It must recognize that all our natural resources are key to our future; that we are becoming increasingly unable to issue debt to buy natural resources from other commodity-rich countries. Resource nationalism is growing everywhere globally. Emerging economies see the need to provide their citizens with a better standard of living. As a result the worldwide market demand for uranium used in power generation which was 114 million pounds in 2008 is expected to rise to 170 million pounds by 2030, with a total of an additional 599 million pounds required over the next 22 years to supply this increased quality of life. Uranium from the Arizona Strip can provide up to 50% of this additional global demand.

In the past decade we have been the recipient of uranium fuel from decommissioned and recycled Russian nuclear warheads. By 2013 it is unlikely that Russia will renew this energy fuel transfer agreement. Last week Russia's president Putin visited Venezuela to sign protocols to assist that country in developing nuclear energy. The United States must also develop a national extractive resource policy that removes our susceptibility to possibly hostile supply disruptions, promotes natural resource development and preserves the environment.

The exploration and mining activities on the Arizona strip were sanctioned by the Mining Law of 1872 and reaffirmed by the Arizona Wilderness Act of 1983. Any company that has mined, or is in the process of finding and developing these uranium pipes, has satisfied numerous regulatory requirements in addition to those of the Mining Law of 1872 and expended significant resources for the betterment of our country's energy independence. The estimated uranium on the Arizona Strip could supply the 18.86 million people in New York, Los Angeles, Chicago, Houston and Phoenix clean electricity for 25 years. Northern Arizona's resources are a significant and increasingly critical natural resource indeed.

In conclusion, I am honored to have had the opportunity to speak to you today on the important geopolitical and economic issues of the withdrawal of the aforementioned land packages from mineral development. This concludes my prepared statement, and I would be pleased to answer any questions you may have.

Table 1: Northern Arizona Uranium– 18.86 million people could be supplied electricity for 25 years with the uranium held in the withdrawn lands

City	Population	Annual usage (kWh)	Potential Yrs Electricity from No.AZ Uranium
New York	8,363,710	105,160,542,151	57
Los Angeles	3,833,995	48,206,476,887	124
Chicago	2,853,114	35,873,435,958	167
Houston	2,242,193	28,192,062,074	213
Phoenix	1,567,924	19,714,186,395	304
<b>All five cities:</b>	<b>18,860,936</b>	237,146,703,465	<b>25</b>

Exhibit 1: A Naturally Eroded Breccia Pipe in the Wall of the Grand Canyon

