Northern Arizona Proposed Withdrawal Draft Environmental Impact Statement

Comments By Gregory Yount

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Chapter 3

Page 3-5 Table 3.1-1 3.3 Geology and Mineral Resources

Issue: Depletion of uranium resources

Mining these uranium deposits in the near future depletes domestic resources that may be needed later for energy production or national security purposes.

The U.S. Government has all the uranium and plutonium that it desires for national security purposes and by treaty must down blend some of it and turn it into fuel for nuclear power plants. Therefore, the uranium in the withdrawal area is not needed for national security purposes. The U.S. imports nearly all of our uranium now, so saving in ground domestic supplies for later doesn't make too much sense when the goal is to become energy independent now.

Page 3-9 Table 3.1-1

3.13 Wilderness Resources

This resource category should not be used in this EIS. The Arizona Wilderness Act of 1984 at part (d) says:

The Congress does not intend that designation of wilderness areas in the State of Arizona lead to the creation of protective perimeters or buffer zones around each wilderness area. The fact that nonwilderness activities or uses can be seen or heard from areas within a wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area.

This section of the law indicates that activities outside the wilderness area are not to be used as affects on the wilderness area that requires some protective act. This DEIS is supposing that there might be effects from the mining of uranium for which the wilderness area will need to be protected from. This is in opposition to the Arizona Wilderness Act of 1984 and the sections and references in this DEIS and final EIS that pertain to Wilderness affects should be deleted in whole.

Section 3.2 Air Quality

Table 3.2-4 seems to be incomplete. The Kayenta Coal Mine should be included.
PM10 value is 1,396 tpy. Other pollution emissions of interest from this source?

Grand Canyon Railway operation?? Burning lots of diesel fuel and kicken up dust on their runs to and from the Grand Canyon.

Table 3.2-5 has no CO2 values. Chapter 4 calculates CO2 emissions for mining activities and there is

no basis to compare with existing sources of CO2.

Table 3.2-5 – It is unclear whether these figures include the transient traffic that exists on I-40. This major interstate cuts across both Mohave and Coconino counties and supports traffic 24/7 with both diesel and gasoline vehicles contributing air contaminates.

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The uranium deposits within the northern Arizona breccia pipes are of higher grade than approximately 85% of the world's known uranium deposits (International Atomic Energy Agency 2009; World Nuclear Association 2009).

It should be acknowledged here that the breccia pipe uranium deposits are considered world class and have attracted exploration and mining interest from all over the world and from across our country.

Table 3.3-1 will need to be revised based on my analysis for Appendix B.

Page 3-37 to 38

Cumulative Withdrawal of High Mineral Potential Lands

This section gives no context as to what amount of uranium these cumulatively withdrawn areas represent. The 5100 square miles represents 73,899 short tons of U3O8.

Section 3.13.1 Wilderness

The introduction to this section should include the Arizona Wilderness Act of 1984 Public Law 98-406 and state the pertinent special management instructions that Congress included:

(d) The Congress does not intend that designation of wilderness areas in the State of Arizona lead to the creation of protective perimeters or buffer zones around each wilderness area. The fact that nonwilderness activities or uses can be seen or heard from areas within a wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area.

The withdrawal areas on the North and East parcels would be the buffer zones created should these areas be withdrawn. If the affects on the wilderness areas were a part of the decision making process for the withdrawal then that would be against the intent and will of Congress which has specifically prohibited this consideration by an act of Law.

Section 3.16 AND Section 4.16
This Entire Comment Section Is Applicable to Section 4.16 In Chapter 4

Energy Resources Available

This section regarding the "energy resources available" was poorly conceived and executed and in my opinion, was written with the intent to minimized the value of the uranium in the withdrawal area. I can think of no other reason for the shoddy analytical work in both what is presented and by what was omitted.

I will provide my commentary in "narrative form" and excerpt specific passages as necessary to illustrate my points.

The Grand Canyon area has two specific kinds of economies to consider within the context of this EIS. One economy is based "primarily" on the inflow of tourists, both nationally and internationally, and their money to the Grand Canyon and environs and the various forms of tourist related businesses that cater to these people. This tourist economy has an inward flow of money to a specific region, i.e., the Grand Canyon area.

The other economy is extractive and the major economic benefit is realized outside the the basic area considered by this EIS. The exploration and mining of uranium in the proposed withdrawal area has the greatest economic impact outside the withdrawal area, i.e., nationally. The economic impact for uranium energy resources available is much larger and more complex than is presented in this DEIS, but not so much that it is hard to conceive or understand.

The introduction to Chapter 3 states:
"The effected environment description will vary by resource and is not confined to the proposed withdrawal area for all resources or issues."

This caveat was applied to many resources and issues, but was plainly not applied to the concept of uranium energy resource. Uranium is an ***energy mineral*** and its primary value is not in its value as a commodity, but in the energy content that it represents. Any analysis that does not address this concept is slipshod.

The Introductions goes on to say:
"The information presented in Chapter 3 does not describe impacts, but rather describes the existing environment with an emphasis on the present value of these resource condition indicators."
The condition indicators for "energy resources available" and their attendant indicators are for the most part not addressed and are ignored.

3.16 Economic Resources	*Description of Relevant Issue*	*Resource Condition Indicators*
Energy resources available	The withdrawal of uranium deposits in the study area would remove a potential source of energy production, which would then be replaced by energy produced from other sources, either additional mining elsewhere, imports of uranium from foreign sources, or production from equivalent amounts of other sources like coal, petroleum, natural gas, wind power, or solar.	*Indicator:* Value of energy produced from study area. *Indicator:* Equivalent amount of other energy-producing commodity represented by uranium production.

3.3 Geology and Mineral Resources	*Description of Relevant Issue*	*Resource Condition Indicators*
Availability of mineral resources	Providing a domestic source of mineral resources is one of the legitimate uses of public lands. Restrictions or closures individually and cumulatively decrease this ability.	*Indicator*: Uranium resource endowment available for development. *Indicator*: Cumulative amount of high-potential uranium resources on lands withdrawn from exploration and development. *Indicator*: Availability of high mineral potential lands within the withdrawal area *Indicator*: Amount of uranium mined as percentage of domestic demand, domestic production, global demand, and global production.
Depletion of uranium resources	Mining these uranium deposits in the near future depletes domestic resources that may be needed later for energy production or national security purposes.	*Indicator*: Amount of uranium mined as percent of known domestic resources. *Indicator*: Depletion of uranium resources within proposed withdrawal area.

Starting with the *description of relevant issues,* the withdrawal of uranium deposits in the study area would remove a potential source of energy production. Note that the concept here is the loss of energy *represented* by the uranium and not the value of it as a commodity. Further, that this loss would then have to be made up by other production elsewhere, or by imports, or by production from equivalent amounts of other energy sources available, i.e., coal, petroleum, natural gas, etc.

Since nuclear energy is a base load electrical power producer, coal would be the natural replacement since coal is our nations largest supplier of base load electrical capacity. Imported uranium would be the other likely replacement source.

Another implied issue is, that when you replace the uranium energy resource that is removed by the withdrawal, you not only have to consider ***what*** the replacement energy resource is, but also the ***associated environmental impact*** that the production of that replacement resource has.

We, as a Nation, are now exporting the environmental impact that would occur in the withdrawal area to some other location in the USA, or to some other location and peoples in the world. i.e., Canada, Uzbekistan, Africa, Australia, etc. The two concepts are not separate. Therefore another "Indicator" needs to be added and that would be:

"*The environmental impact caused by the equivalent replacement energy source either in the USA or a foreign country"*

I will be providing a short example of this, for a replacement of the energy resource represented by the uranium resource in the withdrawal area by coal production nearby the study area.

The second issue is *"Providing a domestic source of mineral resources is one of the legitimate uses of public lands. Restrictions or closures individually and cumulatively decrease this ability."*

There are two aspects of the treatment of this issue within this DEIS that I find extremely troubling. One aspect is that the energy value of the uranium is declared to not contribute to energy independence, from Chapter 3.16.1:

Like oil and lumber, uranium mined in the U.S. can be sold to consumers domestically or abroad, based on demand and subsequent market prices. Currently, there are no laws in place that would require domestic uranium to be solely purchased and consumed within the United States. As a result, uranium mined and produced in the United States would not necessarily move the United States toward energy independence.

It is my opinion that this declarative statement is used by, and allows, the authors of this DEIS to believe that no consideration of the *value* of the energy resource represented by the uranium in the withdrawal area is necessary or required. The authors continue and reiterate this concept in Chapter 4 by declaring:

As previously mentioned in Section 3.16.1, Energy Resources, uranium is considered a fungible commodity where it can be mined in the U.S. and sold to consumers both domestically and abroad based on demand and subsequent market prices. Currently, there are no laws in place that would require domestic uranium to be solely purchased and consumed within the United States. As a result, uranium mined and produced within the parcels would not necessarily move the United States toward energy independence and thus would not represent an impact to national energy resources.

However, These statements are completely and utterly **false** and represent either complete ignorance or purposeful deceit. It allows for dismissing the rather large value

of the energy that the uranium in the withdrawal area represents (and cumulative affects of previous withdrawals) and to the impacts discussed above that replacement energy sources are likely to have. This is a pretty neat trick if you can get away with it, but as I said before it is quite dishonest intellectually at a minimum and at most shows that there is a purposeful agenda at work. (More on this a bit later.)

A simple mental exercise will demonstrate that the two propositions in the DEIS are false.

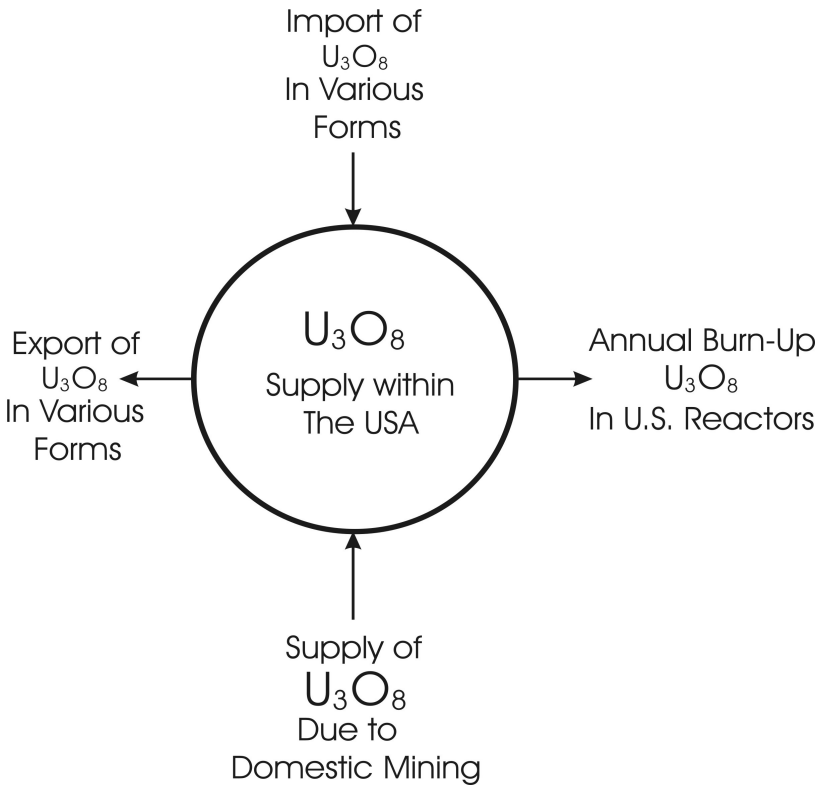


Figure 1. Simplified Diagram of U3O8 Supply Within the U.S.

For this exercise, we will assume that the annual burn-up of uranium in U.S. Nuclear reactors is a constant. Current US imports of Uranium from foreign sources is 89% of U.S. Reactor supply and domestic production from mining is about 8%. The balance of uranium required is made from inventories on hand or secondary non-production domestic sources.

Due to the fact that uranium is a fungible commodity, once this uranium enters the U.S. Supply inventory it is indistinguishable as to source and is traded freely within this market place. So the question is this, if you were to stop imports and exports of uranium in the above system, what would be the amount of future uranium supply available to be used in U.S. Nuclear Power Plants? Given this situation, the answer would be 8% of U.S. Reactor requirements could be met. Now lets consider an alternative scenario, U. S. domestic supply from mining was increased to 30% of U.S. Reactor needs. This supply enters the marketplace and is traded freely within that marketplace. Some of it

will surely be exported, but since it is indistinguishable from other uranium in the marketplace it could just as well be uranium that was *imported* to the US supply inventory that was exported. Once in the supply inventory, there is no difference as to origin. The important point is that the over all ***supply*** of uranium in the U.S. has increased.

Now, under this scenario, if you were to stop imports and exports of uranium, the percentage of future supply available to U.S. Nuclear Power Plants is 30%, or an increase of 22% over the previous example. Therefore, the additional uranium mined and produced in the United Sates has absolutely moved the United States toward energy independence. The DEIS proposition to the contrary has been proved **false**. This proposition holds true until domestic production equals U.S. Reactor requirements.

The very fact that the authors of this DEIS do not understand this basic concept is disturbing. I can only conclude that this false premise was purposefully presented so as to exclude the analysis of the value and economic impact of uranium as a fuel mineral. Also, it precludes having to make comparisons of the environmental and cultural impacts and cost associated with other replacement sources of energy.

The authors write:

Currently, there are no laws in place that would require domestic uranium to be solely purchased and consumed within the United States.

However, no laws are necessary for the uranium mined to contribute to national resources. This statement is deceptive and is a means to preclude further analysis because "getting a law passed that would require the domestic production be used in the US is beyond what the EIS can address" and therefore the analysis does not need to be done.

It is difficult to not conclude that the *false premise* and *false supporting statement of law* were purposeful in design. If purposeful, the only conclusion possible is that there is an agenda being served.

Preliminary Discussion

Let me first state that providing the economic and environmental impacts we export to other countries when we import their uranium is beyond my capability to present. However, it is fair to say that this is exactly what we do as a nation. Some countries, such as Canada and Australia, that we import uranium from have well established environmental controls on the mining and milling of uranium. However, these country's have their own native populations that would share similar cultural impacts as U.S. Native Americans do. It seems odd to me that we feel quite free, as a Nation, to export our environmental and social consequences on to other people throughout the world.

In addition, we import uranium from nations such as Brazil, Czech Republic, Namibia, Niger, South Africa, Kazakhstan, Russia, and Uzbekistan that probably don't have environmental standards that are found in the United States. It would seem to me, that the concepts of social condition and environmental justice used in this DEIS could well be extended to cover these external populations due to our unwillingness to

increase our own domestic production of uranium.

Food for thought!!

Further, lets consider additional mining of uranium in other parts of the U.S. There are some organizations in this country that oppose uranium mining because they are opposed to nuclear power in general. It does not matter where this mining will take place or how safe it is, or how little impact it will have. These people and their organizations will oppose it and aggressively work to prevent the start-up of uranium mining anywhere. This is the case in the Grand Canyon area. In 1984, the Arizona Wilderness Act was passed by Congress and signed into law. The general idea at the time was that the areas not set aside as Wilderness would be open to mining as part of the multiple use doctrine for public lands as administered by the BLM and the USFS.

A new generation of conservation groups want to turn this piece of legislation on its head and use the proximity of the Grand Canyon as a reason to do so. Apparently, the location of the Grand Canyon was unknown to the various groups, including various conservation groups, that came to a compromise in 1984 and formulated and enacted the Arizona Wilderness Act that allowed for the mining of uranium in this region of Arizona.

As a result of organized opposition to uranium mining in the U.S., I find it curious that we could define any National uranium resource at all. For a resource to be valid, it must actually be ***available***. Additional food for thought!

The replacement of the minable uranium in the withdrawal area would then face the same hurdles in other parts of our country and would have similar impacts to the peoples and environs in those areas.

The next option would be to increase our nation's production of coal to replace the loss of uranium resource in the withdrawal area, coal is our nation's greatest provider of base load electrical capacity and so would be the only present resource available to do this. It just so happens that there is a coal mine and coal powered electrical generating plant right next door to the proposed withdrawal area that can be used as a point of comparison for the energy resource value of the uranium within the withdrawal area and for the uranium that has already been cumulatively withdrawn in the surrounding study area. (The Nuclear vs Coal analysis starts on page 10 of these comments)

Uranium Energy Resource Value

I will provide a simplified (not complete) value model for domestically produce uranium fuel mineral based on three basic values. The total value and economic impact of this model should be increase by any economic multipliers that apply for each value. A full analysis of this model is beyond the scope of what I can provide, but more qualified professionals should have no problem doing so.

These values are:

1. *The value of the uranium as a commodity.*
2. *The value added to the uranium due to processing the uranium into fuel.*
3. *The average electrical value of the uranium when it is sold to residential and commercial customers.*

Commodity Value of the Uranium

The direct commodity value of the uranium in the withdrawal area and in those areas previously withdrawn is simply the number of pounds of uranium that could be mined in each area respectfully, multiplied by the average price for uranium during the next 20 years. The authors of this DEIS have chosen to apply a price of $40 per pound U3O8 for the next 20 years. Even as a simplifying concept, this value, given the structural supply and demand deficit that is projected to exist in the near future is too low. That said, the actual direct commodity value is the *lowest* dollar value contributor to the *total energy resource value.*

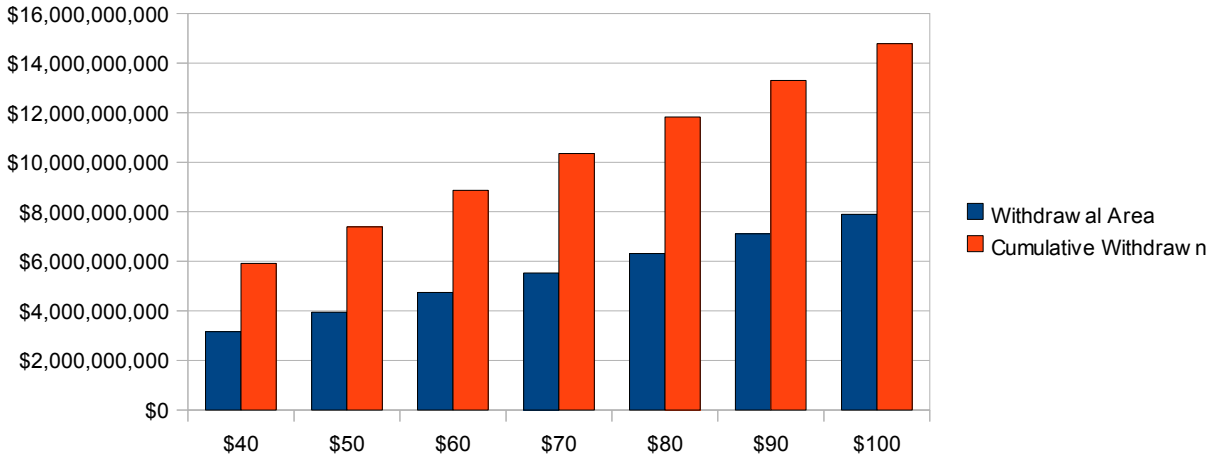
The actual commodity value is the dollar value of the sum of all transactions over the next 20 years that represents the production of uranium from the withdrawal area and those areas previously withdrawn (cumulative impacts). Recall from my comments regarding Appendix B, that the uranium resource calculated for the withdrawal area in this DEIS was at a minimum 19% low and at a maximum 30% low. I will be using ***my*** lower estimated uranium resource value in the following discussion. I will also be assuming that the uranium resource has been calculated in short tons, i.e., 2000 lbs/ton and will be converting to metric tons where required. If the resource was calculated in metric tons, then my calculation will be even more conservative in nature.

Estimated U3O8 resource in the withdrawal area is 39,485 tons or 35,895 metric tons.

The previously withdrawn area as described in the DEIS on page 3-37 is 5100 square miles of highest potential “Favorable Area A”. Based on the methodology proposed in the DEIS to calculate the minable uranium resource, the calculation would be:

5100 sq-mi X 96.6 tons/sq-mi X 15% = *73,899 tons U3O8 or 67,040 metric tons.*

The commodity value is shown for a range of future average values, I leave it to the reader to determine what value they think most likely:



The commodity value affects the uranium mining company the most and has direct and indirect economic impacts on the communities in the study area. These impacts are fairly well analyzed in the DEIS. However, there are several economic impacts at this level that were not analyzed or even considered. These are:

1. The loss of maintenance fees paid to the BLM for claims that are no longer valid. Exploration and mining companies have been paying cumulative location and maintenance fees for their claims in the withdrawal areas. These fees represent an investment by these companies and represent an economic loss should these claims be voided by a withdrawal.

2. The loss of prospective ground claimed by the exploration companies reduces their enterprise value, i.e., stock price and is thus a loss to the company and their stockholders.

3. The loss of the cost of exploration invested in the withdrawal area should their claims be made void by a withdrawal. This has a two fold effect. One is that these expenditures cannot be recovered and many enterprises might fold because they have spent all or nearly all of the funds raised by the company to explore the areas that are now being considered for withdrawal. Secondly, it reduces their capital resources with no return and makes further exploration and development elsewhere more difficult. The overall enterprise value will decrease significantly.

Value Added to Uranium by Processing

Uranium as Yellow Cake U3O8 undergoes three distinct value added processes before being loaded into a nuclear power plant. These are:

1. Conversion to uranium hexafloride.
2. Enrichment.
3. Fuel Fabrication

From the World Nuclear Association's paper "The Economics of Nuclear Power" July 2010 ; http://www.world-nuclear.org/info/inf02.html The following table represents the value added in the processing of uranium to be made into reactor fuel.

In January 2010, the approx. US $ cost to get 1 kg of uranium as UO2 reactor fuel (at likely contract price for the natural uranium from a mine):

Starting uranium U3O8	8.9 Kg U308 @ $115.50/Kg	$1,028.00
Conversion	7.95 Kg U @ $12/Kg	$90.00
Enrichment	7.3 SWU @ $164/SWU	$1,197.00
Fuel Fabrication	1 KG @ $240 /Kg	$240.00

Since I am interested in the *Value Added* by the processing to manufacture the final fuel. The value added per pound of uranium to make the fuel is then:

$ (90 + 1197 + 240) / 19.58* lbs = 77.98 $/lbs of Yellow cake U3O8.

*8.9 Kg of initial U3O8 was converted to pounds.

For the Cumulatively Withdrawn area considered in the DEIS, this has a present value of:

73,899 tons X 2000 lbs/ton X $78 = ***11.53 Billion Dollars***

For the Proposed Withdrawal area, this has a present value of:

39,485 tons X 2000 lbs/ton X $78/lbs = **6.16 Billion Dollars**

In addition, there are likely indirect economic multipliers that correspond to each of these processes on the regional economies in which they reside.

Value of Electricity Generated

The value of electricity generated is calculated by taking the National average price of 9.62 cents/kilowatt-hours and multiplying this by the amount of electricity that can be produced by the uranium from the proposed withdrawal area and the area that has been cumulatively already withdrawn.

The amount of electricity produced by the uranium is calculated by using the Nuclear Fuel Energy and CO_2 Balance Calculator found at :

http://wise-uranium.org/nfce.html

The input value is the amount of U3O8 in metric tons.

Using the calculator, the amount of electricity generated by 73,899 tons U3O8 or 67,040 metric tons from the cumulatively withdrawn area is:

2,404,383 G watt-hours or 2.404 x 10^12 Kilowatt-hours.

This has a value of ***240 Billion Dollars*** at 9.62 cents per Kilowatt-hours.

Similarly, the electrical value of the uranium in the withdrawal area has a value of ***128 Billion Dollars***.

Each nuclear power plant has an economic impact on the community in which it resides and thus has an economic multiplying effect beyond the absolute value of the electricity it generates. An example of this is documented in the:

"Economic Benefits of Palo Verde Nuclear Generation Station" An Economic Impact Study by the Nuclear Energy Institute, November 2004©. There are many such economic impact studies for various nuclear power plants throughout the country.

A summary table is shown below that compiles the various values created by the uranium within the proposed and already withdrawn areas.

	Proposed Withdrawal Area	Already Withdrawn Area
Commodity Value of U3O8	5.53 Billion @ $70/lbs	10.35 Billion @ $70/lbs
Value Added for Processing	6.16 Billion	11.53 Billion
Value of Electricity Gen.	128 Billion	240 Billion
Totals	**139.69** Billion Dollars	**359.33** Billion Dollars

In addition to these values would be any economic values from multipliers that could reasonably be attributed to the production, processing, and electrical power generation from the uranium that could be produced in these two areas.

Replacement of minable Uranium with Coal

For the uranium and coal comparison, I will be comparing how many tons of coal must be mined to equal the electrical power generating capacity represented by the uranium in the withdrawal area and the areas already withdrawn. I will then estimate the amount of land disturbed by both options.

It seems appropriate to use the Navajo Generating Station at Page (2280 Megawatt) and the Kayenta Coal Mine as a point of reference. The Navajo Generating Station produces 16.524 Billion Kilowatt hours annually and uses about 8.3 million tons of coal to produce this power. The uranium in the withdrawal area would provide 1,284 Billion Kilowatt-hours of electrical power or (equivalently) enough to run the Navajo Generating Station for 77.7 years.

The Kayenta Coal Mine has a coal endowment of about 16 million tons of coal per square mile to a depth of 130 ft. The amount of coal equivalent to the uranium in the proposed withdrawal area is:

1284 Billion Kilowatt-hours/ 2000 Kw h/ton of coal = 642,000,000 tons of coal.

The land mined to provide an equivalent energy value to that of uranium would be:

642,000,000 tons of coal / 16,000,000 tons coal per sq mile = ~ 40 Square Miles or

25,600 acres of land disturbed to a depth of 130 feet.

The land in the withdrawal area that is predicted to be disturbed from the exploration and mining of uranium is 1,364 acres and all of these acres must be reclaimed to near pre-mining conditions. For the equivalent amount of delivered energy, coal disturbs more than 25,000 acres.

The Navajo Generating Station is one of the areas greatest sources of pollution. I find it very ironic that the Navajos and the Hopi both profit from a mine and generating station that pollutes so much and disturbs 25,600 acres of land to provide the equivalent power of uranium mined from 1,364 acres. The below table summarizes the Uranium vs Coal comparisons.

	Proposed Withdrawal Area	Already Withdrawn Areas
Uranium Energy Mined	1284 Billion Kilowatt-hours	2404 Billion Kilowatt-hours
Tons of Coal Equivalent	642 Million Tons of Coal	1.202 Billion Tons of Coal
Area Disturbed U Mining	1364 acres	4452 acres
Area Disturbed by Coal	25,600 acres	48,000 acres
Area restored from U mining	1364 acres	4452 acres
Area restored Coal Mining	25,600 acres	48,000 acres

The above basic analysis provides a present value for the energy resources for the lands in question and provides some prospective on the present value for the uranium fuel mineral as compared to another equivalent energy source. Similar analysis can be made for wind, solar, and gas fired power plants.

Indian Cultural Resource

Internet research on the Kayenta Mine and the Navajo Generating Station was very interesting in regards to Native Indian cultural resources. There is a great debate amongst those in the area with regards to cultural resources and how the mine and generating station affect these resources. However, the Navajo Nation receives about 30 million dollars or more in royalties and over 60 million in payroll annually from the operation of these two enterprises and have vigorously defended any attempt to shut down the mine or power plant, despite the disturbance and insult that is created in regards to their cultural resources. The willingness of the Navajo and Hopi to accommodate the mine and generating station's affects on their cultural resources when they benefit economically from them should be included in the EIS as part of the existing cumulative effects on Indian Cultural Resources.

There is copious documentation on the internet of the cultural resources affected by the mine and generating station.

A place to start is: http://coaldiver.org/Kayenta/

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Energy Resources

Indicators used to determine conditions regarding the availability of energy resources include the amount of undiscovered uranium resources or uranium reserves remaining at existing mines and the energy equivalent of those uranium resources.

The energy equivalent is not the only measure. The “energy value” as stated in Table 3.16-22 is also considered. Left out of the above statement is the: Equivalent amount of other energy-producing commodity represented by uranium.