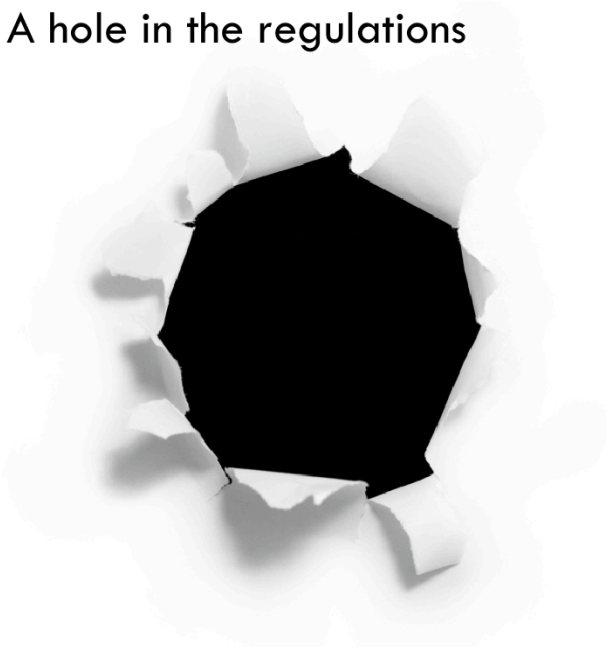
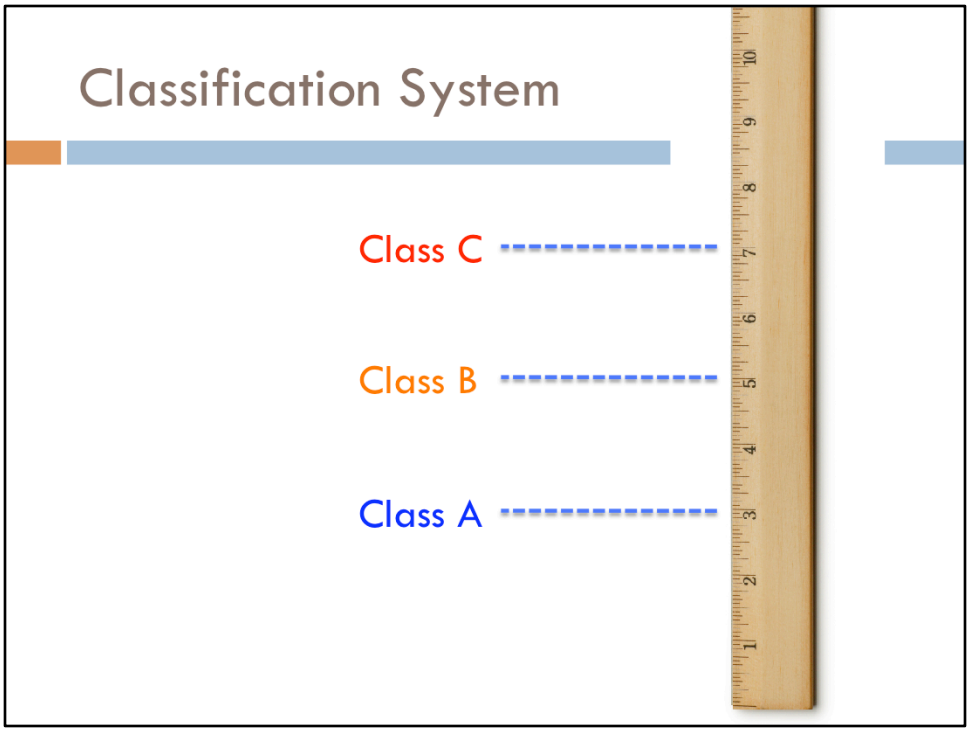
DEPLETED URANIUM AND UTAH

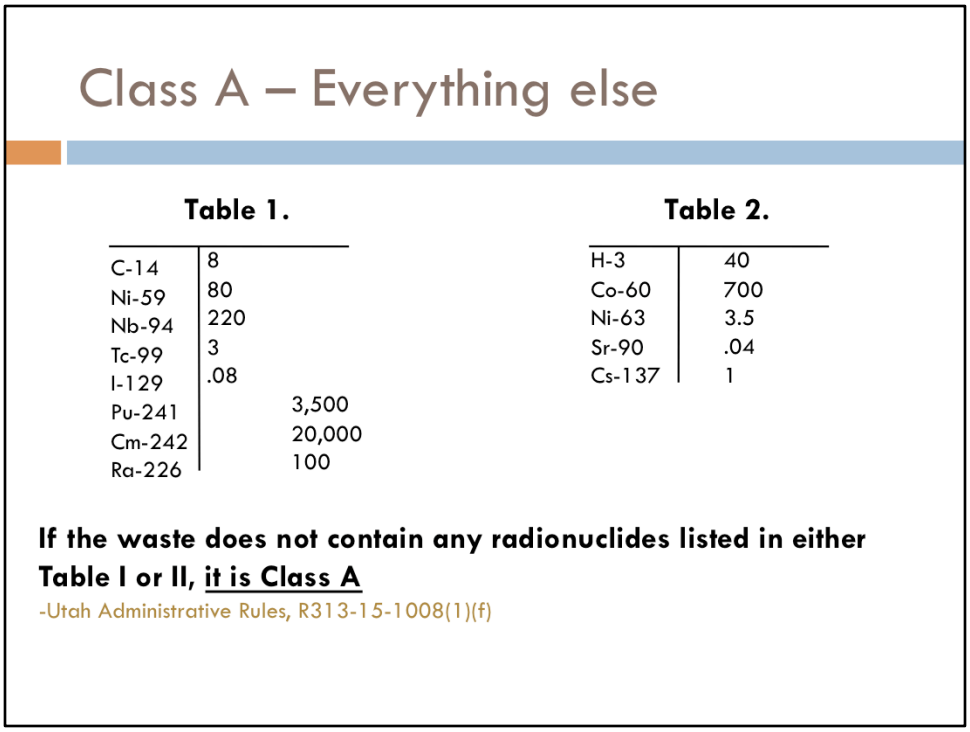
The case for a moratorium on DU disposal

Part 1. A hole in the regulations





People who are concerned about nuclear waste in Utah know that we use a classification system for low-level nuclear waste. You can think of it like a ruler that measures the concentration of a particular radionuclide. Above certain limits, the waste becomes Class B or Class C. Of course in Utah, we have banned Class B and C waste.



But it's actually a little more complicated than that. If you look in our state rules, you will see a couple of tables. You use the tables to figure out whether a particular waste is Class A, B, or C. But there's an important caveat. Any radionuclide that does not appear in either table is defined to be Class A waste. This means that anything that was not dealt with in the tables is automatically cast in the Class A designation and is therefore allowed to be disposed at the EnergySolutions site in Utah. Although these are drastically simplified tables, you will notice that Uranium does not appear in either table – therefore, a literal reading would lead you to believe that all Uranium is by default a Class A waste.

Table 7.2 Waste Classification Table

Isotope	Column 1 Maximum Concentration for Class A Segregated Waste. Above This, It Is Class B Stable Waste μCi/cm³	Column 2 Concentrations Above Which Some Wastes Become Class C Intruder Waste μCi/cm³	Column 3 Maximum Concentration For Any Waste Class μCi/cm³
Any with half-life less than 5 years	700	70,000	Theoretical maximum specific activity
H-3	40	10^8	Theoretical maximum* Specific Activity
C-14	0.8	0.8	0.8*
Ni-59	2.2	2.2	2.2
Co-60	700	70,000	Theoretical maximum specific activity
Ni-63	3.5	70	70
Nb-94	0.002	0.002	0.002
Sr-90	0.04	150	700
Tc-99	0.3	0.3	0.3*
I-129	0.008	0.008	0.008*
Cs-135	84	84	84
Cs-137	1.0	44	4600
Enriched Uranium	0.04	0.04	0.04
Natural or Depleted uranium	0.05	0.05	0.05
Alpha-emitting transuranic isotopes			10 nCi/g
Pu-241			350 nCi/g

However, it wasn't always this way. Here I'm showing you a classification table as it appeared in 1981. This was a first cut at what the waste classification tables would eventually look like.

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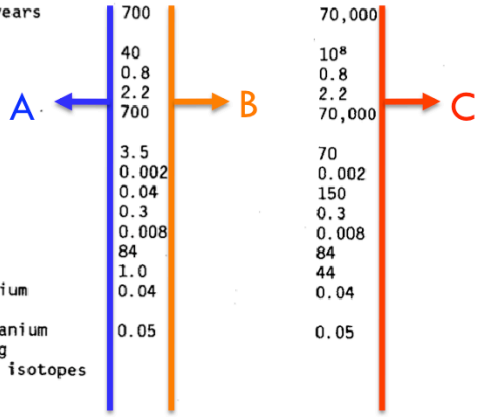

Anything less concentrated than the values in column one is Class A, anything more concentrated is Class B, and anything more concentrated than column 2 is Class C waste. Anything greater than Column 3 was not generally to be disposed in shallow land burial sites like the EnergySolutions site.

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You will notice that in 1981, in the draft classification tables, Uranium DOES appear. And you will also notice that the concentration limits were quite low -- .05 micro-curies per cubic centimeter. This was the limit for Class A, B, and C waste. What does this mean? It meant that in 1981, any waste having greater than .05 micro-curies per cubic centimeter of natural or depleted uranium was generally NOT considered appropriate for shallow land disposal, like at EnergySolutions' site in Utah.

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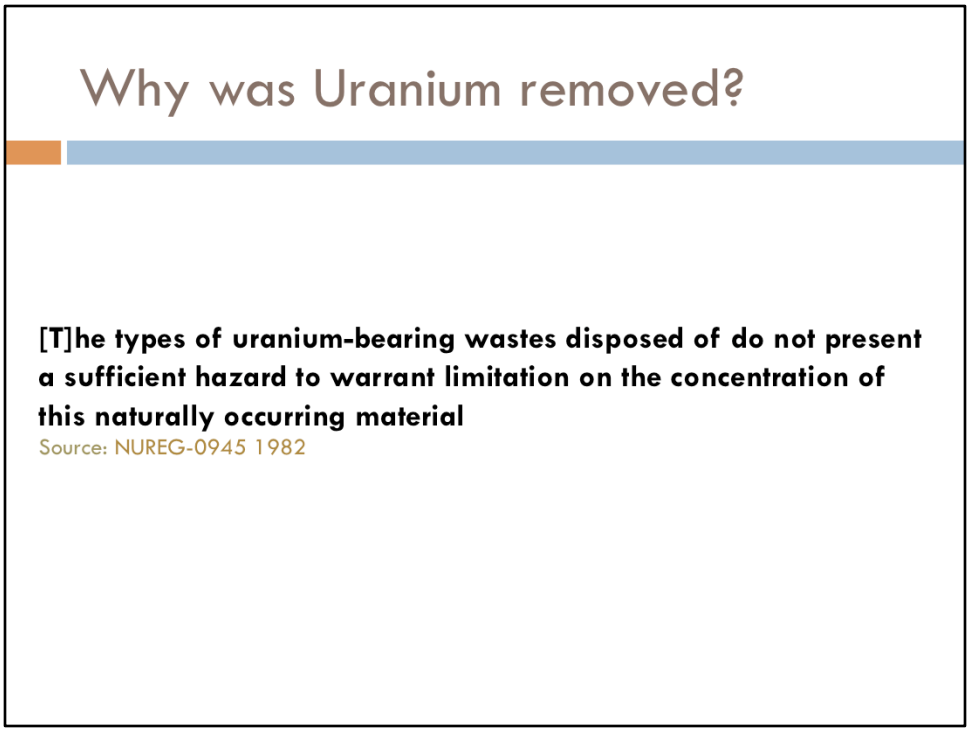
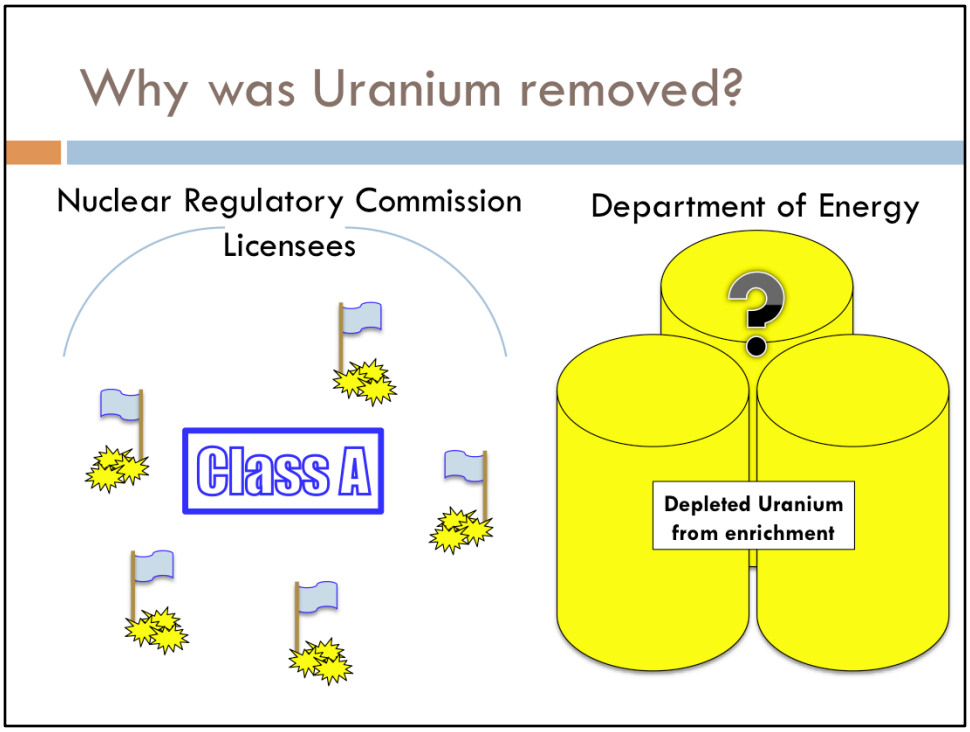
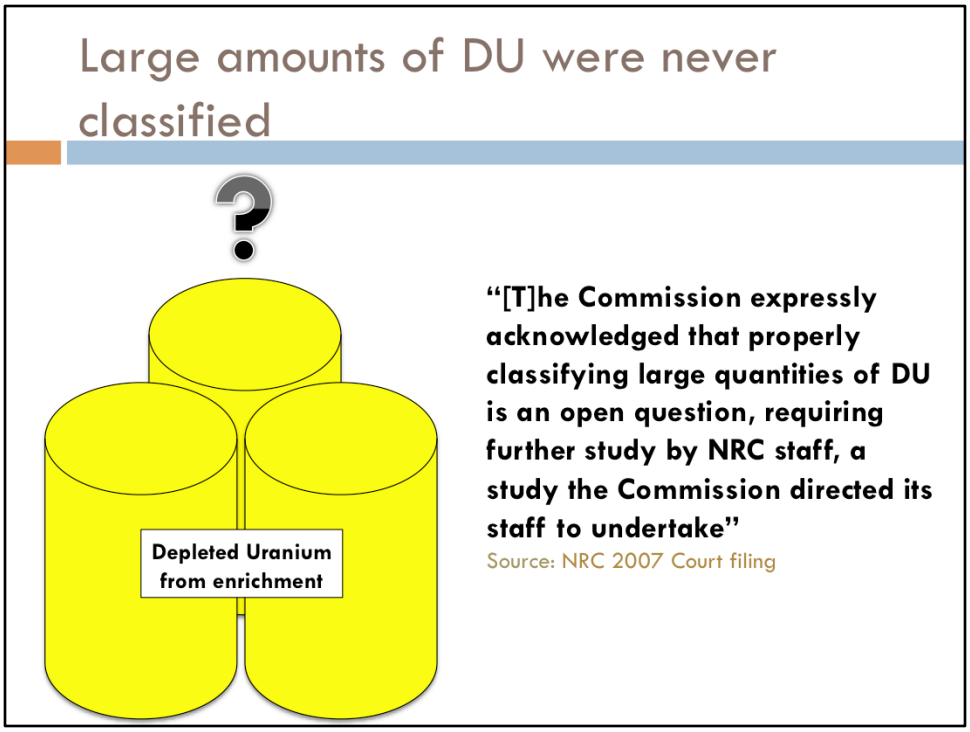
Ultimately, however, Uranium in all its forms was REMOVED from the waste classification tables. Why?



When the Nuclear Regulatory Commission published the final rules on low-level nuclear waste classification, they released this statement, saying that thy types of uranium-bearing wastes they oversaw did not require setting a limit on this naturally occurring material. So what did this mean, practically speaking?



Well, it's important to remember that the Nuclear Regulatory Commission only sets rules, typically, for commercial entities. So back in 1982, as the NRC was publishing these rules, they looked around at all of their commercial licensees and figured out, generally speaking, what kinds of waste they had. And when they did that, they realized that the licensees only possessed small quantities of uranium wastes that did not pose, in their minds, a severe risk. For these small quantities of commercial uranium-based waste, the NRC said that these could safely fall under the Class A rubric. However, there was a very large, very concentrated, and very risky waste stream out there – that belonged to the Department of Energy. By statute, the Department of Energy is not required to play by NRC's rules and is not an NRC licensee. When the NRC said that small amounts of commercial Uranium waste could be considered Class A, it left the classification of large amounts of highly concentrated Depleted Uranium an open question.



The NRC acknowledged this in 2007, in a court filing, when the Commission stated that properly classifying large quantities of DU was an open question, requiring further study by NRC staff. In other words, the impacts and proper disposal of large amounts of depleted uranium was NEVER finalized, and never dealt with in our national low-level waste classification system. This is the hole in the regulations.

A hole in the regulations—Large amounts of DU not covered

Table 1.

C-14	8	
Ni-59	80	
Nb-94	220	
Tc-99	3	
I-129	.08	
Pu-241		3,500
Cm-242		20,000
Ra-226		100

Table 2.

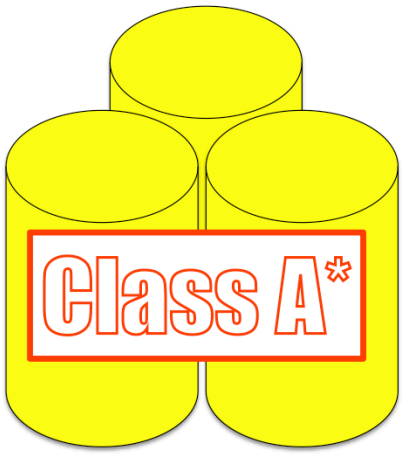
H-3	40
Co-60	700
Ni-63	3.5
Sr-90	.04
Cs-137	1

If the waste does not contain any radionuclides listed in either Table I or II, it is Class A

Source: Utah Administrative Rules, R313-15-1008(1)(f)

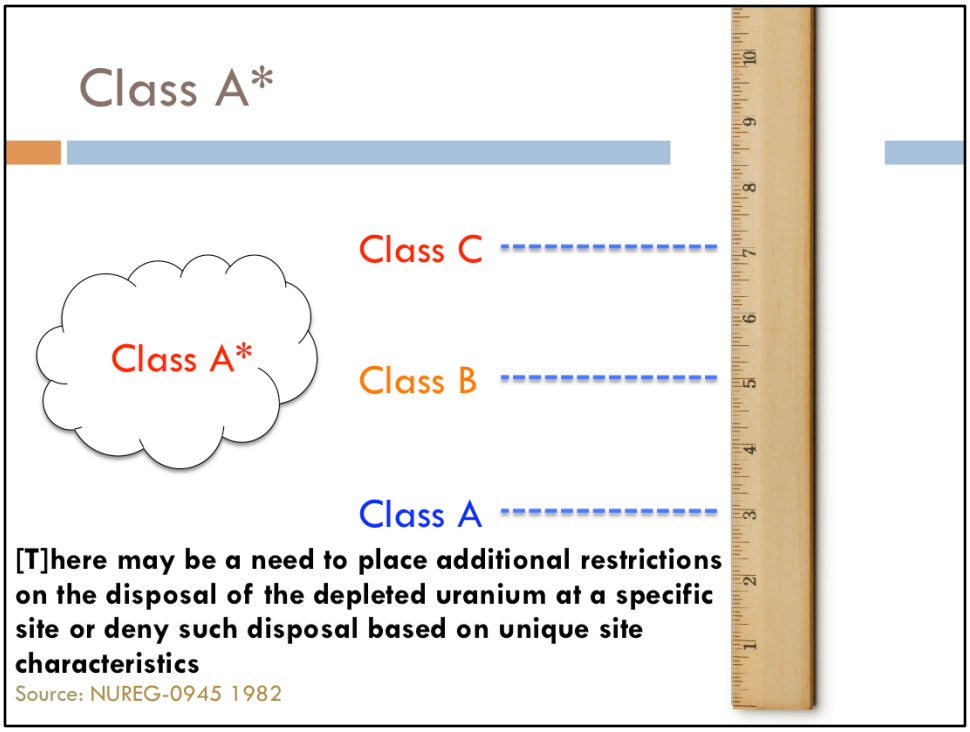
… Because despite the well documented history and the admission by NRC that the classification of depleted uranium was never done and required further study, what we're stuck with is a waste classification system that treats Depleted Uranium, by default, as a class A waste.

Part 2. Class A (with an asterisk)



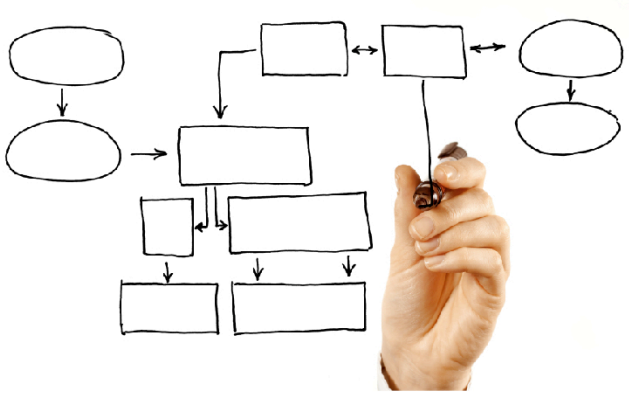
*This waste requires further study before it can be disposed of as a Class A waste

This brings us to the present year, 2009, when the Nuclear Regulatory Commission, by a 3 – 1 vote, tentatively decided to treat depleted uranium as a very special kind of Class A waste. We at HEAL have begun to refer to this as "Class A with an asterisk"



What does Class A with an asterisk mean? Well, unlike the system we're used to, where anything that is a Class A waste can go to a Class A site, and so on, depleted uranium is considered a class A waste but may NOT be suitable for disposal at Class A sites. In their words, "There my be a need to place additional restrictions on the disposal of depleted uranium at a specific site or (even) DENY such disposal based on unique site characteristics."

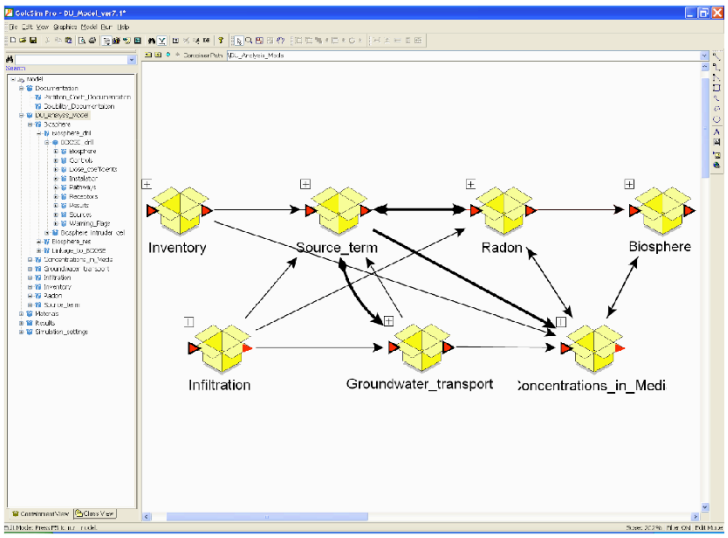
Class A* (site-specific analysis)



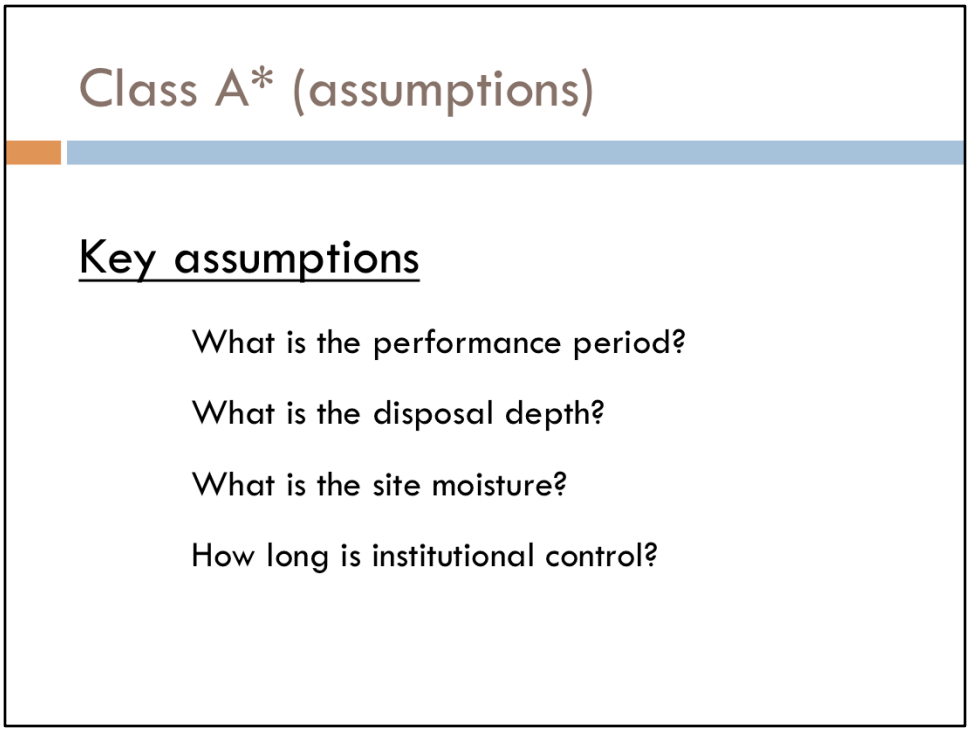
Will dose limits be exceeded?

What this will require is complicated mathematical modeling that will try to answer the question of whether dose limits to members of the public will be exceeded.

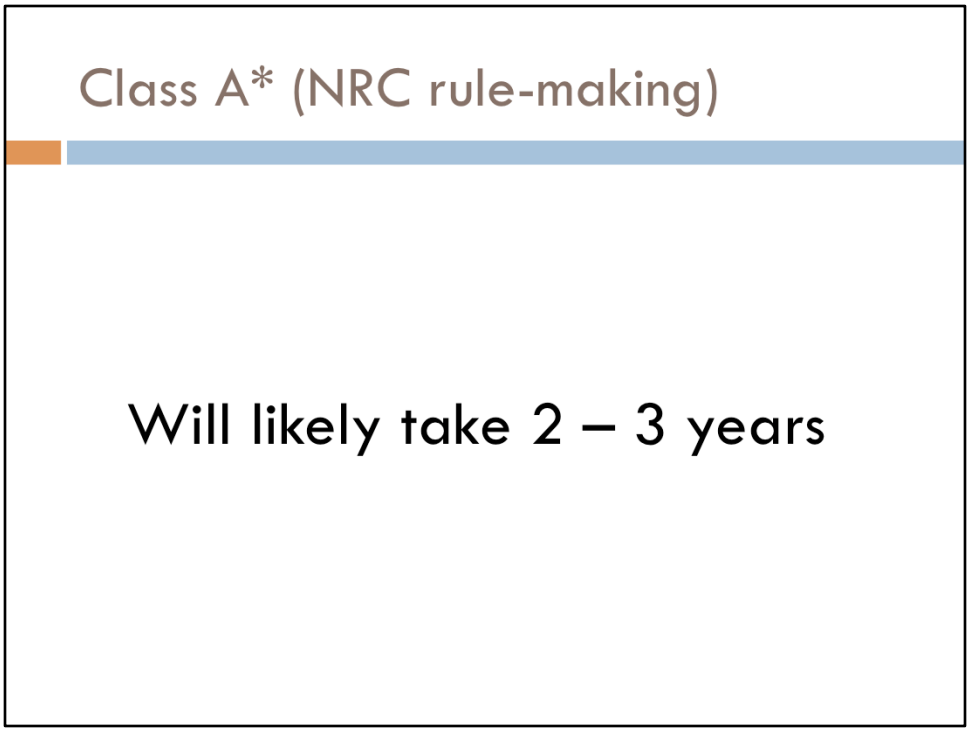
Class A* (site-specific analysis)



Of course they won't use a whiteboard, they'll use computers to do the analysis – this is an image from NRC's recent publication on depleted uranium.

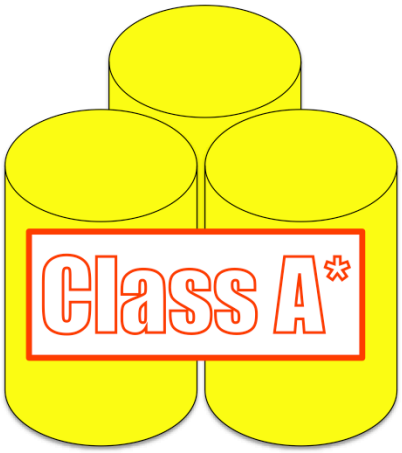


The outcome of these models – whether dose limits will be exceeded – hinge entirely upon the variables and assumptions used to run the program. These are several key factors that if set low or high could change the outcome of the model. For instance, if you look at depleted uranium over a short horizon (say, 10,000 years) a site could well meet the dose limits. However, if that same site were modeled over 1 million years (which is when depleted uranium is at its peak hazard), that same site could fail. In order to ensure consistency, NRC will undertake a rule-making to decide what some of these key assumptions are and how they can vary over the modeling time horizon.



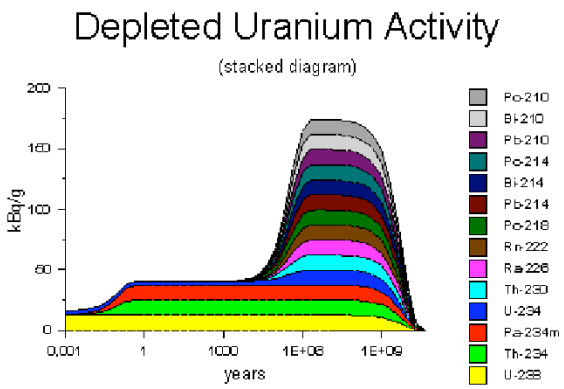
I was recently in Washington, DC, and met with the staff that is working on this issue of depleted uranium classification, and they said that this rulemaking would likely take in the neighborhood of 2 to 3 years. This is important, and I will come back to it later.

Part 3. The problem

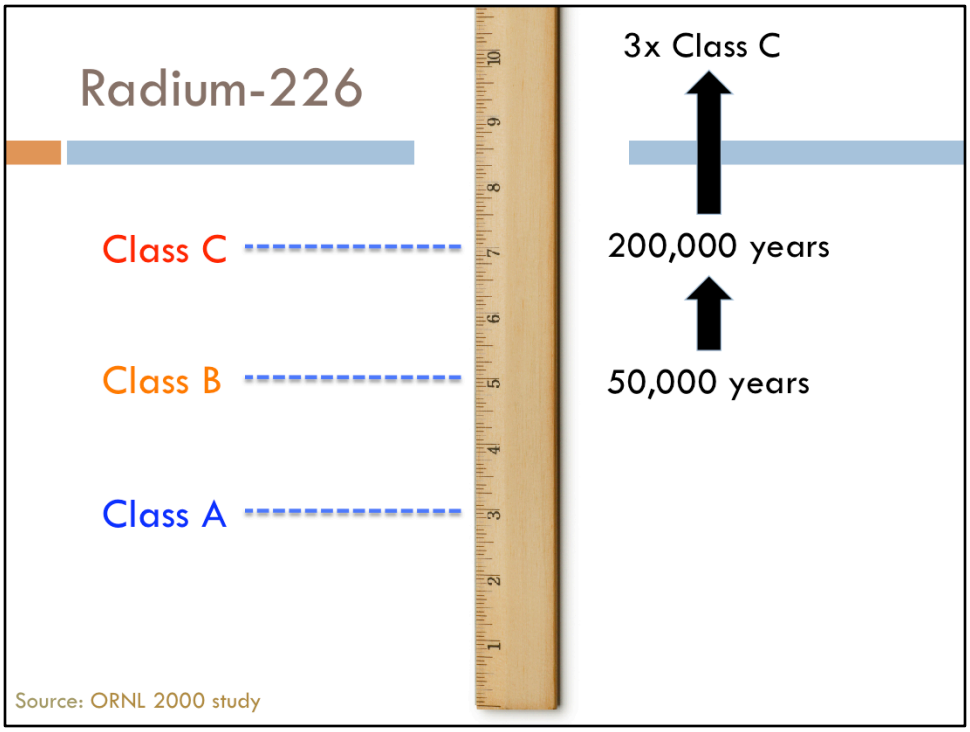


So, in the mean time, why should we here in Utah, and you as Radiation Control Board members, be concerned about Depleted Uranium coming to Utah?

DU increases in radioactivity for thousands of years

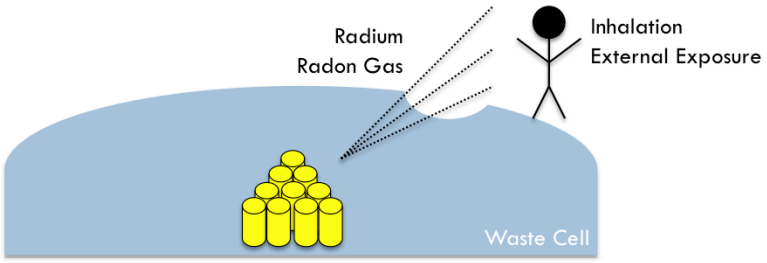


As was noted in the last meeting and in newspaper reports, depleted uranium grows more radioactive and hazardous over time. Whereas most Class A waste is thought to decay to reasonably safe levels within 100 years, depleted uranium reaches its peak hazard in around 1 millioin years. This is because of the decay products of uranium-238, the main constituent of depleted uranium. If you can see it, one listed decay product is Radium-226, which I'm going to focus on for a moment.



The state of Utah, even though it doesn't define limits for Uranium, DOES specify limits on Radium-226. And if you look at one study by the DOE conducted in 2000, there are some interesting results. According to their calculations, the radium-226 from depleted uranium will exceed Class B limits in around 50,000 years, and will exceed Class C limits in about 200,000 years. Eventually, the concentration of Radium-226 will be THREE TIMES the class C limit. If you're like me, then you're probably asking yourself why we would ever allow a waste stream into the state that will in the future exceed Class A limits. Although Utah law is silent on when to apply classification limits, the Division of Radiation Control has taken the position that the limits are observed when the waste arrives for disposal, and not over the life of the waste. This doesn't seem right to me.

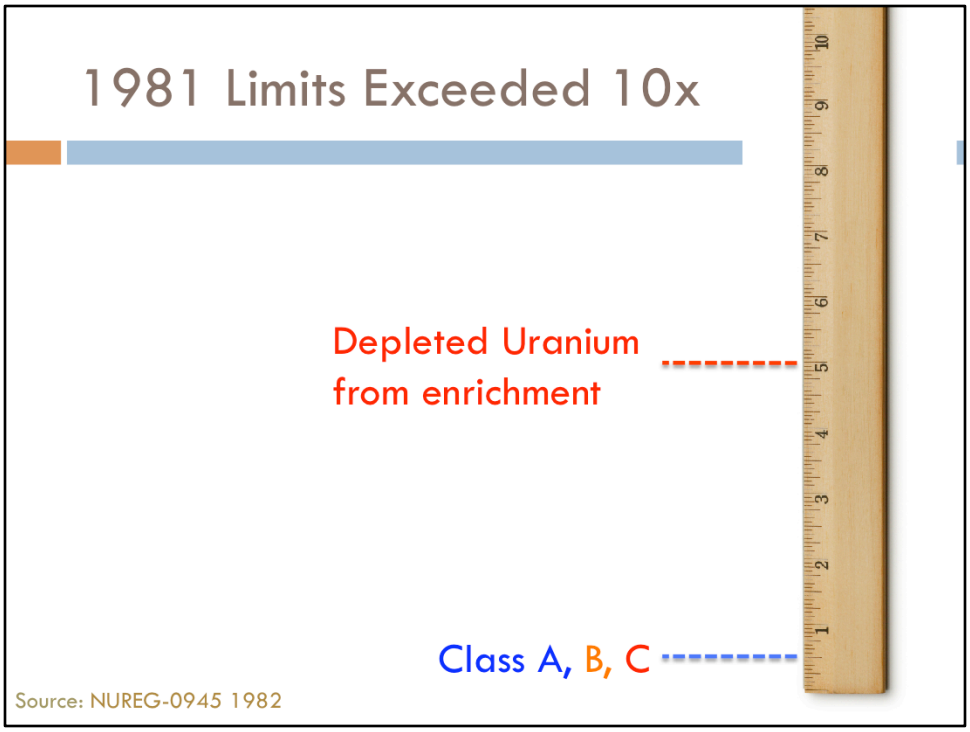
Radiation exposure limits could be exceeded in a matter of hours



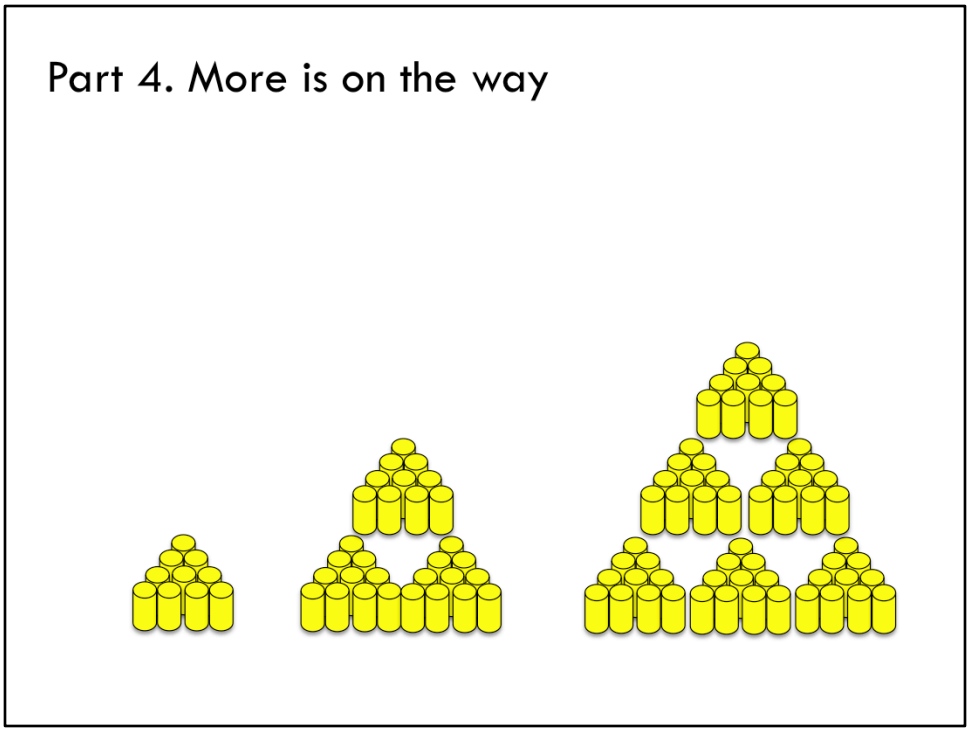
Even if the disposal site is arid, eventual erosion of the cover could lead to doses exceeding the Federal standard (25 mRem per year) in only a matter of hours for an onsite intruder

One of the problems with radium-226 and radon gas, another decay product, is that these can expose on-site intruders if the waste cap is ever eroded. And it's hard to imagine that the cap would NOT erode over 1 million years of hazard. One study found that if the depleted uranium waste was ever uncovered through erosion, an onsite intruder could receive more than the dose limit in a matter of mere hours.

Furthermore, if you look at Utah's radiation rules, particular emphasis is placed on making sure the site won't need active maintenance over the long haul after the site has been closed down. However, if you have a very long-lived hazard, active maintenance will almost CERTAINLY be required to keep the cap in a functional condition. And remember, we don't even know who is supposed to take care of this site in the long-term. The state of Utah said it doesn't want that responsibility. The Department of Energy hasn't said it will take over the long-term care, either. Why would we create a long-term hazard that requires ongoing active care at the site, in violation of our own rules and when we don't even have a long-term custodian for the site?

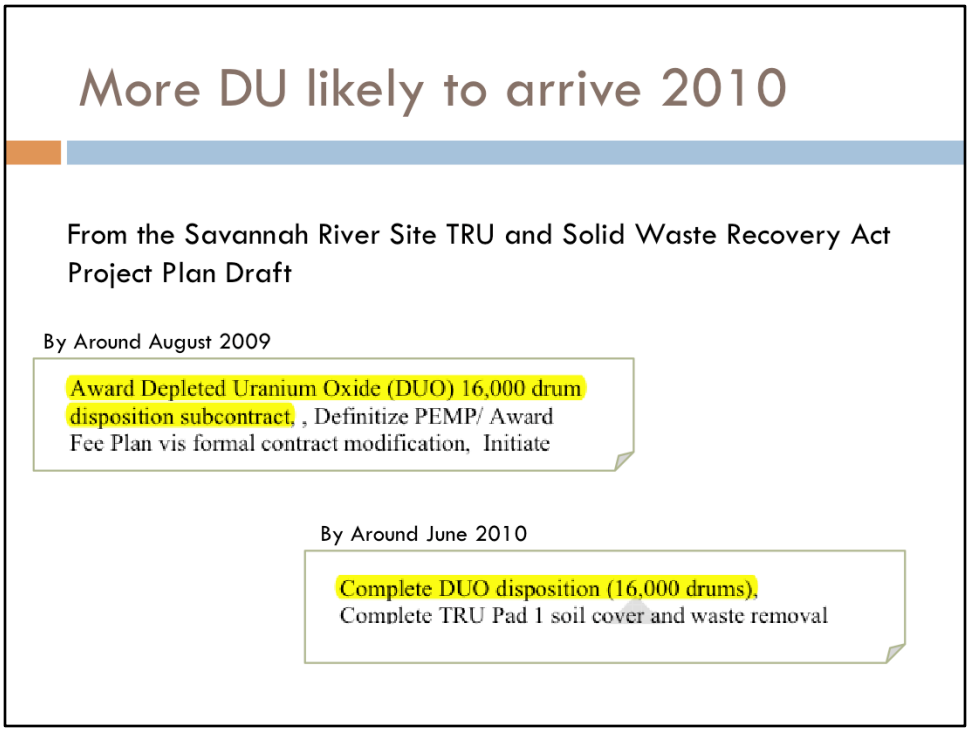


Now, remember that 1981 limit that was in the draft waste classification tables? That limit was .05 microcuries per cubic centimeter. If you look at the concentration of the depleted uranium that Utah stands to get from the Department of Energy, that stuff is over 10 TIMES the concentration that the draft tables would have considered unsuitable for shallow land burial. In other words, we could be taking material in Utah that the NRC in 1981 said should only be placed in deep geologic disposal like what was contemplated at Yucca Mountain for HIGH level waste.

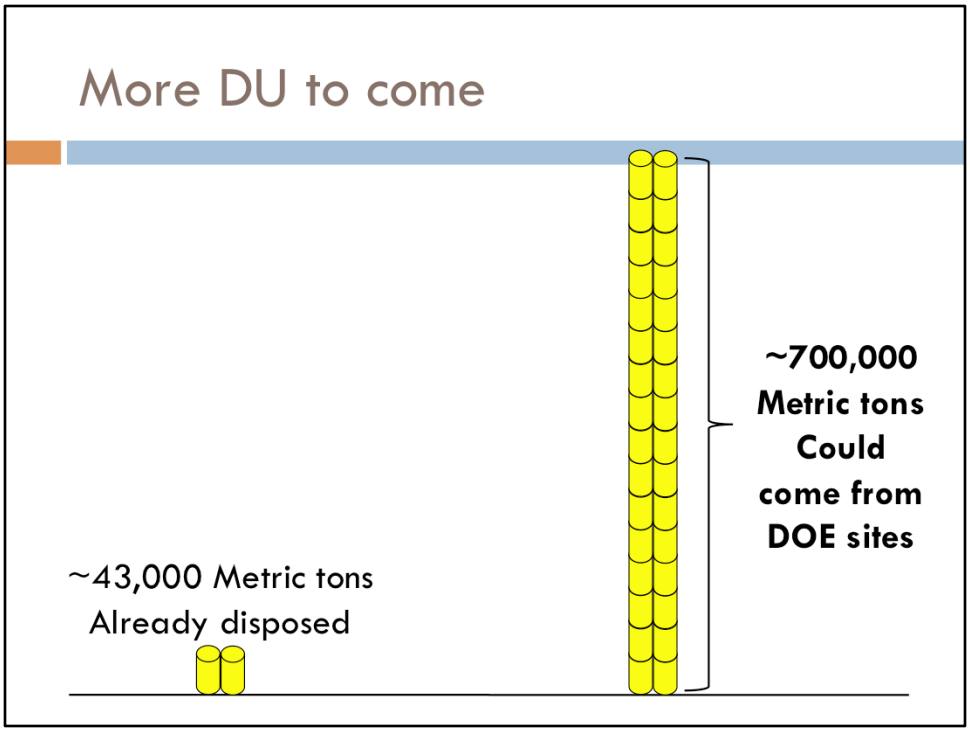


Now that we've talked about some of the hazards of depleted uranium, I want to turn to the question of what's out there, and what EnergySolutions has taken in the past.

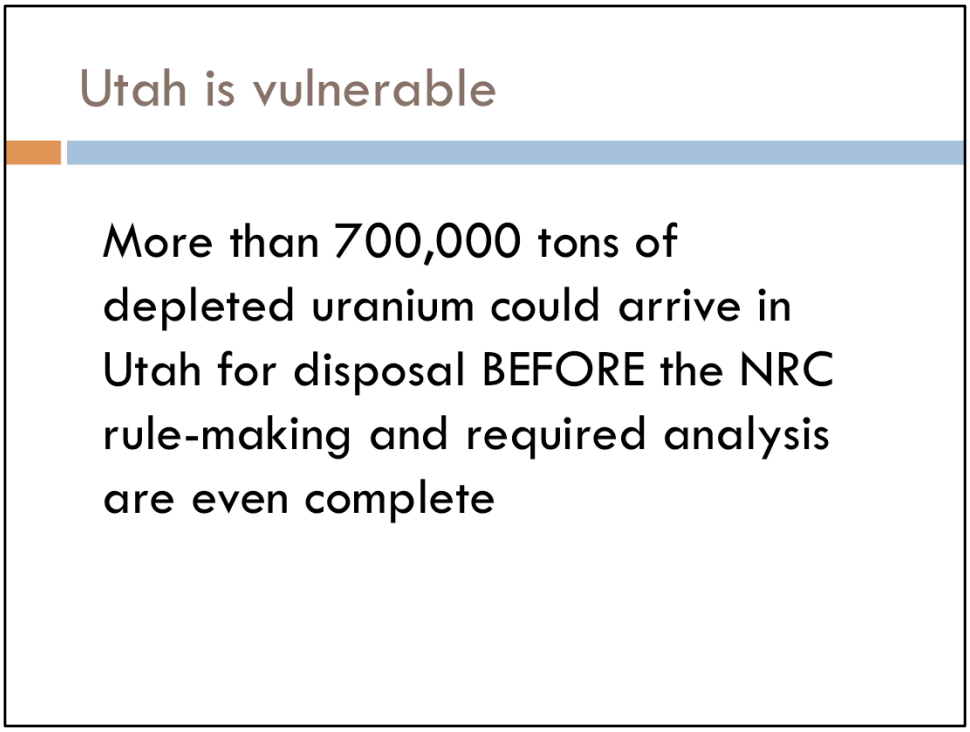
First of all, I was shocked to find out that around 5,400 drums of depleted uranium were sent to EnergySOlutions Utah site just last October. I was alarmed because I knew that the NRC was only just starting to look at the question of whether depleted uranium was safe to bury at a site like EnergySolutions. When I contacted the Division to find out more information about this material, I was further alarmed to find out that they did not have the waste documentation on hand. It was only after a member of the Board requested the manifests that I was sent a copy. Bottom line is that I'm not sure the state knew or was even concerned that this depleted uranium was coming here. After I reviewed the manifests and consulted a radiation expert, we determined that this was nearly pure depleted uranium oxide very similar to what we are concerned about.



Then also when I was in DC, I found out that the stimulus package passed by Congress will pay for the disposal of another 16,000 drums. The great thing about the stimulus bill is that it requires a huge degree of transparency in how the funds are being spent. So I was able to pull up the draft project plan and it looks as though a DOE subcontractor will award the contract to dispose the 16,000 drums this year and complete disposal in 2010. I don't know for sure that EnergySolutions will get this disposal contract, but I'd say it's a very good possibility.



I was also shocked last month when the Executive Secretary stated that EnergySolutions had disposed of 43,000 metric tons of depleted uranium over its history. This sounds like a lot. But when you compare that to the stockpile maintained by the Department of Energy, it pales in comparison. 16 TIMES as much depleted uranium will shortly be de-converted from gaseous to solid form and could be disposed within the next three years.



The bottom line is that because of the hole in our regulations, these 700,000 tons of depleted uranium could arrive in Utah for disposal before the NRC has even finished its rulemaking and before the analysis is even complete. This means that Utah is vulnerable and that our current laws and regulations won't stop this waste from coming here. This could have drastic implications for the heath of future Utahns. It could also have drastic financial implications for the site.

Temporary moratorium

- Temporary moratorium until NRC rule-making and analysis are complete
- Participate in the rule-making to ensure Utah health and safety standards observed
- Review the analysis with expert consultation
- Consider other rule-making as appropriate

Finally, here's what I would ask you as the Board to consider. Because we are vulnerable, because there is a lot of this depleted uranium that could be coming here later this year and in years to come, I am asking you to place a moratorium on depleted uranium disposal in our state – at least until the NRC has completed its rule-making and we understand if depleted uranium disposal can be safely done in Utah. With that, I'd be happy to take any questions.