(The Regular Scheduled Board Meeting of September 8, 2009,
was Postponed and Rescheduled to be
Held on the Following Date)

September 22, 2009

DRC BOARD MEETING

Department of Environmental Quality
168 N 1950 W
DEQ BLDG #2
Conference Room 101
SALT LAKE CITY, UT
84114-4850
3:00 p.m. – 5:00 p.m.

RADIATION CONTROL BOARD
Department of Environmental Quality (Bldg #2),
Conference Room 101, 168 North 1950 West, Salt Lake City, Utah
3:00 – 5:00 P.M., September 22, 2009

FINAL AGENDA

I. Minutes **(Board Action Item)**
   a. Approval of the Minutes from the July 14, 2009 Board Meeting

II. Rules
   No Items

III. Radioactive Materials Licensing/Inspection
   No Items

IV. X-Ray Registration/Inspection
   No Items

V. Radioactive Waste Disposal
   a. Responses from the U.S. Nuclear Regulatory Commission (NRC) to Board Questions Regarding Disposal of Depleted Uranium **(Board Information Item)**

   b. Consideration of Proposals for Policy & Rules on Disposal of Depleted Uranium **(Board Action Item)**

VI. Uranium Mill Licensing and Inspection
   No Items

VII. Other Division Issues **(Board Information Item)**
   a. Division Activities Report

VIII. Public Comment

IX. **The Next Scheduled Board Meeting: October 13, 2009 (Tuesday)**, DEQ Bldg #2, Conference Room 101, 168 North 1950 West, Salt Lake City, Utah 3:00 – 5:00 P.M.

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Public Attendance Sheet

Utah Radiation Control Board Meeting

DEQ Bldg. #2, Conf. Room 101
168 N 1950 W, Salt Lake City, UT 84114-4850
3:00 – 5:00 p.m.
September 22, 2009

Please Print

NAME (Please Print)	Organization/Affiliation Phone Number and Email Address:	Speak: Yes or No? If Yes, which Agenda Item Do you Wish to Address Before the Board Today? (List Item#)
1. David Esh	US NRC 301 415 6705 david.esh@nrc.gov	NA
2. Chris Grossman	USNRC christopher.grossman 301-415-7658 @nrc.gov	No
3. Anna Bradford	USNRC anna.bradford 301-415-1827@nrc.gov	No
4. Lisa London	US NRC 301/415-3233 lisa.london@nrc.gov	No
5. LARRY CAMPER	USNRC larry.camper@nrc.gov 301-415-7437	
6. John GREEVES	TECHSMAN INT. 3014523511 GREEVESJC@AOL.COM	No.
7. Duncan White	USNRC 301-415-2598 duncan.white@NRC.gov	NO
8. GREGORY SUBER	USNRC / 301 415 8087 GREGORY.SUBER@NRC.GOV	NO
9. Richard Codell	USNRC Consultant 9 Northwood Ln Sandy UT 84092	NO
10. Dan Shrum	Energy Solutions	NO
11. Sarah Anderson	Exchange Monitor	NO
12. Mark Ledoux	Energy Solutions	No
13. Sue Rice	Cavanagh Services	No
14. GEORGE GATES	HEAL UTAH	NO
15. Laura Lockhart	AG for DRC	No
16. James Holtkamp	Hollow & Hurst	No
17. James O'Neal	citizen	yes (item V) ✓
18. Kent Stahelin	"	No,
19. KRISTA BOWERS	citizen	no

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20. THOMAS MAGETTE	ENERGY SOLUTIONS	N
21. Beatrice Brailsford	Shoshone-Bannock Tribes, Idaho	N
22. Tom Rushing	Ut DRC	N
23. David Essar	DRC	N
24. Mario A. Bettolo	DRC	N
25. Vanessa Pierce	HEAL Utah	N
26. ROLAINE COULTER	HEAL UTAH	N
27. Mary Rogers	HEAL UTAH	N
28. AMY O'CONNOR	NA	N
29. John Coulter	Heal	N
30. CHRISTOPHER THOMAS	HEAL Utah	Yes V. ✓
31. Eric Spreng	HEAL Utah	N
32. Joel Clay	Citizen	N
33.		
34.		
35.		
36.		
37.		
38.		

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96. Bob Archibald	801 9433264	No
97. Mary Ellen Navas	801 2376288	No
98. Mike Zody	PB-T	No
99. Gil Clifford		
100. Sandra Hays	801 572 2536	NO
101. Aurora E. Shlien	Citizens for Sustainability 801-413-8321	no
102. Cherry Berg	Waneta Corp	No
103. Fynbo	Jeff 801-968 8470	no
104. Polly Hough	801-953-1320	Yes X
105. Joe Carth	801 359-6686	no
106.		
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114.		

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77. Janine Morga	Heal Utah	
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39. Helene Cuomo		yes ✓
40. Claire Geddes		
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DIVISION OF RADIATION CONTROL
BOARD

VOTING POLL

13 Board Voting Members
13– Total DRC Board Members

DRC Board Mtg Date: Sept. 22, 2009
DRC Board Members Present:_____
DRC Board Members Absent:_____
Total DRC Board Members:_____

Action Item on Agenda:
Item V. Radioactive Waste
b. Presentations by HEAL – Utah, and Energy*Solutions*, LLC "Moratorium On Disposal of Depleted Uranium Low-Level Radioactive Waste" (Board Action Item)

Name of Board Member Vote on:

	Listed in Seating Order: (Your Right to Left)	Attending Mtg/ Yes or NO	Vote: Yeah/ Yes	Vote: Neah/ No	Abstain:	MOTION PASSED	MOTION DID NOT PASS	
1	Scott Bird		✓					
2	Christian K. Gardner			X				
3	Patrick D. Cone			X				
4	Frank D. DeRosso, MSPH, CIH		✓					
5	John W. Thomson, M.D.			X				
6	Amanda Smith, DEQ Exec. Director		X					
	Dane L. Finerfrock, Exec. Sec.	N/A	N/A	N/A		N/A	N/A	
7	Peter A. Jenkins, M.S. CHP, DRC Chair							
8	Elizabeth Goryunova, M.S. DRC Vice Chair							
9	Joseph K. Miner, M.D., MSPH		X					
10	Colleen Johnson		X					
11	Douglas S. Kimball, DMD		X					
12	Edd C. Johnson		✓					
13	David A. Tripp, Ph.D.		X					
	Total DRC Board Members							
	Total Voting – Yeah/Yes							
	Total Voting – Neah/No							
	Total DRC Board Member's Abstention on This Vote							
	Vote Passed – Approved, Yes							
	Vote Did Not Pass - No							

8/3

Next Month

DIVISION OF RADIATION CONTROL
BOARD

VOTING POLL

13 Board Voting Members
13– Total DRC Board Members

DRC Board Mtg Date: Sept. 22, 2009
DRC Board Members Present: 12
DRC Board Members Absent: 1 Elizabeth Goryunova Absent
Total DRC Board Members: 13

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Name of Board Member

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1	Scott Bird							
2	Christian K. Gardner							
3	Patrick D. Cone							
4	Frank D. DeRosso, MSPH, CIH							
5	John W. Thomson, M.D.							
6	Amanda Smith, DEQ Exec. Director							
	Dane L. Finerfrock, Exec. Sec.	**N/A**	**N/A**	**N/A**		**N/A**	**N/A**	
7	Peter A. Jenkins, M.S. CHP, DRC Chair							
8	Elizabeth Goryunova, M.S. DRC Vice Chair							
9	Joseph K. Miner, M.D., MSPH							
10	Colleen Johnson							
11	Douglas S. Kimball, DMD							
12	Edd C. Johnson							
13	David A. Tripp, Ph.D.							
	Total DRC Board Members							
	Total Voting – Yeah/Yes							
	Total Voting – Neah/No							
	Total DRC Board Member's Abstention on This Vote							
	Vote Passed – Approved, Yes							
	Vote Did Not Pass - No							

RADIATION CONTROL BOARD
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   c.

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V. Radioactive Waste Disposal

a. Responses from the U.S. Nuclear Regulatory Commission (NRC) to Board Questions Regarding Disposal of Depleted Uranium (Board Information Item)

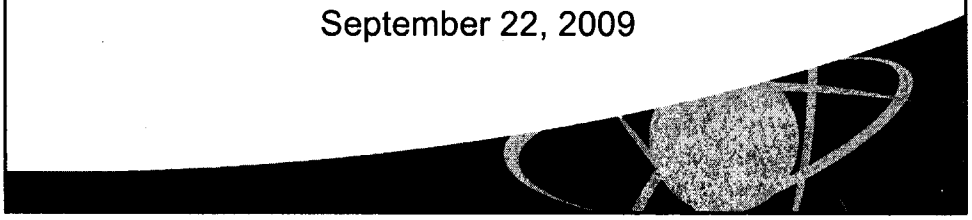
Additional Handout by U.S. Nuclear Regulatory Commission (NRC)
Handed-out at the DRC Board Meeting for their
Presentation to the Board
Tuesday, September 22, 2009

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Response to Questions Regarding Depleted Uranium

Utah Radiation Control Board Meeting

David Esh
Division of Waste Management and Environmental Protection
September 22, 2009



1. What are the criteria used by the NRC staff in their report to the NRC Commissioners, regarding the possible re-classification of DU? How did the 3 options vary that were presented?

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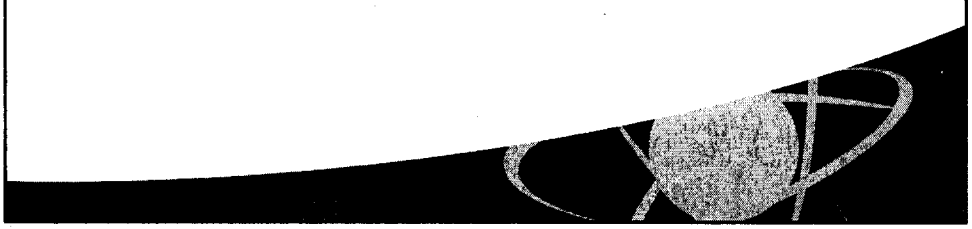
United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Reclassification was not attempted as part of SECY-08-0147
- Primary variable of options was the degree of change (minimal to extensive)



2. Is there a possibility that the classification of DU will be revisited in the near future? If not, why not? Is the NRC "strongly" considering placing DU as a special subset of Class A waste with different disposal requirements?

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United States Nuclear Regulatory Commission
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Answer:

- Unlikely in the near future
- Deliberative process with stakeholders important
- No immediate public health and safety concern
- It is unlikely large quantities of DU can be disposed of as Class A waste without additional requirements
- Analysis must support its safe disposal

3. Please describe the performance analysis that was used to develop the specifications for the waste disposal of DU. For example, source function (i.e. amounts), time scale, and possible events that could impact the outcome?

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Answer:

- See next four slides

  - **Source type and quantity**: variable (1 to 1E6 MT)
  - **Time scale**: variable (1,000 to 1,000,000 years)
  - **Events**: normal natural processes (not geomorphological processes)

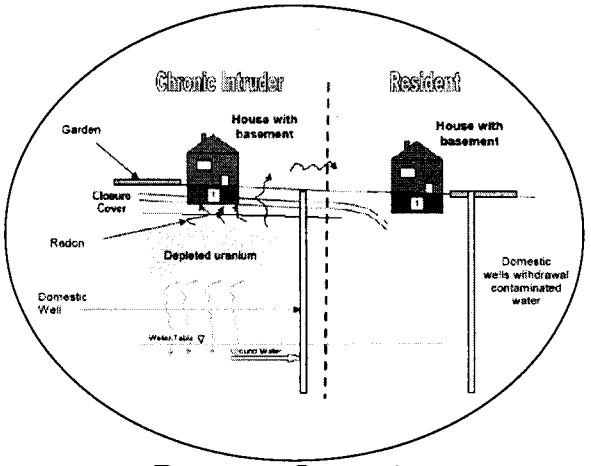
Depleted Uranium: NRC Analysis

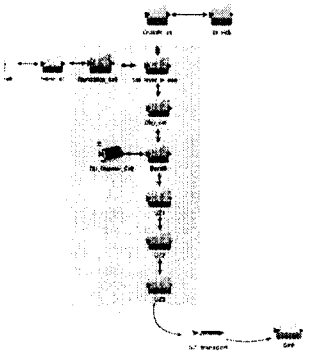
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Screening model developed for SECY-08-0147
- Developed to examine key variables:
  - Period of performance
  - Disposal depth
  - Receptor types and scenarios
  - Site characteristics
- Performed probabilistic assessment
- Analysis methodology for unique waste streams consistent with original Part 61 analysis

Depleted Uranium: NRC Analysis

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment





Receptor Scenarios

Depleted Uranium: NRC Analysis

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Major variables: period of performance, disposal depth, receptor scenarios
- Uncertainty analysis performed with genetic algorithms
- Key parameters:
  - Hydraulic conductivity and gradient of the aquifer
  - Infiltration rate
  - Geochemical conditions
  - Liquid saturation
  - Properties of the house and scenario (radon related)

Depleted Uranium: NRC Analysis

U.S.NRC
United States Nuclear Regulatory Commission
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- If radon is included, shallow disposal at an arid site is challenging
- For humid sites, the groundwater pathway can exceed the performance objectives
- Greater consideration of long-term stability needed
- Site-specific conditions can result in large variance in impacts

4. If the State of Utah either banned or placed a moratorium on DU disposal within the State, what would the NRC reaction be? Would this action threaten Utah's inclusion as one of the "agreement states"?

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United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- This depends on the basis of a ban or moratorium:
  - Utah should provide NRC with any proposed language
  - NRC staff would make a determination regarding compatibility
  - NRC would work with the State to resolve any issues that affect compatibility of the low-level waste program
- This action could affect compatibility status (of this specific area)

5. What are the long and short-term dangers of DU in an engineered facility? What are the health and safety issues related to DU in an above-ground waste facility as opposed to a geological facility similar to Yucca Mountain?

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United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Short-term risks are minimal in an engineered facility
- Long-term risks can result from groundwater (leaching), radon, and direct exposure pathways (if disturbed)
- Above ground vs. geologic disposal:
  - Radon risk is highly-nonlinear with depth
  - Likelihood of disturbance is higher with near surface
  - Geologic stability is higher with deep disposal

6. Is it possible that the Energy Solutions site at Clive Utah will not be a suitable disposal site for DU given its above-ground shallow cells? (See question #9)

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United States Nuclear Regulatory Commission
Protecting People and the Environment

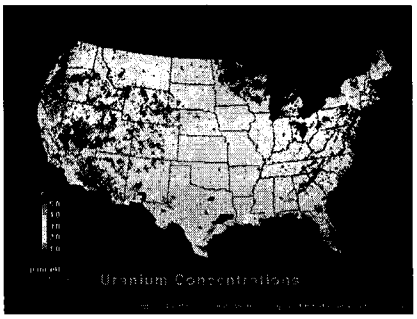
Answer:

- Suitability of the Clive site for DU must be evaluated with a site-specific analysis
- Utah Division of Radiation Control has responsibility as agreement State regulator
- Above-grade disposal is not ideal for long-lived waste, but may be suitable
- Assessment becomes more challenging with long-lived radioactive waste

Uranium in the Environment

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Uranium in surface soils ~ 1 to 5 ppm
- Mean atmospheric radon is ~ 0.25 pCi/L
- Indoor average radon levels ~ 1.5 to 4.2 pCi/L
- Radon contributes roughly 70% of the average annual dose in the United States (~250 mrem/yr)

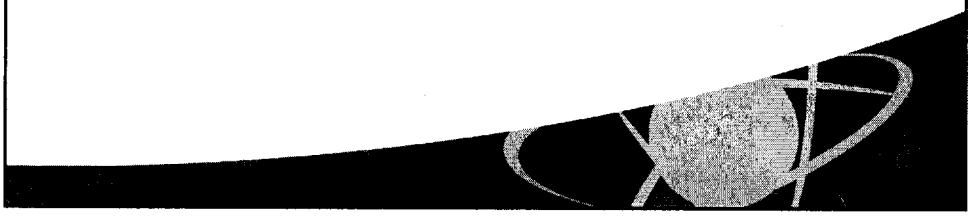


7. How much DU needs to be disposed, both domestic and foreign? What's DOE's role in this? Is there a pressing need for disposal? What are the projected timeframes?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Greater than 1,000,000 MT (700k DOE, 400k LES, other)
- Not aware of foreign sources
- 14,800 drums of legacy waste from SRS – Sept 2009
- DOE de-converted DU disposal - mid-2010



8. What are the health and safety issues associated with DU disposal prior to the final rule making by the NRC? Are preemptive actions required?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Material disposed of in an engineered facility under institutional control poses minimal risk
- Preemptive actions are not anticipated

9. Does increasing the burial depth to a minimum of 10 feet remove the risks? If not, what does NRC feel the burial depth should be? This should be asked for short or long term time periods.

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United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Increasing burial depth can lessen but not eliminate risk

Examples (Regulatory Guide 3.64 [20 pCi/(m^2 s)])[1,2]:

- arid conditions/ peak ~8 m (5 to 13)
- humid conditions/ peak ~2 m
- arid conditions/ 10,000 yr ~5 m (2 to 7)
- humid conditions/ 10,000 yr ~1 m

[1] Use of clay (if kept wet) can reduce thicknesses
[2] Site-specific analysis is needed

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Thank you, questions?

Contact Information:

David Esh
david.esh@nrc.gov

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Backup

Commission Direction

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Memorandum and Order CLI-05-20, 10/19/05
  - Commission directed staff, "outside of the LES adjudication, to consider whether the quantities of depleted uranium (DU) at issue in the waste stream from uranium enrichment facilities warrant amending section 61.55 (a)(6) or the section 61.55 (a) waste classification tables."

Options Evaluated

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Generic Communication
- Require site-specific analysis
- Classification of DU within existing classification framework
- Re-examine existing waste classification framework

Path Forward

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Commission chose a two-tiered approach
  - Site-specific performance assessment
  - Budget to re-examine the waste classification framework in the long-term

Site-specific PA + Re-examine framework

DIVISION OF RADIATION CONTROL

BOARD MEETING

September 22, 2009

ADDITIONAL SUPPLEMENTS

DRC BOARD FILE

RADIATION CONTROL BOARD
Department of Environmental Quality (Bldg #2),
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JIM MATHESON
2ND DISTRICT, UTAH

http://matheson.house.gov

ENERGY AND COMMERCE COMMITTEE

SUBCOMMITTEES:
HEALTH
ENERGY AND AIR QUALITY
COMMERCE, TRADE AND CONSUMER PROTECTION

SCIENCE AND TECHNOLOGY COMMITTEE

Congress of the United States
House of Representatives
Washington, DC 20515-4402

September 16, 2009

The Honorable Steven Chu
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary Chu:

I write to you regarding my concern about the Department of Energy's decision to dispose of part of its vast depleted uranium stockpile in Utah and to ask that any future depleted uranium disposal be temporarily suspended.

As you know, the U.S. Nuclear Regulatory Commission (NRC) issued a controversial split-decision earlier this year to designate large amounts of depleted uranium as Class A low-level waste. Depleted uranium is materially different from all other Class A waste, in that Class A waste is supposed to decay to reasonably safe levels within 100 years, whereas the radioactive hazard from depleted uranium actually increases over time for tens of thousands of years. At the time, NRC Chairman Gregory Jaczko dissented and said, "I do not believe the Commission should undermine the entire waste classification system, which is designed in such a way that Class A waste is meant to be that waste that poses the least hazard and requires the fewest restrictions on waste form and disposal."

As you also know, the Department of Energy currently maintains a vast stockpile of depleted uranium. Some of this depleted uranium—like that found in Portsmouth, Ohio and at Paducah, Kentucky—is the byproduct of uranium enrichment. A smaller but still significant portion arose as the byproduct of spent fuel reprocessing at Savannah River Site in South Carolina.

It is my understanding that the NRC staff is currently working on new rules that would formally designate significant quantities of depleted uranium as Class A waste. The new rules are expected to provide guidance regarding a new site specific evaluation process that will ensure that large amounts of depleted uranium are disposed of safely. However, these rules are not likely to be completed until 2012 or 2013.

Last month, the Department reported in a press release that nearly 15,000 drums of depleted uranium from the Savannah River Site in South Carolina will be shipped to a nuclear disposal site in Utah. The first of these shipments is set to arrive in October of this year.

WASHINGTON OFFICE
2434 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-4402
PHONE (202) 225-3011
FAX (202) 225-5638

SALT LAKE OFFICE:
240 EAST MORRIS AVENUE (2430 SOUTH) #236
SOUTH SALT LAKE, UT 84115
PHONE (801) 486-1236
FAX (801) 486-1417

SOUTHERN UTAH OFFICE
321 NORTH MALL DRIVE #E101B
SAINT GEORGE, UT 84790
PHONE (435) 627-0880
FAX (435) 627-1479

This is very concerning to me as I do not believe that such a large quantity of depleted uranium should be sent to Utah before the Nuclear Regulatory Commission determines what kind of evaluation will be required to ensure its safe disposal. Therefore, I ask you to postpone plans to dispose of the Savannah River Site depleted uranium until the Nuclear Regulatory Commission finishes its rulemaking process. Furthermore, the Department of Energy should immediately suspend all decision-making with regard to disposal of the much larger depleted uranium stockpiles at the Portsmouth and Paducah enrichment sites until the Nuclear Regulatory Commission rules and guidelines are complete.

Given your support for cleaning up contaminated nuclear weapons sites—which I fully support—I hope we can work together to better address this issue. Thank you for your prompt consideration of this request. I look forward to your response.

Sincerely,

JIM MATHESON
Member of Congress

JIM MATHESON
2ND DISTRICT, UTAH

http://matheson.house.gov

Congress of the United States
House of Representatives
Washington, DC 20515-4402

ENERGY AND COMMERCE COMMITTEE

SUBCOMMITTEES:
HEALTH
ENERGY AND AIR QUALITY
COMMERCE, TRADE AND CONSUMER PROTECTION

SCIENCE AND TECHNOLOGY COMMITTEE

September 16, 2009

The Honorable Steven Chu
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

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Member of Congress

VII. Other Division Issues **(Board Information Item)**
   a. Division Activities Report

Division of Radiation Control
Activities Report Summary

July & August, 2009

Notices of Violation assigned a Severity Level I, II, or III or where a Monetary Penalty has been imposed.

1. Professional Service Industries (PSI), Oakbrook Terrace, IL; Severity Level III and $2,500.00 civil Penalty

   An inspector investigated an allegation that Professional Service Industries, a licensee of the U.S. Nuclear Regulatory Commission (NRC), was performing industrial radiography in Utah without following the reciprocal recognition licensing requirements. By rule, an out-of-state licensee must notify the Executive Secretary in writing at least three days prior to the use of licensed materials in Utah. Notifications must indicate the location, period, and type of proposed possession and use within Utah and must be accompanied by a copy of the radioactive material license.

2. Bayou Inspection Services, Inc., Amelia, LA; Severity Level III

   This licensee was working in Utah by reciprocal recognition of their State of Louisiana radioactive material license. Two Severity Level III violations were observed and both involved security matters. First, the licensee allowed an individual to have unescorted assess to a large quantity of radioactive material and the individual had not been deemed trustworthy and reliable by the licensee. Second, the licensee stored a large quantity of radioactive material in two vehicles without a representative available at close proximity to respond to a theft or intrusion alarm.

V. Radioactive Waste (Board Action Item)

b. Consideration of Proposals for Policy & Rules on Disposal of Depleted Uranium

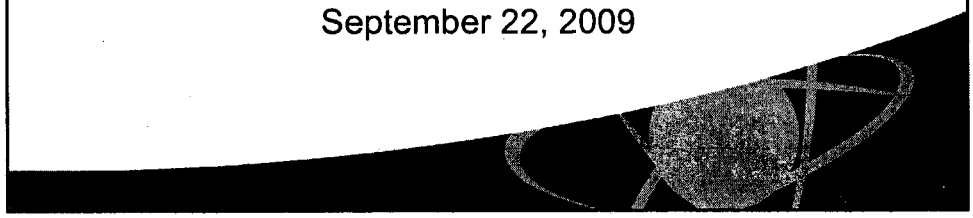
(correct copy)
Sept 22, 2009

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Response to Questions Regarding Depleted Uranium

Utah Radiation Control Board Meeting

David Esh
Division of Waste Management and Environmental Protection
September 22, 2009

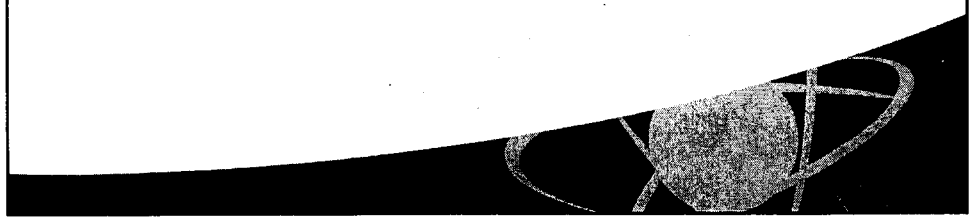


1. What are the criteria used by the NRC staff in their report to the NRC Commissioners, regarding the possible re-classification of DU? How did the 3 options vary that were presented?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Reclassification was not attempted as part of SECY-08-0147
- Primary variable of options was the degree of change (minimal to extensive)



2. Is there a possibility that the classification of DU will be revisited in the near future? If not, why not? Is the NRC "strongly" considering placing DU as a special subset of Class A waste with different disposal requirements?

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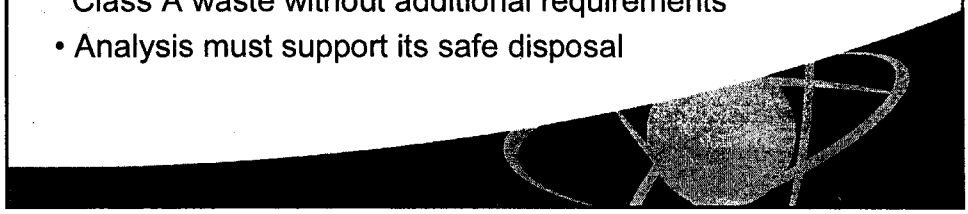
Answer:

- Unlikely in the near future
- Deliberative process with stakeholders important
- No immediate public health and safety concern
- It is unlikely large quantities of DU can be disposed of as Class A waste without additional requirements
- Analysis must support its safe disposal



3. Please describe the performance analysis that was used to develop the specifications for the waste disposal of DU. For example, source function (i.e. amounts), time scale, and possible events that could impact the outcome?

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United States Nuclear Regulatory Commission
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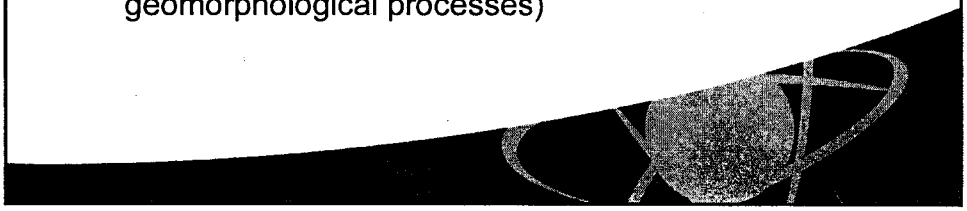
Answer:

- See next four slides

  - **Source type and quantity**: variable (1 to 1E6 MT)
  - **Time scale**: variable (1,000 to 1,000,000 years)
  - **Events**: normal natural processes (not geomorphological processes)



Depleted Uranium: NRC Analysis

U.S.NRC
United States Nuclear Regulatory Commission
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- Screening model developed for SECY-08-0147
- Developed to examine key variables:
  - Period of performance
  - Disposal depth
  - Receptor types and scenarios
  - Site characteristics
- Performed probabilistic assessment
- Analysis methodology for unique waste streams consistent with original Part 61 analysis

Depleted Uranium: NRC Analysis

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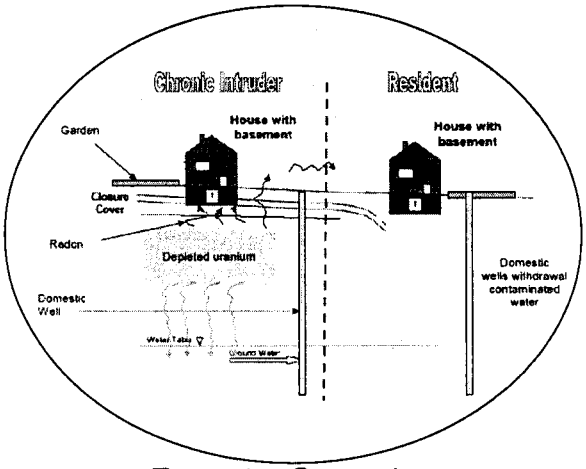

Receptor Scenarios

Depleted Uranium: NRC Analysis

U.S.NRC
United States Nuclear Regulatory Commission
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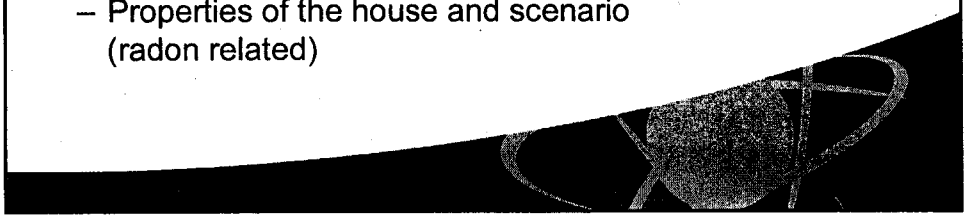
- Major variables: period of performance, disposal depth, receptor scenarios
- Uncertainty analysis performed with genetic algorithms
- Key parameters:
  - Hydraulic conductivity and gradient of the aquifer
  - Infiltration rate
  - Geochemical conditions
  - Liquid saturation
  - Properties of the house and scenario (radon related)



Depleted Uranium: NRC Analysis

U.S.NRC
United States Nuclear Regulatory Commission
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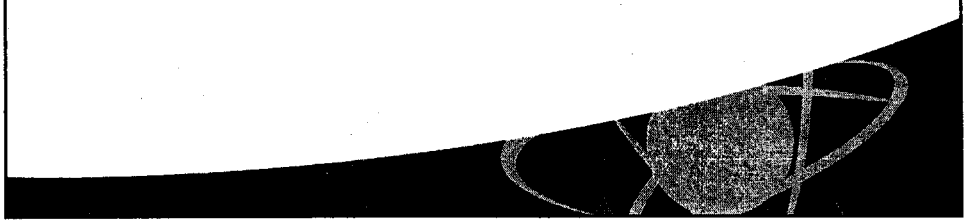
- If radon is included, shallow disposal at an arid site is challenging
- For humid sites, the groundwater pathway can exceed the performance objectives
- Greater consideration of long-term stability needed
- Site-specific conditions can result in large variance in impacts



4. If the State of Utah either banned or placed a moratorium on DU disposal within the State, what would the NRC reaction be? Would this action threaten Utah's inclusion as one of the "agreement states"?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- This depends on the basis of a ban or moratorium:
  - Utah should provide NRC with any proposed language
  - NRC staff would make a determination regarding compatibility
  - NRC would work with the State to resolve any issues that affect compatibility of the low-level waste program
- This action could affect compatibility status (of this specific area)

5. What are the long and short-term dangers of DU in an engineered facility? What are the health and safety issues related to DU in an above-ground waste facility as opposed to a geological facility similar to Yucca Mountain?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Short-term risks are minimal in an engineered facility
- Long-term risks can result from groundwater (leaching), radon, and direct exposure pathways (if disturbed)
- Above ground vs. geologic disposal:
  - Radon risk is highly-nonlinear with depth
  - Likelihood of disturbance is higher with near surface
  - Geologic stability is higher with deep disposal

6. Is it possible that the Energy Solutions site at Clive Utah will not be a suitable disposal site for DU given its above-ground shallow cells? (See question #9)

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Answer:

- Suitability of the Clive site for DU must be evaluated with a site-specific analysis
- Utah Division of Radiation Control has responsibility as agreement State regulator
- Above-grade disposal is not ideal for long-lived waste, but may be suitable
- Assessment becomes more challenging with long-lived radioactive waste

Uranium in the Environment

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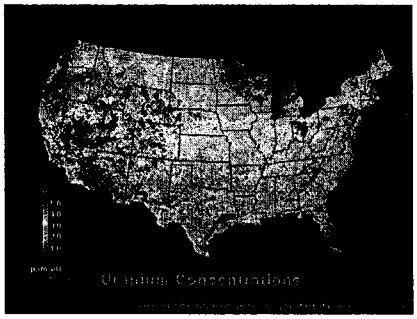
- Uranium in surface soils ~ 1 to 5 ppm
- Mean atmospheric radon is ~ 0.25 pCi/L
- Indoor average radon levels ~ 1.5 to 4.2 pCi/L
- Radon contributes roughly 70% of the average annual dose in the United States (~250 mrem/yr)



7. How much DU needs to be disposed, both domestic and foreign? What's DOE's role in this? Is there a pressing need for disposal? What are the projected timeframes?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Answer:

- Greater than 1,000,000 MT (700k DOE, 400k LES, other)
- Not aware of foreign sources
- 14,800 drums of legacy waste from SRS – Sept 2009
- DOE de-converted DU disposal - mid-2010

8. What are the health and safety issues associated with DU disposal prior to the final rule making by the NRC? Are preemptive actions required?

U.S.NRC
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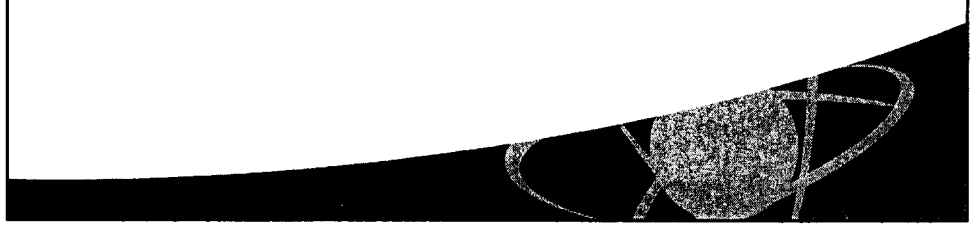
Answer:

- Material disposed of in an engineered facility under institutional control poses minimal risk
- Preemptive actions are not anticipated



9. Does increasing the burial depth to a minimum of 10 feet remove the risks? If not, what does NRC feel the burial depth should be? This should be asked for short or long term time periods.

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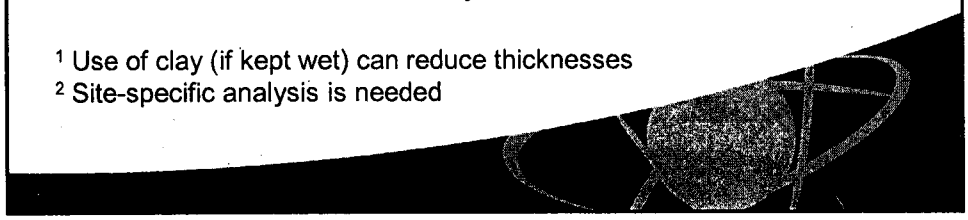
Answer:

- Increasing burial depth can lessen but not eliminate risk

Examples (Regulatory Guide 3.64 [20 pCi/(m^2 s)])[1,2]:

- arid conditions/ peak ~8 m (5 to 13)
- humid conditions/ peak ~2 m
- arid conditions/ 10,000 yr ~5 m (2 to 7)
- humid conditions/ 10,000 yr ~1 m

[1] Use of clay (if kept wet) can reduce thicknesses
[2] Site-specific analysis is needed



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United States Nuclear Regulatory Commission
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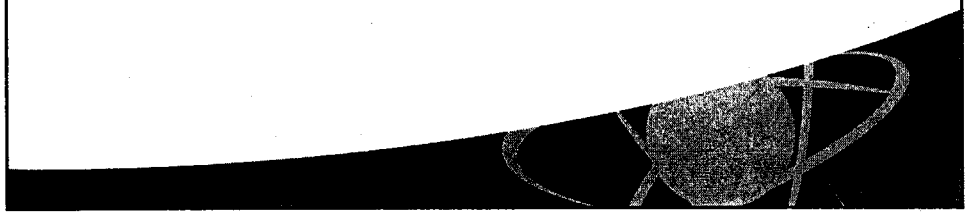
Thank you, questions?

Contact Information:

David Esh
david.esh@nrc.gov



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Backup

Commission Direction

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Memorandum and Order CLI-05-20, 10/19/05
  - Commission directed staff, "outside of the LES adjudication, to consider whether the quantities of depleted uranium (DU) at issue in the waste stream from uranium enrichment facilities warrant amending section 61.55 (a)(6) or the section 61.55 (a) waste classification tables."

Options Evaluated

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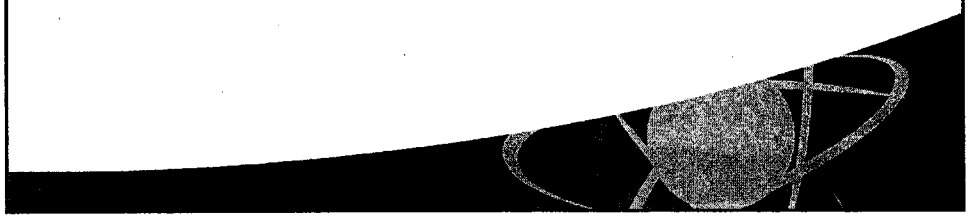
Protecting People and the Environment

- Generic Communication
- Require site-specific analysis
- Classification of DU within existing classification framework
- Re-examine existing waste classification framework



Path Forward

U.S.NRC
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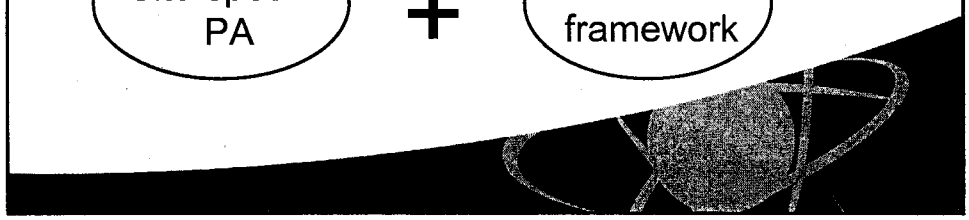
- Commission chose a two-tiered approach
  - Site-specific performance assessment
  - Budget to re-examine the waste classification framework in the long-term

Site-specific PA + Re-examine framework



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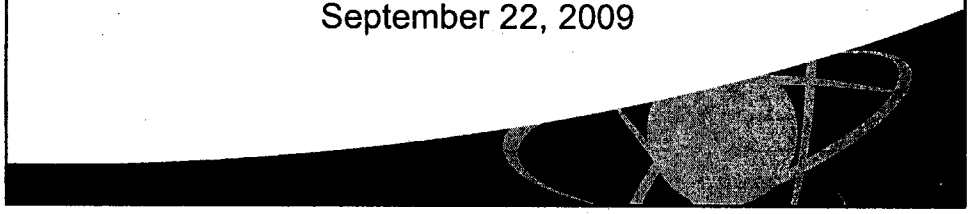
NRC Response to Questions Regarding Depleted Uranium

Utah Radiation Control Board Meeting

David Esh
Division of Waste Management and Environmental Protection
September 22, 2009



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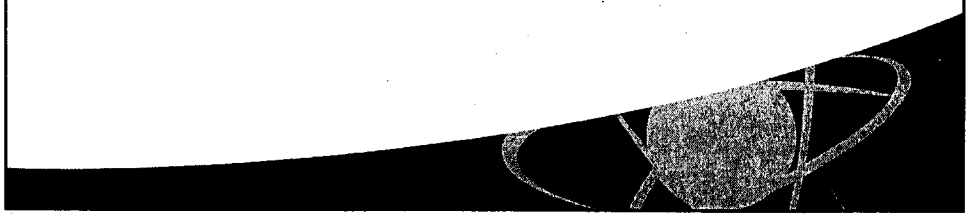

Depleted Uranium: NRC Analysis

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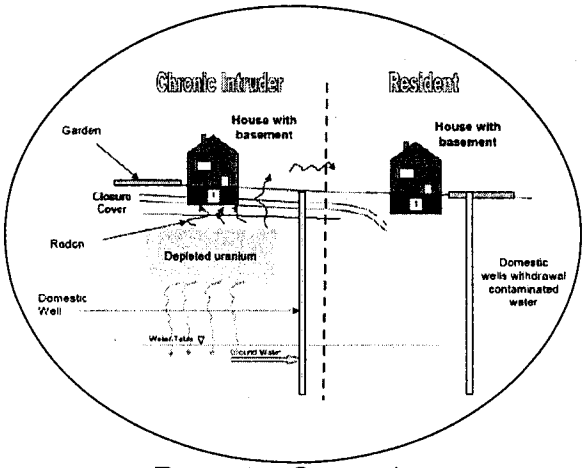
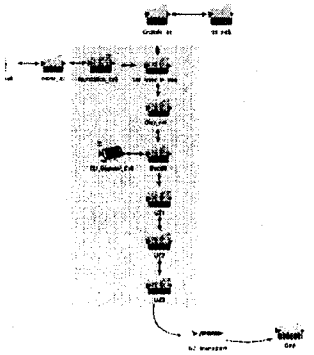


Receptor Scenarios



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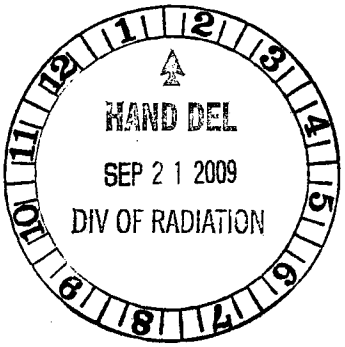
ENERGY*SOLUTIONS*



September 21, 2009

CD09-0241

Ms. Amanda Smith
Executive Director
Utah Department of Environmental Quality
P.O. Box 144850
Salt Lake City, UT 84114-4850

Re: Radioactive Material License Number UT 2300249 – Commitments Relating to Depleted Uranium Disposal

Dear Ms. Smith:

This letter summarizes commitments Energy*Solutions* made on July 14, 2009 to the Utah Radiation Control Board regarding disposal of depleted uranium. At that meeting, Energy*Solutions* presented its understanding of the current and likely future direction of the Nuclear Regulatory Commission (NRC) rulemaking on this subject and outlined actions the company has voluntarily undertaken to address concerns that have been raised regarding the disposal of depleted uranium. These actions take into account the findings of the NRC as described in the NRC's paper, *Response to Commission Order CLI-05-20 Regarding Depleted Uranium*, October 7, 2008, SECY-08-0147, and address the specific focus of the ongoing rulemaking that will establish requirements for site-specific performance assessments.

Consistent with commitments made to the Board, Energy*Solutions* is engaged in the following specific actions:

1. Disposal depth: The generic NRC evaluations of depleted uranium disposal suggest a disposal depth of at least 10 feet. Therefore, Energy*Solutions* will dispose of wastes with depleted uranium concentrations greater than 5 percent (by weight) a minimum of 10 feet below the top of cover. This commitment has been captured in License amendment 5 at condition 35.

2. Performance assessment: Energy*Solutions* has contracted with Neptune and Company, the industry recognized experts in the field of performance assessments, to provide an updated performance assessment for depleted uranium disposal. It might be helpful for you to know that Neptune and Company was selected by the DOE to complete the performance assessment for low-level radioactive waste disposal at the U.S. Department of Energy's Nevada Test Site. We anticipate that the performance assessment will be provided to your staff by December 2010.

   This type of performance assessment is the subject of NRC's current rulemaking and the topic of workshops on depleted uranium disposal. While final criteria for the performance assessment have not yet been codified, we believe there is sufficient information in

existing NRC guidance to get started. Furthermore, our efforts are guided by the results of the first workshop held by NRC in Bethesda, Maryland on September 2-3, 2009. By initiating work on the performance assessment before NRC rulemaking is complete, the review cycle will be accelerated. Changes to input parameters based on Final NRC rules or guidance can be easily incorporated into the dynamic performance assessment.

3. Revised disposal embankment design: Results of the performance assessment will be used to implement any changes to disposal operations and cover design necessary to ensure compliance with the requirements of 10 CFR Part 61 or Utah Administrative Code R313. For example, we anticipate that depleted uranium will require greater depth of cover than other Class A low-level radioactive wastes and therefore adjusted our disposal depth accordingly. This potential re-design will consider wastes that have been disposed of previously, including depleted uranium received from the U.S. Department of Energy's Savannah River Site.

   If, upon completion of the performance assessment, a revised cover design is required, then Energy*Solutions* will provide your staff with a revised design and construct the embankments accordingly. Similarly, if other barriers or disposal methods unique to depleted uranium are indicated, these will of course be adopted.

As mentioned above, our commitment described in item 1 is already captured in the License and we are already performing consistent with the commitments described above. If the Division of Radiation Control would like to make additional changes to our License to reflect the commitments described in items 2 and 3 we will certainly be accommodating.

Please feel free to contact me or Dan Shrum at your convenience if you have any questions regarding the foregoing. You can reach me directly at 801-580-5443. You can reach Dan at 801-649-2109.

Sincerely,

Val J. Christensen
President
Energy*Solutions*

cc Dane Finerfrock

RADIATION CONTROL BOARD

Department of Environmental Quality (Bldg #2)
Conference Room 101, 168 North 1950 West, Salt Lake City, Utah
3:00 – 5:00 P.M., September 22, 2009

TENTATIVE AGENDA

I. Minutes **(Board Action Item)**
   a. Approval of the Minutes from the July 14, 2009 Board Meeting

II. Rules
   No Items

III. Radioactive Materials Licensing/Inspection
   No Items

IV. X-Ray Registration/Inspection
   No Items

V. Radioactive Waste (Board Action Item)
   a. Responses from the U.S. Nuclear Regulatory Commission (NRC) to Board Questions Regarding Disposal of Depleted Uranium

VI. Uranium Mill Licensing and Inspection
   No Items

VII. Other Division Issues **(Board Information Item)**
   a. Division Activities Report

VIII. Public Comment

IX. **The Next Scheduled Board Meeting: October 12, 2009 (Tuesday)**, DEQ Bldg #2, Conference Room 101, 168 North 1950 West, Salt Lake City, Utah 3:00 – 5:00 P.M.

For those individuals needing special assistance in accordance with the Americans with Disabilities Act, please contact Brooke Baker at the Utah Department of Environmental Quality, at 168 North 1950 West, Salt Lake City, UT 84116, Office of Human Resources at (801) 536-4412, TDD (801) 536-4414, or by email at: bbaker@utah.gov.

1

I. Minutes (Board Action Item)

a. Approval of the Minutes from the July 14, 2009 Board Meeting

2

II. Rules

No Items

3

III. Radioactive Materials Licensing/Inspection

No Items

4

IV. X-Ray Registration/Inspection

No Items

5

V. Radioactive Waste (Board Action

a. Responses from the U.S. Nuclear Regulatory Commission (NRC) to Board Questions Regarding Disposal of Depleted Uranium

6

VI. Uranium Mill Licensing and Inspection

No Items

7

VII. Other Division Issues (Board Info Items)

a. Division Activities Report

VIII. Public Comment

8

IX. Other Issues:

The Next Scheduled Board Meeting: October 13, 2009 (Tuesday), DEQ Bldg #2, Conference Room 101, 168 North 1950 West, Salt Lake City, Utah, 3:00 – 5:00 P.M.

I. Minutes (Board Action Item)

a. Approval of the Minutes from the July 14, 2009 Board Meeting

MINUTES

OF

THE UTAH RADIATION CONTROL BOARD

July 14, 2009

Department of Environmental Quality, DEQ Building #2

Conference Room 101

168 N 1950 W

Salt Lake City, Utah 84114-4850

BOARD MEMBERS PRESENT
Peter A. Jenkins, M.S., CHP, Chair
Elizabeth Goryunova, M.S., Vice Chair
Dane L. Finerfrock, Executive Secretary
Scott Bird
Patrick D. Cone
Frank D. DeRosso, MSPH, CIH
Christian K. Gardner
Colleen Johnson
Edd C. Johnson
Joseph K. Miner, M.D., MSPH
Amanda Smith, Acting DEQ Executive Director
John W. Thomson, M.D.
David A. Tripp, Ph.D.

BOARD MEMBERS ABSENT/EXCUSED
Douglas S. Kimball, DMD

DRC STAFF/OTHER DEQ MEMBERS PRESENT
Phil Goble, DRC Staff
John Hultquist, DRC Section Manager
Craig Jones, DRC Section Manager
Laura Lockhart, Attorney, Atty General's Office
Yoli Necochea, DRC Staff
Fred Nelson, Attorney, Atty General's Office
Loren Morton, DRC Section Manager
Sonja Robinson, DRC Staff
Donna Spangler, PIO, DEQ – PPA Staff

PUBLIC
Krista Bowers, Concerned Citizen
Jeff Clay, Concerned Citizen
Chris Cowley, M.D., UPHE
Michael Cowley, Concerned Citizen
Candice Fitches, Student
Tim Fine, HEAL-Utah
Bob Henline, Concerned Citizen
Amy Jeffs, Concerned Citizen
Len Jeppson, Concerned Citizen
Mark Ledoux, Energy*Solutions*
Thomas Magete, Energy*Solutions*
Brian Moench, M.D.
Arthur Morris, HEAL-Utah
Stephen T. Nelson, Ph.D., Brigham Young University (BYU)
Sophia Nicholas, HEAL- Utah
Amy O'Donoghue, Deseret News
James O'Neal, Private Citizen, Provo, UT
Vanessa Pierce, HEAL-Utah
Mary Rogers, Concerned Citizen
Kate Savage, Concerned Citizen
Dan Shrum, Energy*Solutions*, LLC
Erick Spreny, HEAL-Utah
Christopher Thomas, HEAL-Utah
Cherry Wong, Women Concerned

GREETINGS/WORK MEETING CALLED TO ORDER

The Utah Radiation Control Board Work Meeting convened in the Department of Environmental Quality (DEQ), Conference Room 101, 168 North 1950 West, DEQ Bldg. 2, Salt Lake City, Utah. Peter A. Jenkins, Chair, called the Work Meeting to order at 2:30 p.m. Chairman Jenkins said the Executive Secretary, Dane L. Finerfrock, would give a presentation on the subject of Depleted Uranium (Copy Attached).

DRC Board Work Meeting Attendance:

(1) Peter A. Jenkins, M.S. CHP, DRC Chair
(2) Elizabeth Goryunova, M.S., Vice Chair
(3) Scott Bird
(4) Patrick D. Cone
(5) Frank D. DeRosso
(6) Christian K. Gardner
(7) Colleen Johnson
(8) Edd C. Johnson
(9) Amanda Smith, DEQ Exec. Director
(10) John W. Thomson, M.D.
(11) David A. Tripp, Ph.D.
(12) Dane L. Finerfrock, Executive Secretary

The Work Meeting ended at 3:07 p.m.

GREETINGS/MEETING CALLED TO ORDER

Peter A. Jenkins, Chairman, called the board meeting to order at 3:07 p.m. and welcomed the board members and the public. He indicated that if the public wished to address any items on the agenda, they should sign the public sign-in sheet. Those desiring to comment would be given an opportunity to address their concerns during the comment period.

I. APPROVAL OF MINUTES (Board Action Item)

a. Approval of the Minutes from the June 9, 2009 Board Meeting

Peter A. Jenkins, Chair, asked the board members if they had any corrections to the minutes from the June 9, 2009 board meeting. There were no corrections requested by the board members.

MOTION MADE BY EDD C. JOHNSON TO APPROVE THE MINUTES OF JUNE 9, 2009 AS WRITTEN

MOTION SECONDED BY ELIZABETH GORYUNOVA

MOTION CARRIED AND PASSED UNANIMOUSLY

II. RULES

No Items

III. RADIOACTIVE MATERIALS LICENSING/INSPECTION

No Items

IV. X-RAY REGISTRATION/INSPECTION

No Items

V. Radioactive Waste

a. **Presentation by Laura Lockhart: Utah Code Annotated § 19-3-104(8) "No More Stringent Rule" (Board Information Item)**

Peter A. Jenkins, Chairman, said the purpose of the presentations and discussion on depleted uranium (DU) would be to consider instigating a moratorium, until the U.S. Nuclear Regulatory Commission (NRC) could formulate a rule.

Laura Lockhart, Attorney General's Office, addressed the Board (Copy Attached).

Questions by the Board:

After Laura Lockhart's presentation, the board members discussed whether to impose a moratorium or instigate a rulemaking for depleted uranium:

(1) The board members asked if there was adequate legal standing, and if the moratorium on DU could be challenged.

Response:
Yes, the Board could act toward instigating a moratorium, and the moratorium could be challenged.

(2) The board members asked if a more stringent rule could be imposed by the Board, if there were a public health and safety issue not being addressed in the Federal rules.

Response:
The Solid and Hazardous Waste Control Board promulgated a more stringent rulemaking for a nerve agent of a hazardous waste. Ms. Lockhart said that this was a small issue for the Federal Government and a large issue for the Department of Environmental Quality (DEQ)--it made sense for DEQ to promulgate a more stringent rule.

(3) The board members asked for clarification on the application of the more stringent requirements.

Response:
The more stringent requirement would apply to rulemaking—it would not apply to a specific license or to inspections.

(4) The board members asked if a moratorium were imposed, if it could be challenged. They asked if the NRC could have a rule in place by the time the Board had settled on a rule.

Response:
The rule could most certainly be challenged. She said if there were a judicial review provision, the standard would be reasonableness. The court would also consider stringency requirements. The procedure would start at District Court, and has the potential to go to the Utah Supreme Court. This process would take some time. There is an ethical rule against taking a legal action solely for the purpose of causing a delay.

(5) What kind of evidence has to be shown for inadequate protection?

Response:
Ms. Lockhart said this question would have to be answered, after the notice and comment period. She said that she felt that it was pretty strong evidence that the NRC staff had concluded that the rule was inadequate to protect health and safety. She said that in the rule the standard was a "reasonable person standard." She said every member on the Board was a "reasonable person." Ms. Lockhart said that it would be the board members that would be called on to make the determination or decision.

(6) The board members asked if the rule passed, and the rule was challenged, if there were a provision to request a stay. And if the decision were appealed, would the rule be effective.

Response:
Ms. Lockhart responded that there were provisions for requesting a "stay." And the rule may not be effective during the "stay."

b. Presentation by HEAL-Utah "Moratorium On Disposal of Depleted Uranium Low-Level Radioactive Waste" (Board Action Item)

Christopher Thomas, HEAL-Utah, made a presentation to the Board (Copy Attached). Christopher Thomas said the radiation dose limit for members of the public could be exceeded in less than three hours at the Energy*Solutions* site, after long-term erosion allows the waste to be uncovered. Mr. Thomas said that to his knowledge long-term erosion had not been considered in conjunction with Utah's rules and laws. He said

that he would like the Board to look into this.

Energy*Solutions*, LLC "Moratorium On the Disposal of Depleted Uranium Low-Level Radioactive Waste" (Board Action Item)

Daniel Shrum and Tom Magete, from Energy*Solutions* informed the Board on this item (Copy Attached). The final remarks by Tom Magete, were that he and Daniel Shrum believed that they had demonstrated not only why the disposal of Depleted Uranium (DU) at Clive, Utah was safe, but also why a moratorium was not necessary. He said that the site at Clive was inhospitable to human habitation. The U.S. Nuclear Regulatory Commission (NRC) had published criteria regarding how one could do modeling for performance assessments—he said that Energy*Solutions* had followed NRC's criteria. He believed the disposal of DU at Energy*Solutions* was safe today, tomorrow and many tens of thousands of years into the future. He said that Energy*Solutions* believes that the NRC ruling process will accommodate any changes that need to me made. Mr. Magete said that Energy*Solutions* was prepared to accept any requirements that might be imposed or required of them today.

Questions by the Board:
Questions and discussion continued by the board members and Energy*Solutions'* representatives. The following are some of the questions the board members had:

Frank D. DeRossa asked if the moratorium would come with a cost, and he wanted to know what that cost would be.

Tom Magete responded that there were continuous DU clean-ups that were on-going, and they would not have a disposal site.

The board members asked if the DU waste clean-ups included the 46,000 metric tons of waste from the U.S. Environmental Protection Agency (EPA).

Tom Magete responded that Energy*Solutions* did have contracts with DOE, but they did not have active task orders. Energy*Solutions* had the potential of disposing of waste from the Savannah River within the next year (about 10,000 tons). The next five years, he projected 46,000 tons coming from Portsmouth and Paducah.

The board members asked if Energy*Solutions* would be willing to wait until NRC completed its rulemaking on DU disposal.

Tom Magete said that Energy*Solutions* could not wait for NRC to complete its rulemaking or for the Board to implement a moratorium. He

said that EnergySoutions could make a commitment to what they think would go beyond what the NRC will require for DU. He said the key is the cover, and Energy*Solutions* could increase the thickness. The new DU material could also be placed very low in the disposal cell.

Peter A. Jenkins said there were members of the public that wanted to make public comment on this issue.

Public Speakers:

(1) **James O'Neal, Citizen from Provo, Utah**

James O'Neal said that after hearing all the presentations from the different parties that he, as a Private Citizen, would like to see a moratorium. He said that Depleted Uranium is white, and it reminds him of the chemical "Agent Orange." "Agent Orange" has had quite a lot of controversy over the years, and it took a while for scientists to figure it out. He said the scientific community in England has recently made new findings about exposure to "Agent Orange," because of the people in Iraq's exposure to "Agent Orange."

Mr. O'Neal said it was the Board's job to protect the people in Utah. He said that there would obviously be no agreements between HEAL-Utah and Energy*Solutions*. Mr. O'Neal said that he appreciated the Board and trusted them to make the best decision.

(2) **Michael Cowley, Private Citizen of Salt Lake County, Business Owner**

Michael Cowley said that in all of Energy*Solutions'* presentations, Energy*Solutions* keeps mentioning that the site is suitable, if it stays in an arid condition. Energy*Solutions'* stated in its remodeling plan that the site is "an arid desert environment receiving fifty-inches of rain up to a million years from now." Mr. Cowley said at a previous Board meeting, he had brought the map of Lake Bonneville. He said every 50,000 years the area of Lake Bonneville banks and fills—it is not a fantasy or some indefinite future. It is something that will happen. Mr. Cowley said that what he did not hear from Energy*Solutions* was that they would remodel, and show what will happen to the Energy*Solutions'* landfill when it goes underwater.

Mr. Cowley said another concern was the integrity of the structures that they have at the facility. Mr. Cowley said that the reason he was bringing this up was because Energy*Solutions* had a bad history in this country with liquid D and C waste. He said that across the country anywhere liquid D and C waste has been stored it has leaked. He said the liquid D and C

waste was stored in much less "critically at risk environments" than where Clive is located. He said that he could not think of a more inappropriate place to put long-term radioactive waste then at the bottom of a periodically filling lake.

He asked the Board to consider the cost of site remediation. He said at the West Valley facility in New York, they spent 5.2 billion dollars for the remediation of Depleted Uranium (DU) at that site—and it could go as high as 27 billion dollars. He said it was inappropriate for Utah to have deep geologic burial for DU at the Clive site. IDER estimated the cost at about 2.5 to 3 billion dollars. Mr. Cowley said it would be more prudent to dispose of DU at a facility where it would at least not contaminate the environment. He said that instigating a moratorium could save a lot of money for future site remediation.

Chairman Jenkins asked Dane Finerfrock, Executive Secretary, to reiterate what would happen, if the Board voted for a moratorium. Dane Finerfrock went over the procedures that the Board would have to follow, prior to establishing a rulemaking. Laura Lockhart advised the Board that prior to rulemaking, they needed to respond to the evaluation questions and establish the evidence.

Questions by the Board:

Peter A. Jenkins, Chairman, said that he would like the Board to spend some time discussing the issue of Depleted Uranium (DU). He said that for the last three months, the Board has been trying to decide if they should instigate a moratorium on the disposal of large quantities of DU at the Clive facility. Chairman Jenkins said that he felt that the Board had enough information to make a decision on whether to vote for a moratorium. He said after this discussion, he would like a motion to be made.

David A. Tripp, Ph.D., said that he had listened to both sides. Each side had different opinions as to the intent of the NRC's rulemaking. Dr. Tripp said that HEAL-Utah indicated they had been led to believe that the NRC would make significant rulemaking changes for DU. Energy*Solutions*, on the other hand, did not believe the NRC would be making significant changes.

Dr. Tripp said the NRC had consented to meet with the DRC Board on September 22, 2009; therefore, he would like to motion that the Board "table the discussion of a moratorium," until after the meeting. He said the Board could hear from the NRC about the DU rulemaking.

Discussion followed by the board members. The board members discussed presenting a list of specific questions to the NRC. The Board

could look at the list of questions in advance at the Board meeting, and modify them if needed. Chairman Jenkins said they could form a subcommittee to gather the information for the questions. Chairman Jenkins called for a motion from the Board.

MOTION MADE BY DAVID A. TRIPP THAT THE BOARD TABLES THE DISCUSSION OF A MORITORIUM, UNTIL AFTER THE BOARD MEETS WITH THE U.S. NUCLEAR REGULATORY COMMISSION

MOTION SECONDED BY SCOTT BIRD

Peter A. Jenkins, Chairman, called for a vote from the board members: Aye, would mean that they were in favor of tabling the discussion, and Nay, would mean that they were not in favor of tabling the discussion.

(1) Christian K. Gardner – Aye
(2) Scott Bird - Aye
(3) Frank D. DeRosso – Nay
(4) John W. Thomson – Nay
(5) Amanda Smith – Aye
(6) Elizabeth Goryunova – Aye
(7) Joseph K. Miner – Nay
(8) Edd C. Johnson – Aye
(9) David A. Tripp - Aye
(10) Patrick D. Cone - Nay

There were 4 "Nays" and 6 "Ayes"

MOTION PASSED AND CARRIED

Chairman Jenkins asked for volunteers from the Board to form the subcommittee. The following board members volunteered to be on the subcommittee: Patrick D. Cone, Elizabeth Goryunova, Christine K. Gardner, and David A. Tripp. Chairman Jenkins said that the subcommittee could meet and gather the board members' questions for the NRC's response. The Board could then make the necessary corrections, and have the questions ready for the NRC's response.

MOTION MADE BY DAVID A. TRIPP TO MOVE THE SEPTEMBER 8, 2009 MEETING TO SEPTEMBER 22, 2009 AND FOR THE SUBCOMMITTEE TO PREPARE A LIST OF QUESTIONS FOR THE U.S. NUCLEAR REGULATORY COMMISSION TO ANSWER AT THE BOARD MEETING

MOTION SECONDED BY PATRICK D. CONE

MOTION CARRIED AND PASSED UNANIMOUSLY

c. **Requests to the Board to Provide Comments on Depleted Uranium Disposal (Board Information Item)**

Stephen T. Nelson, Ph.D., Associate Professor at BYU, said that an annual dose standard at Yucca Mountain is set by the U.S. Environmental Protection Agency (EPA). The EPA's rule is 15 millirems per year. His presentation to the Board is attached (Copy Attached). Dr. Nelson also stated that he was bothered and offended by Board member, Edd C. Johnson's statement that we are "crying wolf." He said concentrated depleted uranium oxide should not be disposed anywhere near the surface where the hazard can be passed into the environment. Dr. Nelson said that he had provided the Board with a letter that he sent to the U.S. Nuclear Regulatory Commission (NRC) on the proposed rulemaking.

Chris Cowley, M.D., and Brian Moench, M.D., members of Utah Physicians for a Healthy Environment (UPHE), presented information to the Board on Depleted Uranium (Copy Attached). Dr. Moench said that the precautionary principle was imperative: "whenever there is doubt, do for the patient that which represents the least amount of risk to the patient."

Questions by the Board:
Discussion followed by board members as to when Depleted Uranium (DUF_6) turned from a solid or a gas and if DU was being stored as uranium hexafluoride (DUF_6) or as uranium oxide. Dr. Moench said DU would change to a solid at 143°F, and that right now the containers of DU were being stored in cylinders as uranium hexafluoride. He said that most of the cylinders were about 62% (percent) full of solid, but most of them also have some gas in them. He said that uranium hexafluoride at 143°F would turn into a gas.

Discussion followed between Peter A. Jenkins, Chairman, and Dr. Brian Moench. Chairman Jenkins said Dr. Moench had mentioned the National Academy of Science in his presentation and wondered if he was referring to the BEAR (Biological Effects of Atomic Radiation) Report. Brian Moench said that he was referring to the BEAR Report. Discussion continued between them about the BEAR Report.

VI. URANIUM MILL LICENSING AND INSPECTION

No Items

VII. **OTHER DIVISION ISSUES (Board Information Item)**

a. **Division Activities Report**

Peter A. Jenkins, Chair, asked the Board if they had any questions on the Division Activities Report. The board members had none.

Chairman Jenkins, asked Dane L. Finerfrock to report to the Board regarding the email that he had received from the U.S. Nuclear Regulatory Commission (NRC).

Dane L. Finerfrock, Executive Secretary, said that in the board packet he had included an email. The email indicated that the NRC would hold a workshop on the disposal of Depleted Uranium from September 23-24, 2009 at the Salt Lake City Marriot in University Park. He said that the NRC had offered to meet with the Board on September 22, 2009 and discuss any topics the Board would like to hear.

VIII. **PUBLIC COMMENT**
Please refer to Item V. a.

IX. **The Next Scheduled Board Meeting: September 22, 2009, DEQ Bldg #2, Conference Room 101, 168 North 1950 West, Salt Lake City, Utah 3:00 – 5:00 P.M. THE BOARD MEETING ADJOURNED AT 5:54 P.M.**

V. Radioactive Waste

a. Presentation by Laura Lockhart: Utah Code Annotated § 19-3-104(8)
"No More Stringent" Rule **(Board Information Item)**

OFFICE OF THE ATTORNEY GENERAL, STATE OF UTAH
MEMORANDUM

TO: Radiation Control Board

FROM: Laura Lockhart

DATE: July 7, 2009

RE: Request for additional information about the statutory provisions governing the stringency of DRC rules

The handout used for the June Board meeting will also be used to discuss the statutory provisions governing the stringency of DRC rules. A copy is included again for your convenience. See Part 1.c for the text of those statutory provisions.

DEPLETED URANIUM - OPTIONS FOR REGULATION

1. PROPOSED RULE IMPOSING MORATORIUM

a. Possible language:

R313-71-1. Definitions.
For purposes of this Section R313-71:
"Incidental depleted uranium" means depleted uranium in concentrations of less than [#]% contained in other waste streams.

R313-71-2. Moratorium on land disposal of depleted uranium

(a) No facility licensed for land disposal of radioactive waste may dispose of depleted uranium.
(b) This prohibition does not apply to:
(i) small amounts of incidental depleted uranium contained within other waste streams, which collectively total less than [#] metric tons annually;
(ii) waste received by a facility for disposal before the effective date of this Section R313-72, provided the contract to dispose of the waste is dated before [DATE].
(c) This prohibition shall expire on the earlier of the following dates:
(i) 180 days after the effective date of the rule promulgated by the federal Nuclear Regulatory Commission regarding disposal of depleted uranium, as anticipated in the March 18, 2009 instruction from the Commission to NRC staff entitled "Staff Requirements – SECY-08-0147 – Response to Commission Order CLI-05-20 Regarding Depleted Uranium;" or
(ii) January 1, 2013.

Other exemptions to consider:
- Waste streams the land disposal facility has a contract to dispose of if the contract is dated [before May 13, 2009] [before the effective date of this Section R313-71].

b. Authority for rule:

Utah Code Ann. § 19-3-104. Registration and licensing of radiation sources by department - Assessment of fees - Rulemaking authority and procedure - Siting criteria.

. . .

(4) The board may make rules:
(a) necessary for controlling exposure to sources of radiation that constitute a significant health hazard . . . .

c. Applicability of Utah Code Ann. §§ 19-3-104(8) and (9).

Compliance with Utah Code Ann. §§ 19-3-104(8) and (9) would be required. Those provisions limit the authority of the Board to make rules:

(8) (a) Except as provided in Subsection (9), the board may not adopt rules, for the

purpose of the state assuming responsibilities from the United States Nuclear Regulatory Commission with respect to regulation of sources of ionizing radiation, that are more stringent than the corresponding federal regulations which address the same circumstances. (b) In adopting those rules, the board may incorporate corresponding federal regulations by reference.

(9) (a) The board may adopt rules more stringent than corresponding federal regulations for the purpose described in Subsection (8) only if it makes a written finding after public comment and hearing and based on evidence in the record that corresponding federal regulations are not adequate to protect public health and the environment of the state.

d. Questions the Board should consider as it determines whether to adopt this rule:

1. What is the evidence that corresponding federal regulations either are or are not adequate to protect public health and the environment?

2. If there is evidence that federal regulations are not adequate to protect public health and the environment, do we know the quantities of depleted uranium that may be land disposed without raising those concerns?

3. In the absence of a moratorium, what quantities of depleted uranium would be disposed of before the NRC completes its rulemaking process and we are able to complete ours?

2. EFFECTIVENESS OF WAIVER RULE

a. Background:

(i) DRC rules require that a land disposal facility have evidence that a federal or state agency either own the property or will own it after closure.

R313-25-9. Institutional Information.

The institutional information submitted by the applicant shall include:
(1) A certification by the federal or state agency which owns the disposal site that the agency is prepared to accept transfer of the license when the provisions of R313-25-16 are met and will assume responsibility for institutional control after site closure and for post-closure observation and maintenance.
(2) Evidence, if the proposed disposal site is on land not owned by the federal or a state government, that arrangements have been made for assumption of ownership in fee by the federal or a state agency.

(ii) EnergySolutions, through its predecessor Envirocare, received waivers from the land ownership/control requirement based on the other controls that were provided. The waivers were granted under this section of the General Provisions:

R313-12-55. Exemptions.

(1) The Board may, upon application or upon its own initiative, grant exemptions or exceptions from the requirements of these rules as it determines are authorized by law and will not result in undue hazard to public health and safety or the environment.

b. Possible language:

R313-71-3. Limitation on Exemptions from the Requirements of R313-25-9.

(1) No facility licensed for land disposal of radioactive waste may dispose of depleted uranium unless it demonstrated compliance with the requirements of R313-25-9 during the licensing process.
(2) The requirements of R313-71-3(1) may not be waived under the authority of R313-12-55, except by a specific order from this Board that cites this Section R313-71-3.
(3) A facility that has not been required to meet the requirements of R313-25-9 because it has received an exemption from the requirements of that provision has not demonstrated compliance with the requirements of that provision for purposes of paragraph R313-71-3(1).
(4) The prohibition specified in R313-71-3(1) does not apply to:
  (i) small amounts of incidental depleted uranium which collectively total less than [#] metric tons annually; or
  (ii) waste received by a facility for disposal before the effective date of this Section R313-71, provided the contract to dispose of the waste is dated before [May 13, 2009].

Other exemptions to consider:
- waste streams the land disposal facility has a contract to dispose of if the contract is dated [before May 13, 2009] [before the effective date of this Section R313-71].

c. Authority for rule:

See authority for rulemaking cited under Part 1.b above.

d. Applicability of Utah Code Ann. §§ 19-3-104(8) and (9).

Land ownership/control requirements are specified in federal rules (10 C.F.R. § 61.14). For that reason, no analysis under these provisions would be required.

e. Questions the Board should consider as it determines whether to adopt this rule:

1. What is the basis for having different approaches to exemption from the land ownership/control requirements of R315-25-9 for different wastes?

2. What is the basis for having the rule apply immediately?

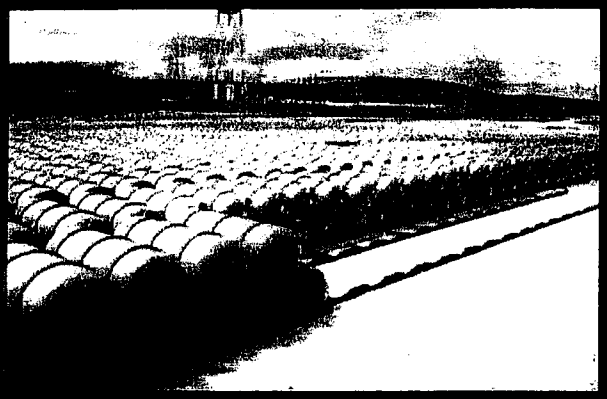
V. Radioactive Waste

b. Presentations by **HEAL-Utah,** and Energy*Solutions*, LLC "Moratorium On Disposal of Depleted Uranium Low-Level Radioactive Waste"
(Board Action Item)

Depleted Uranium and Utah

Presentation to Utah Radiation Control Board
July 14, 2009

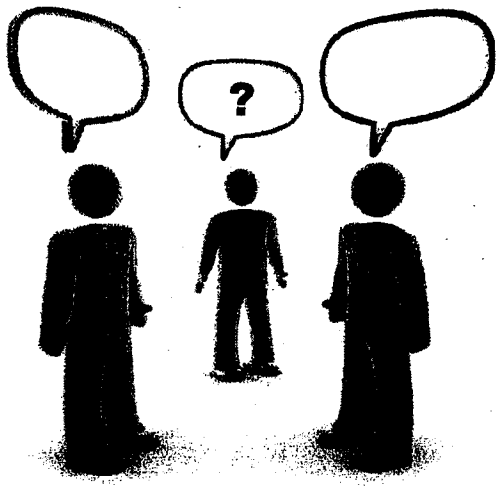
Christopher Thomas
Policy Director
HEAL Utah



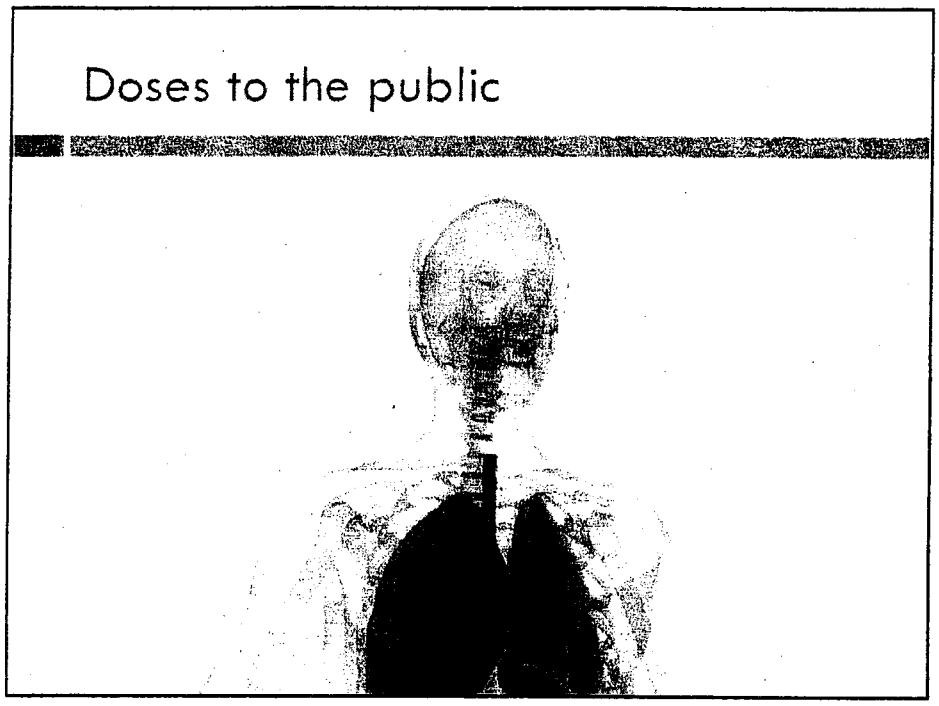
DEPLETED URANIUM AND UTAH

Health and Safety Considerations

Part 1. Is it safe?



We're here today to talk about whether or not the disposal of large amounts of depleted uranium can be considered safe.



When we talk about keeping the public safe from radiation, what we're talking about is protecting people from receiving radioactive doses. That dose limit is described in Utah's administrative rules.

Protecting the public – 25 mrem

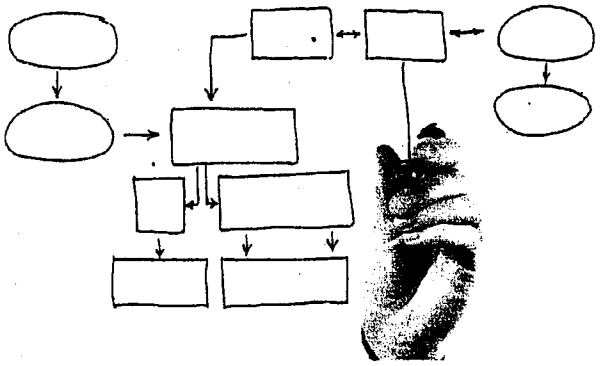
Concentrations of radioactive material ... shall not result in an annual dose exceeding an equivalent of 0.25 mSv (0.025 rem) to the whole body, 0.75 mSv (0.075 rem) to the thyroid, and 0.25 mSv (0.025 rem) to any other organ of any member of the public

Source: R313-25-19. Protection of the General Population from Releases of Radioactivity.

Here is the rule that protects members of the public in Utah. It says that a person shall not receive more than .025 rems (or 25 millirems) of radiation in a given year.

Well, you might wonder how the state of Utah and companies like EnergySolutions ensure that this limit of 25 mrem per year will not be exceeded.

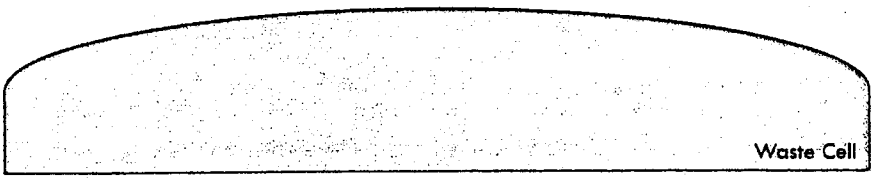
Modeling and exposure pathways



Will dose limits be exceeded?

EnergySolutions and the state of Utah use computer modeling to determine if the dose limit will be exceeded.

EnergySolutions: "It's safe!"

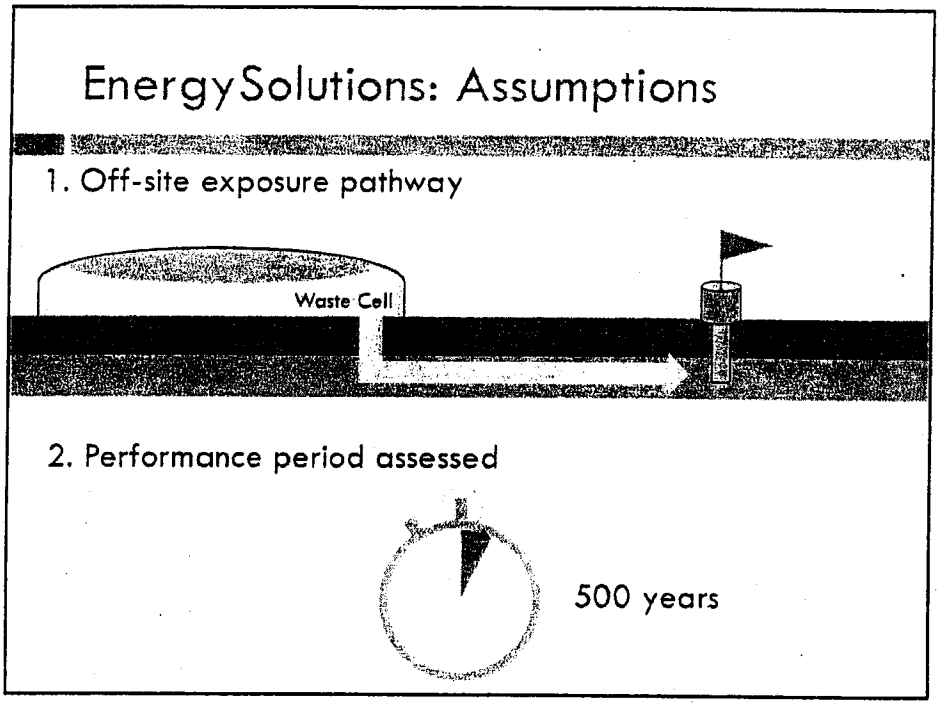


"Site-specific performance modeling for uranium disposal at the EnergySolutions site has demonstrated that natural uranium can be safely placed in the disposal cells, even when the waste is assumed to only consist of uranium." (Schramke 2007)

When HEAL Utah submitted comments in 2007 to the DRC on this issue of depleted uranium disposal, EnergySolutions commissioned a memo from Dr. Janet Schramke. In it, she wrote, "Site-specific performance modeling for uranium disposal at the EnergySolutions site has demonstrated that natural uranium can be safely placed in the disposal cells, even when the waste is assumed to only consist of uranium." She went on to write "These calculations provide an extreme upper limit on the risks of uranium disposal at the *EnergySolutions* site..."

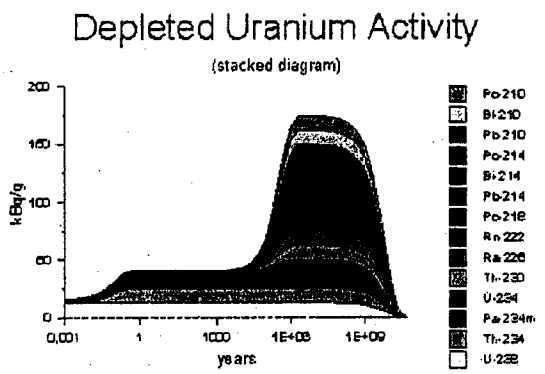
This same claim has been made to the NRC and this Board.

As evidence, Schramke cites a report by Whetstone Associates from 2000. So I looked at the Whetstone evaluation to see how it was conducted.

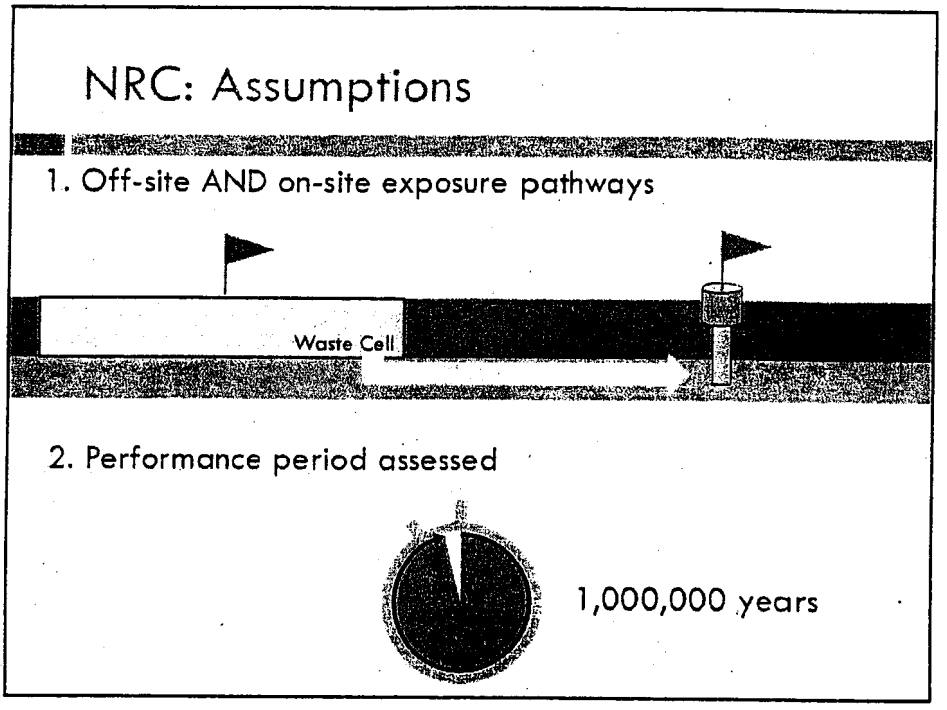


It's informative to look at the assumptions used in the Whetstone report for EnergySolutions ... the first is that the only long-term impacts modeled were compliance at groundwater wells. In other words, impacts to on-site individuals were not assessed. EnergySolutions appears not to have assessed long-term impacts to on-site individuals since at least 1996. Secondly, the performance period examined was only 500 years, as has been discussed previously. Are these the best assumptions to use when evaluation the hazard posed by depleted uranium?

DU increases in radioactivity for thousands of years



Well, as we know, depleted uranium increases in radioactivity for thousands and hundreds of thousands of years and doesn't reach peak hazard for 1 million years. Clearly, this has drastic implications for measuring the hazard from depleted uranium. Some hazardous constituents, like Radium-226 and Radon gas, don't even appear for thousands of years. So let's compare the assumptions used in the recent Nuclear Regulatory Commission analysis to what the EnergySolutions report uses.



The NRC conducted its evaluation over 1 million years and also assessed the long-term dose impacts to off-site individuals AS WELL AS on-site individuals.

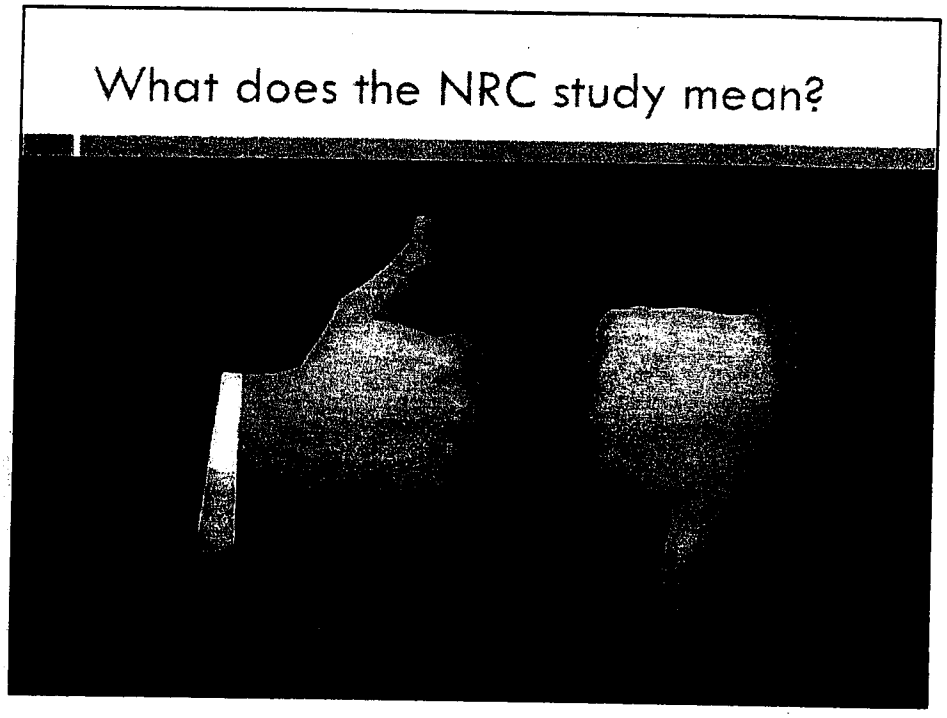
Different assumptions ... and results

NRC	EnergySolutions
 1 million yrs	 500 yrs
 On-site	 Off-site
"Radon is limiting at arid sites and for shallow disposal." (NRC 2008 p.ii)	The radon hazard from DU never even modeled (see Whetstone 2000 p.19)
"Shallow disposal (< 3m deep) is likely to <u>not be appropriate</u> for large quantities of DU, regardless of site conditions." (NRC 2008 p.16)	Disposal depth does not appear to matter; entire cell could be filled with DU

***"periods of performance of 1,000 years or less result in a <u>significant truncation</u> of estimated risk"* (NRC 2008 p.16)**

Not surprisingly, the two studies, using vastly different starting assumptions, arrive at vastly different conclusions. For instance, the NRC study says that radon gas from depleted uranium is the limiting hazard at arid sites, whereas EnergySolutions' analysis didn't even model the radon emanating from DU—due to the short performance period studied.

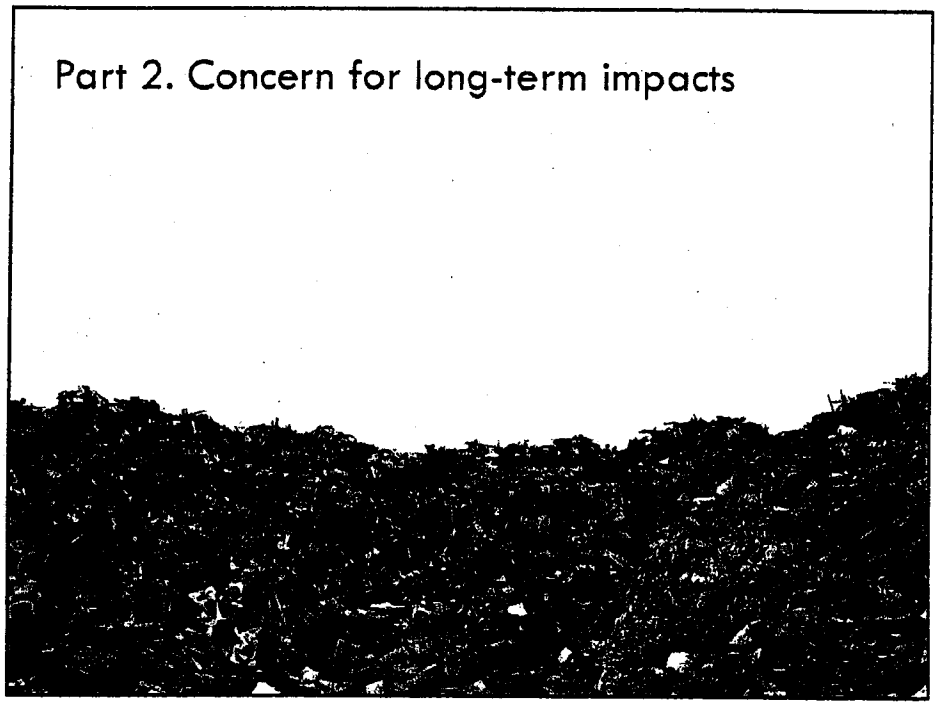
Similarly, the NRC analysis found that shallow disposal was likely to "not be appropriate ... regardless of site conditions," whereas EnergySolutions' analysis implied the entire cells could be filled with DU. The bottom line, as expressed by the NRC, is that "periods of performance of 1,000 years or less results in a significant truncation of estimated risk." For this reason alone, EnergySolutions' modeling does not appear to be adequate to protect public health and safety.



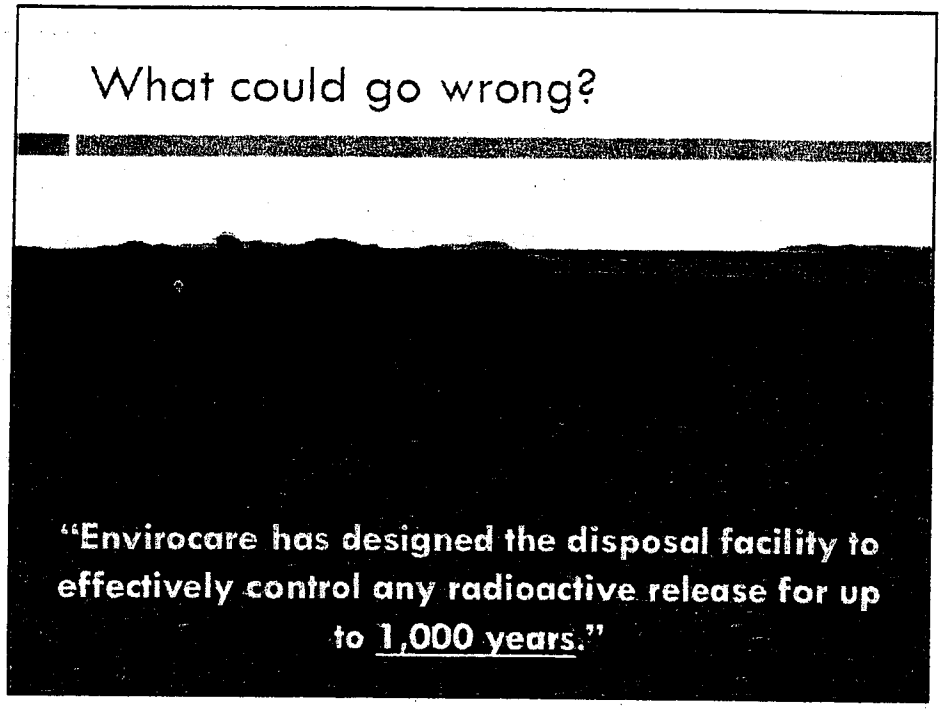
So at the end of the day, what does the NRC study really mean? It means that if you want to dispose of depleted uranium in a near-surface disposal facility, and you're concerned about public health effects, the local site conditions make a huge difference in whether the public is protected or not. This is true for both arid sites, like EnergySolutions, and humid sites, like you would find out East. Now, EnergySolutions tried to frame the NRC study as justifying their Clive site as acceptable for DU disposal. When I was discussing this with a senior systems performance analyst at the NRC, here's what he said:

"Our analysis is not to be used to justify a particular site or action; each site needs to be justified on its own merits. A range of results is possible, strongly site-specific. So if you want to make a decision on a particular site, you need to do that analysis on that site." [Dr. David Esh, Senior Systems Performance Analyst.]

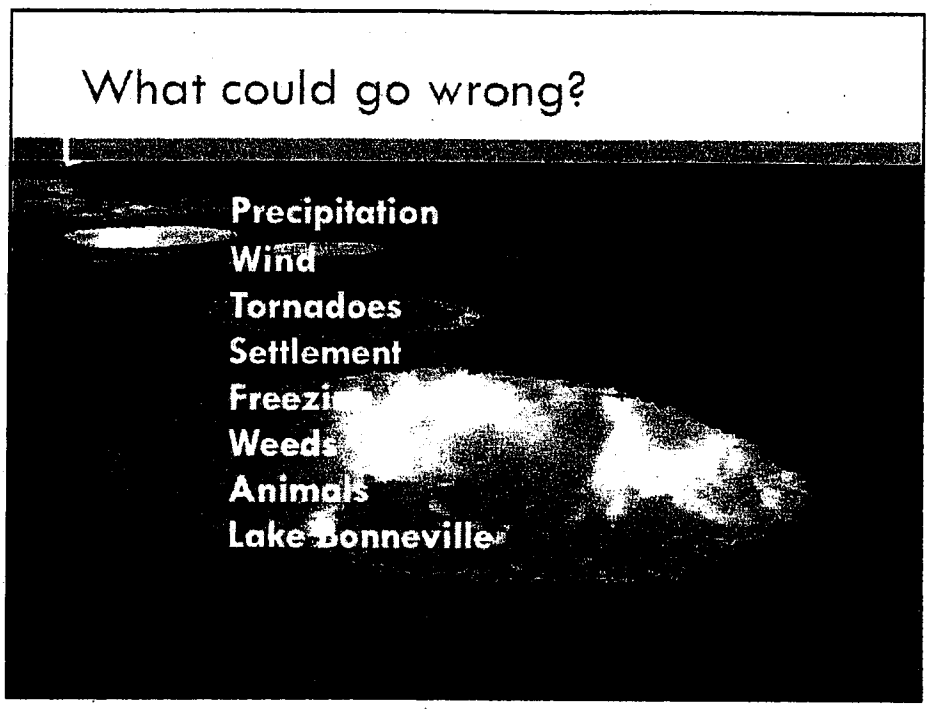
Far from justifying EnergySolutions as a safe site for bulk DU disposal, it points out the need to conduct a site-specific analysis to ensure protection of the public.



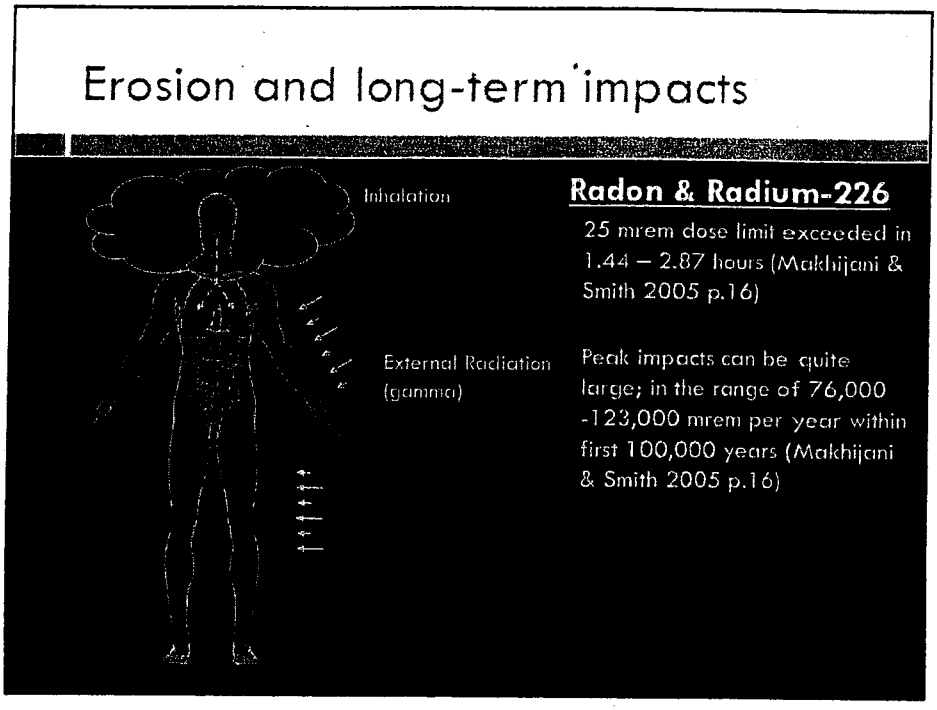
Now I want to talk a little bit about long-term impacts, because I know this Board is struggling with how to treat impacts that could occur thousands of years in the future.



First of all, although the EnergySolutions site is designed to mitigate erosion, it's important to remember—by the company's own admission—the facility was designed to control radioactive releases for "up to 1,000 years." A hazard that will last a million years or more seems inappropriate for a site designed only for 1,000 years.



Even though the site may look impermeable at closure, consider how the site could change over a million years and more. During that time, the site will have to weather many destructive forces, including precipitation, wind, tornadoes, differential settlement, freezing and thawing, the return of Lake Bonneville, weeds, animals



If you assume that, for whatever reason, the protective coverings eventually erode, you can calculate very high impacts to on-site intruders. Makhijani and Smith calculated that – only considering inhalation and external doses – someone could receive more than the annual limit of 25 mrem in only a couple of hours. Under certain scenarios, on-site intruders could receive hundreds of thousands of millirems of radiation per year – far in excess of the 25 mrem required by regulation

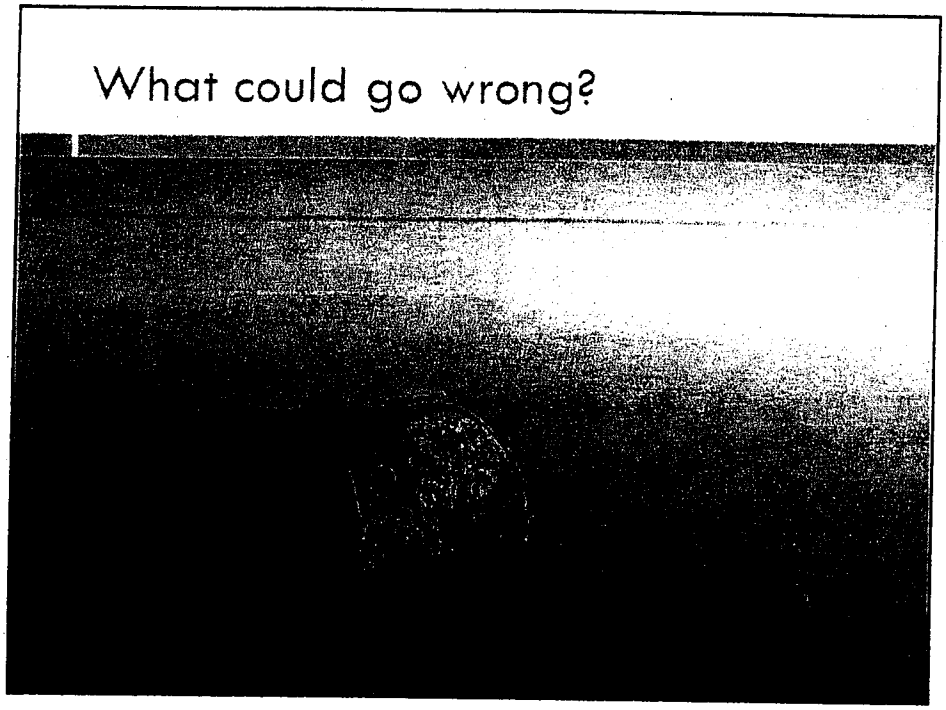
Inadvertent intruders

Design, operation, and closure of the land disposal facility shall ensure protection of any individuals inadvertently intruding into the disposal site and occupying the site or contacting the waste after active institutional controls over the disposal site are removed.

R313-25-20. Protection of Individuals from Inadvertent Intrusion.

Now, you might say that you don't want to consider inadvertent intruders onto the site – because you think it's an unlikely scenario or because you think things like fences and guards will keep them out. But Utah regulations require protection of inadvertent intruders. Furthermore, things like fences or people guarding the site can only be relied on for 100 years after site closure.

("institutional controls may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner") **R313-25-28. Institutional Requirements.**



Furthermore, when we talk about geologic processes affecting the site—like long-term erosion or the potential return of Lake Bonneville—there are some who say that the large uncertainty around such processes means we can essentially ignore them.

Utah rules require "defensible modeling"

Areas shall be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with sufficient such frequency and extent to <u>significantly affect the ability of the disposal site to meet the performance objectives</u> of R313-25, or <u>may preclude defensible modeling and prediction of long-term impacts.</u>

R313-25-23. Disposal Site Suitability Requirements for Land Disposal - Near-Surface Disposal.

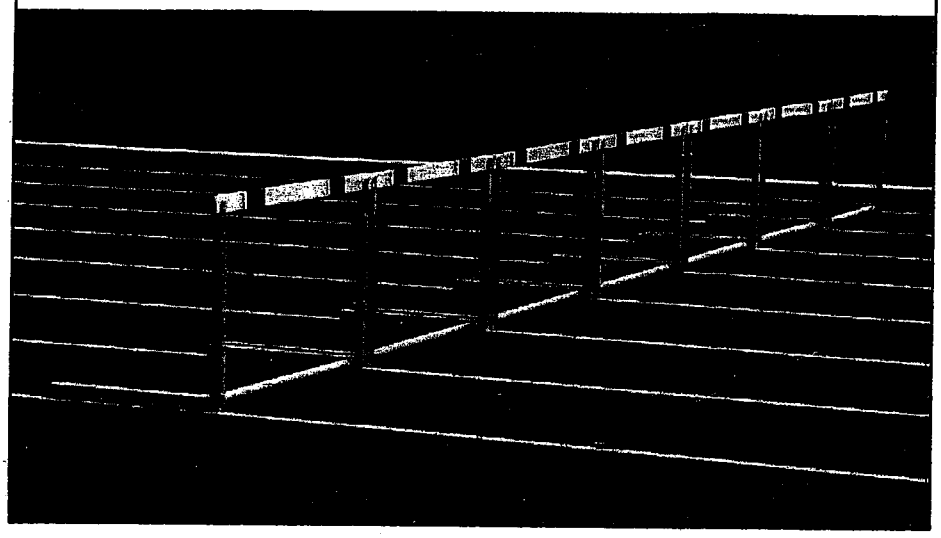
But fortunately (or unfortunately) for us, I don't believe Utah's radiation rules let us off the hook that easily.

Utah regulations say that sites should be avoided in situations where geologic processes may "preclude defensible modeling and prediction of long-term impacts."

Before, when we thought we were dealing with a 100-year hazard, maybe we didn't need to worry about 1 million years of erosion and the potential return of Lake Bonneville. But when you start dealing with a hazard that can be measured in geologic time, our rules require us to avoid disposal in areas subject to geologic processes that could expose the public to that hazard.

I don't think this Board has the luxury of deciding whether to care about the long-term; in this instance, I think the law of the land requires it.

Part 3. The hurdles of rule-making



Finally, I want to address what would be required should the Board decide to go down the road of initiating a rule-making to put a moratorium on the disposal of depleted uranium.

Rule 1 – Temporary moratorium

No DU until 180 days after NRC rulemaking is effective or January 1, 2013

Now, in order to pass a temporary moratorium on DU disposal, as described by the Attorney General's office in Rule 1, the Board would have to meet the state's "stringency test." What does this mean? It means that in order to pass this moratorium, the Board would need to make a finding that "corresponding federal regulations are not adequate to protect public health and the environment of the state." What would that look like?

Justifying the moratorium

It is the large quantities and higher concentration of DU that create a potential health and safety concern, and staff believes that the goal of any changes to Part 61 should be to provide a means to ensure additional disposal considerations are taken for DU, based on the quantity of material at issue.

NRC 2008 p.7

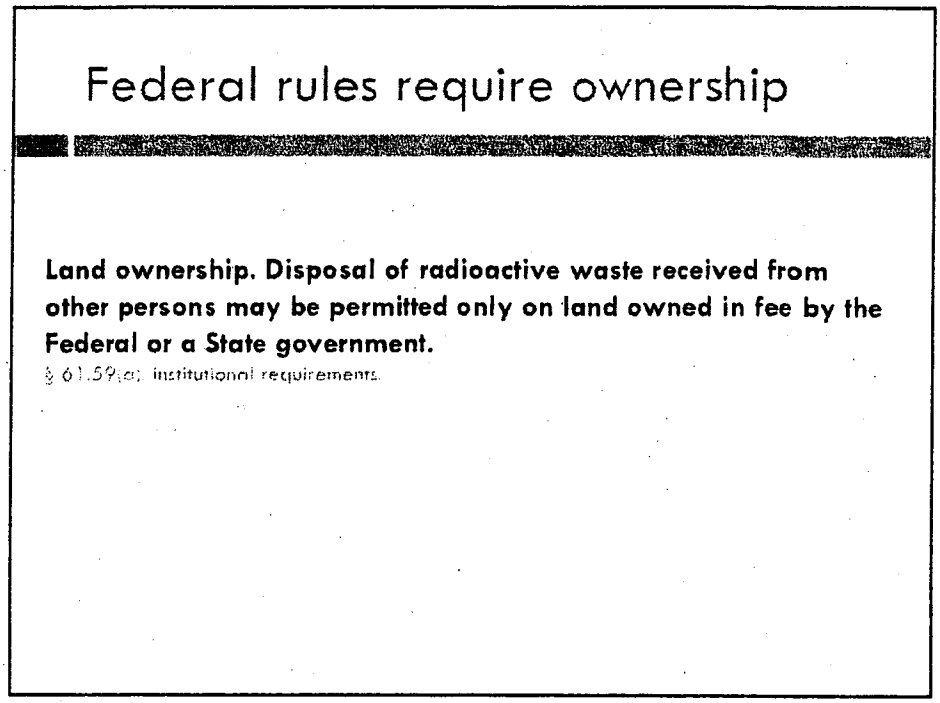
Well, thankfully, the Nuclear Regulatory Commission has already provided us the justification we need. In fact, the NRC has both admitted that the existing analysis does not cover the disposal of large quantities of depleted uranium, AND has determined based upon its own analysis that different sites may or may not be able to dispose of depleted uranium safely, as we saw earlier. That's precisely why—based on health and safety concerns—the NRC has decided to require a site-specific analysis before large quantities of DU are disposed. Therefore, a justification that federal rules are inadequate to protect public health and safety for rule 1 seems fairly straightforward.

Rule 2 – Waiver required

No DU until Board gives waiver or long-term site ownership determined

Now, you may remember that the handout from the AG's office had a second rule for you to consider, that would be promulgated in conjunction with the first.

Let's take a look at this.



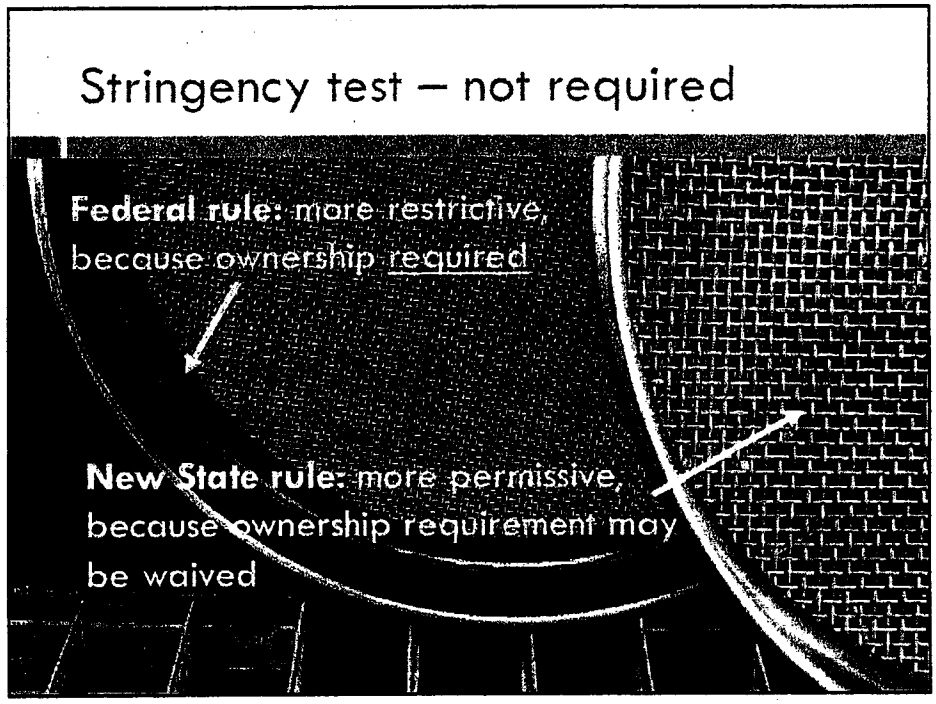
You may not know it, but both Federal and state rules require that, for privately-owned facilities like EnergySolutions, the company must provide evidence that arrangements have been made for a state or federal agency to eventually assume ownership of the site.

First Envirocare, and now EnergySolutions, has never been able to make this required arrangement. Therefore, as the company has expanded its license to take more and hotter wastes, it has had to secure waivers or exemptions to this requirements from this very Board.

In fact, when it sought and obtained a license to accept B and C wastes, DEQ suggested legislation that would have required the state of Utah to become the site owner. That legislation failed, presumably because the state legislature didn't want to take on that kind of liability.

Envirocare also approached the Department of Energy about becoming the long-term site owner. DOE responded that it could only accept ownership after the post-closure period had elapsed ... in other words, only 100 years after the site had closed.

The new proposed rule would simply say that, before disposing of large quantities of depleted uranium, this Board would have to issue another waiver to EnergySolutions to exempt it from the land ownership requirement.



When thinking about stringency, I find it helpful to think of it like a sieve. A more stringent rule is like a tighter sieve – it's more restrictive.

Well, in the case of land ownership requirements, the Federal rule is actually more restrictive than the proposed state rule. The Federal rule requires site ownership, period.

The new state rule would simply require an additional waiver for disposal of large quantities of depleted uranium – still more permissive than the Federal rule, because it allows the ownership requirement to be waived at the Board's discretion.

This would simply extend the historical practice of requiring an additional waiver when longer-lived hazards are sought. The state required an additional waiver be obtained back in 1999/2000 when Envirocare sought a license for B and C waste disposal, and the NRC concurred.

Prior waivers should not be considered to cover large amounts of depleted uranium, because the long-term hazards had not been studied or acknowledged, and Class A wastes were historically thought to decay away within 100 years to a level that posed an "acceptable hazard" to on-site intruders. See 10 CFR § 61.7. Concepts.

Therefore, in order to pass the second rule, the Board would not have to make a finding that Federal rules are not protective of human health and the environment.

V. Radioactive Waste

b. Presentations by HEAL-Utah, and **Energy*Solutions*, LLC** "Moratorium On Disposal of Depleted Uranium Low-Level Radioactive Waste"
(Board Action Item)

Disposal of Depleted Uranium at ENERGY*SOLUTIONS*' Clive Facility

July 14, 2009

Presentation to the State of Utah, Radiation Control Board

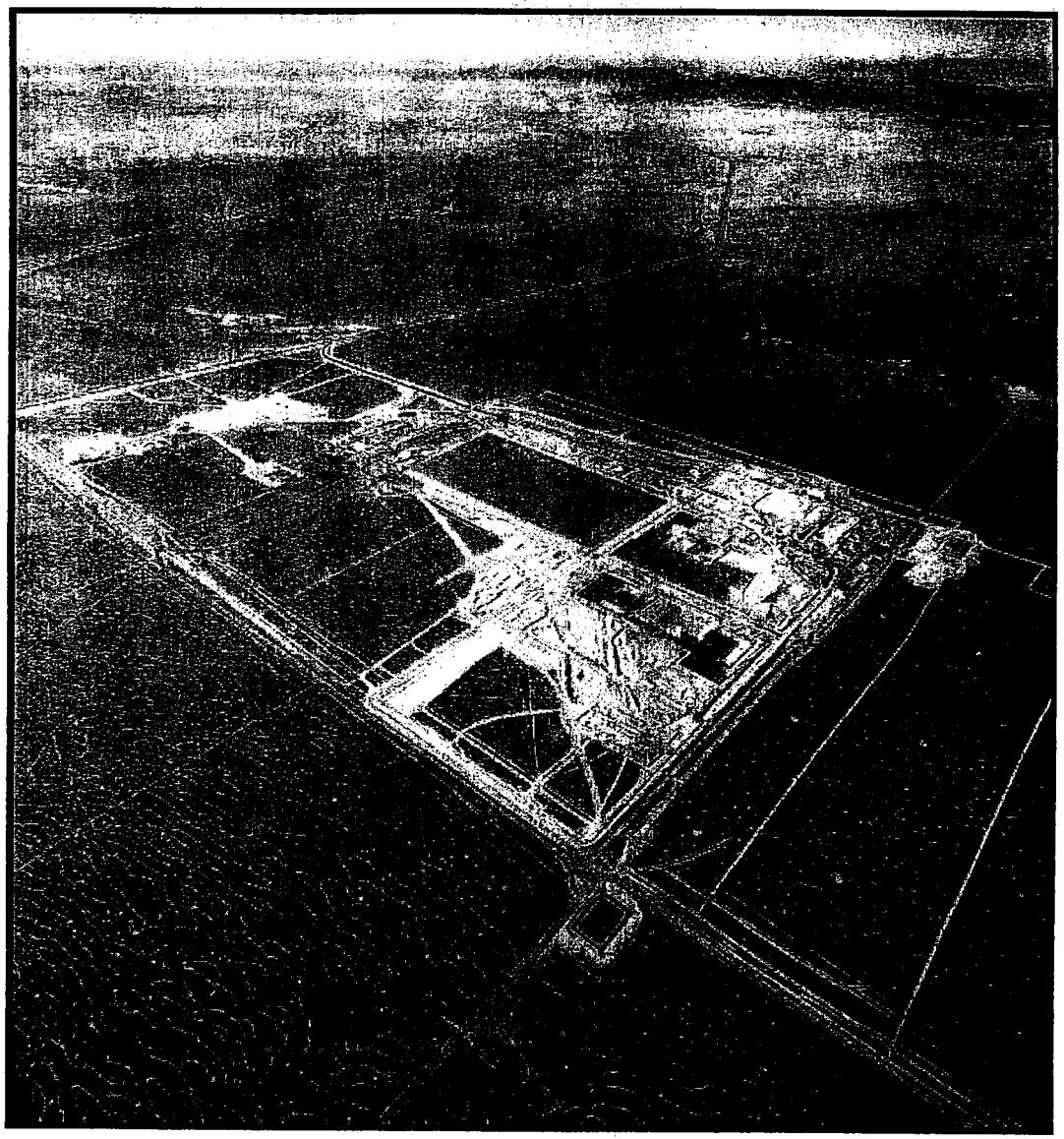
Thomas E. Magette, P.E.
Daniel B. Shrum, P.G.

ENERGY*SOLUTIONS*

We're part of the solution

The Clive site is safe for DU disposal

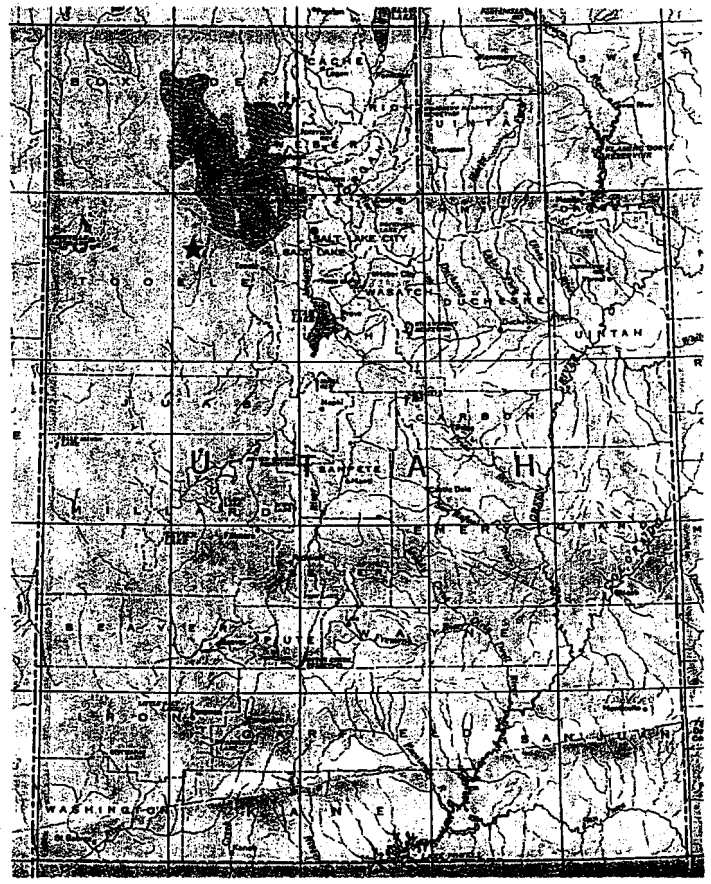
- The Clive site is safe
  - Sited and managed to provide long term protection
  - Ideally suited for disposal of depleted uranium
- Depleted Uranium is properly classified as Class A LLW
  - NRC decision based on extensive analysis
  - Performance objectives protect health and safety
  - NRC has not prohibited DU disposal
- There is no need for a moratorium



ENERGYSOLUTIONS

The Clive Site is Safe

- Remote location
  - 7 miles to nearest resident
  - 35 miles to nearest population center
- Arid Climate
  - Low precipitation
  - High evaporation
- Naturally poor aquifer
- Low erosion potential
- Site thoroughly analyzed for disposal of LLW and Mill Tailings
- Located in Tooele County Hazardous Materials Corridor
- Abundance of natural embankment construction materials
  - Clay
  - Sand
  - Rock



ENERGYSOLUTIONS

Site Suitability

- Clive has been thoroughly evaluated and proven to be an excellent site for LLW and uranium/thorium mill tailing disposal
- Protection for extended time period has been addressed
  - Site inhospitable to human habitation
  - Inherently protective against intruder scenarios
  - Utah DRC conclusion[1]
    "…unrealistic to assume residential or agricultural intruders."
  - From the Nuclear Regulatory Commission's Order[1]
    "…significant intruder exposures at a site like Envirocare are unrealistic."
    "…could be licensed under 10 CFR 61 regardless of the time frame you looked at."
    "…any projections about the likelihood of an intruder scenario would be exceedingly speculative."

Site Suitability

- NRC Staff stated these conclusions in adjudicated proceeding

  "…it is reasonable to assume there will not be radiological exposures involving residents or farmers drinking contaminated water obtained from the site and eating foods irrigated by the site's water and grown in the site's soil."[1]

- Staff conclusion concurred by
  - Atomic Safety Licensing Board
  - U.S. Nuclear Regulatory Commission
  - Utah Division of Radiation Control

[1]Memorandum and Order in the Matter of Louisiana Energy Services, L.P., CLI-06-15, June 2, 2006.

Response to Specific Board Questions

Board Questions

1. **Do you anticipate the NRC rule-making process to result in significant changes to the DU acceptance and performance criteria for the Energy*Solutions* site? Explain how anticipated changes may/may not affect health and safety concerns.**

A. It is not anticipated that the NRC rulemaking process will result in significant changes to the DU acceptance and performance criteria at Clive.

Scope of NRC Rulemaking

- Purpose of rulemaking
  - Require site-specific analysis for the disposal of large quantities of DU
  - Establish technical requirements for such an analysis
  - Develop guidance document that outlines the parameters and assumptions to be used in conducting site-specific analyses
- Conduct a public workshop inviting all potentially affected stakeholders
  - Issues associated with the disposal of depleted uranium
  - Potential issues to be considered in rulemaking
  - Technical parameters of concern in the analysis
  - *"...so that informed decisions can be made in the interim period until the rulemaking is final."*[2]
- "...the Commission is not proposing to alter the waste classification of depleted uranium." [2]

[2]Staff Requirements – SECY-08-0147 – Response to Commission Order CLI-05-20 Regarding Depleted Uranium, March 18, 2009

Current Classification

- There is no "hole in the regulations"
- Depleted Uranium is Class A LLW
- Reference to deletion of uranium from the draft tables irrelevant and misleading
- Consciously removed from Part 61.55 tables before regulations enacted
- DU properly classified – affirmed by the Nuclear Regulatory Commission in 2005, 2008, and again this year
- Reclassification of DU *not* under consideration

Site-Specific Performance Assessment

- Reliance on site-specific performance assessment
  - Sound science
  - Emphasizes risk-informed decision making
  - Protects the people and environment of Utah
  - Most effective measure of suitability for shallow land burial
- Performance Assessment not a new requirement
  - Builds on existing NRC requirements
  - Assessment already required to satisfy performance objectives
  - Applies to release of all radioactive material, not just isotopes listed in waste classification tables
  - Regulations include dose standards to protect people and the environment

Anticipated Changes

- Result of NRC rulemaking at Clive
  - Disposal of DU from enrichment will continue to be acceptable
  - May be changes necessary to meet performance objectives
  - Performance modeling of greater time periods
  - Possibility of minimum disposal depth requirement
- Changes to disposal methods not significant

Board Questions

2. Would the acceptance, under the current regulatory framework, of large quantity DU waste between now and the time the NRC issues its ruling pose a health and safety risk to the people and environment of Utah? If so, how? If not, why not?

A. The acceptance of DU waste between now and the time the NRC issues its ruling will *not* pose a health and safety risk to the people and environment of Utah; moreover, the volumes of DU available for disposal in that time period are much lower than the Board has been led to believe.

700,000 metric tons not coming to Clive in 2 years

- Large quantities of DU *not* available for disposal in next 2 years
- 46,000 metric tons – maximum available for disposal *anywhere* over next *5 years*
  - Includes waste from deconversion
  - Includes material from Savannah River
  - Consistent with past waste streams
- 700,000 metric tons total DOE inventory
  - To be disposed or sold over next *25-30 years*
  - Waste requires deconversion prior to disposal – DUF_6 to U_3O_8
  - Deconversion facilities constructed but not yet operational
  - DOE's own estimate – less than 46,000 metric tons in next 5 years
- Continued acceptance of DU is safe

Board Questions

3. How would the implementation of a temporary moratorium affect the answers given above?

A. The implementation of a temporary moratorium does not alter the facts:

- Clive is safe for the disposal of depleted uranium
- The quantities of DU that could be disposed of in the next two years has been greatly exaggerated
- The NRC is effectively addressing the issue

Imposition of a Moratorium

- Board could impose a moratorium only via rulemaking
- There are no Federal restrictions on DU disposal
- State law requires that a moratorium meet "no more stringent" provision
  - "…written finding after public comment and hearing and *based on evidence in the record* that corresponding federal regulations are not adequate to protect public health and the environment of the state."
- NRC has carefully and recently reviewed basis for their regulations
  - Includes > 6 years of recent study and new modeling
  - Litigated in adjudicatory proceeding (LES)
  - Affirmed by the Commission in multiple Orders

The Record that supports NRC conclusion

- Draft Environmental Impact Statement on 10 CFR Part 61 Licensing Requirements for Land Disposal of Radioactive Waste, NUREG-0782, September 1981.
- Final Environmental Impact Statement on 10 CFR Part 61 Licensing Requirements for Land Disposal of Radioactive Waste, NUREG-0945, November 1982.
- Final Rule, Licensing Requirements for Land Disposal of Radioactive Waste, Nuclear Regulatory Commission, 47 FR 57446, December 27, 1982.
- Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-term Management and Use of Depleted Uranium Hexafluoride, U. S. Department of Energy, DOE-/EIS-0269, April 1999
- LES Environmental Report, December 2003
- Draft Environmental Impact Statement for the Proposed National Enrichment Facility in Lea County, New Mexico, NUREG-1790, September 2004
- Memorandum and Order in the Matter of Louisiana Energy Services, L.P., CLI-06-15, June 2, 2006
- Staff Requirements – SECY-08-0147 – Response to Commission Order CLI-05-20 Regarding Depleted Uranium, March 18, 2009
- Memorandum and Order in the Matter of Louisiana Energy Services, L.P., CLI-05-05, January 18, 2005
- Memorandum and Order in the Matter of Louisiana Energy Services, L.P., CLI-05-20, October 20, 2005
- Staff Requirements – SECY-08-0147 – Response to Commission Order CLI-05-20 Regarding Depleted Uranium, March 18, 2009
- 10 CFR 61
- Memorandum, M. Blevins to S. Flanders, Telephone Summary Regarding Depleted Uranium Disposal, April 6, 2005
- Transcript In the Matter of Louisiana Energy Services, L.P., National Enrichment Facility, Docket No. 70-3103-ML

NRC process is responsive

- Better approach is to rely on NRC rulemaking
- NRC workshops scheduled for September 2009 **in Utah**
- NRC process designed *so that informed decisions can be made in the interim period until the rulemaking is final*
- NRC has identified no technical basis to justify a moratorium

Board Questions

4. Can the same results be accomplished by means other than a moratorium?

A. Energy*Solutions* suggests an alternate response to concerns regarding the interim disposal of depleted uranium that is both more effective and avoids a potential conflict between Board and NRC rules.

Energy*Solutions* Commitment

- NRC technical analysis shows that large volumes DU can safely be disposed at arid sites provided the materials are buried a minimum of 3 meters (10 feet)
- Energy*Solutions* commits to
  - Burying all future shipments of DU from enrichment facilities a minimum of 10 feet below the top of cover
  - Accepting a formal license condition (could be completed in less than 60 days)
  - Implementing this commitment effective immediately
  - Ensuring that DU already disposed of meets all existing and future NRC requirements
- **Our proposal is consistent with how DU has been disposed of at Clive historically**
- A similar license condition currently exists in our uranium mill tailings license for wastes with higher concentrations of Th-230 and Ra-226

Proposed LLW License Condition

59) (currently reserved)

The Licensee shall place all wastes with depleted uranium concentrations greater than 5 percent (by weight) a minimum of 10 feet below the top of the cover. This license condition shall be removed following the completion of the Nuclear Regulatory Commission's rulemaking on Depleted Uranium and subsequent approval by the Division of the site specific performance assessment for the Clive facility.

Moratorium not needed to protect health and safety

- Clive has been proven to be a safe site for LLW disposal
- Inhospitable to human habitation now and for many generations
- Change to those conditions would be on a geologic time-scale
- NRC rulemaking process accommodates informed decision making in the interim
- Minimum DU from enrichment could be disposed of during that time period
- Energy*Solutions* is committed to enhanced disposal requirements via formal license amendment

Speakers

Speakers

- Daniel B. Shrum, P.G.
  - M.S. Hydrogeology, Brigham Young University, 1993
  - B.S. Engineering Geology, Brigham Young University, 1988
  - Professional Geologist – Utah, Wyoming, Tennessee
  - Mr. Shrum is the Senior Vice President of Regulatory Compliance and has been with Energy*Solutions* for 12 years. He is also responsible for the overall Corporate environmental culture, obtaining and updating Energy*Solutions* numerous permits and licenses, and ensuring that the regulations are followed at all facilities. He has over 19 years of professional experience including investigations and remedial actions at numerous CERCLA and RCRA sites in Utah, North Dakota, Alaska, and California. Mr. Shrum has designed and installed monitoring well compliance and groundwater extraction systems, and conducted and interpreted aquifer test data for many groundwater investigations. He has successfully managed field teams conducting site characterizations, remedial investigations, and treatability studies. He is experienced in all aspects of drilling and monitoring well completion methods, appropriate air, soil, and groundwater sampling protocol, and QA/QC procedures.
- Thomas E. Magette, P.E.
  - M.S., Nuclear Engineering, University of Tennessee, 1979
  - B.S., Nuclear Engineering, University of Tennessee, 1977
  - Professional Engineer – New Mexico, Virginia, Maryland
  - Energy*Solutions*' Senior Vice President for Nuclear Regulatory Strategy, Mr. Magette has over 30 years experience managing and conducting environmental assessment, siting, licensing, and nuclear safety programs for a wide variety of energy generation and transmission; defense; and radioactive waste disposal facilities. He has extensive experience in all phases of environmental compliance for energy facilities and has prepared and presented expert testimony in regulatory proceedings. Mr. Magette developed Energy*Solutions*' licensing strategy for License Stewardship approach to D&D, the first application of which was recently approved by the NRC for the Zion nuclear station. Mr. Magette has managed the preparation of NEPA analyses and documents for several highly controversial projects, including the siting and licensing of power plants, defense nuclear reactors, nuclear weapons manufacturing facilities, high-voltage transmission lines, natural gas distribution lines, and biosafety level IV facilities.

V. Radioactive Waste

c. Requests to Board to Provide Comments on Depleted Uranium Disposal
(Board Information Item)

1. Stephen T. Nelson, Ph.D.
2. Brian Moench, M.D.

Dane Finerfrock - Re: Radiation Control Board: follow-up

From: Steve Nelson <oxygen.isotope@gmail.com>
To: Dane Finerfrock <DFINERFROCK@utah.gov>
Date: 6/30/2009 12:33 PM
Subject: Re: Radiation Control Board: follow-up

Dane,

The idea that anyone could confuse DU with LLW is stunning to me.

Here's my outline:

I. A brief review of the nature of DU
A. What it is
B. Where it comes from
C. Essential differences from LLW
II. Existing regulatory philosophy
A. Control of "short-lived" [century-scale] wastes
B. Control of "long-lived" [millenium to 1 million years] wastes
C. Environmental ethics
III. Suitability of ES Clive facility
A. As an engineered facility for short-lived wastes
B. As a disposal facility for long-lived wastes

****
Steve Nelson
Professor
Dept. of Geological Sciences
S-389 ESC
Brigham Young University
Provo, UT 84602

office/voice mail: 801-422-8688
lab: 801-422-7330

Jan. 20, 2009: The end of an error.
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V. Radioactive Waste

c. Requests to Board to Provide Comments on Depleted Uranium Disposal
(Board Information Item)

1. Stephen T. Nelson, Ph.D.
2. Brian Moench, M.D.

From: <drmoench@yahoo.com>
To: <dfinerfrock@utah.gov>
Date: 6/29/2009 3:22 PM
Subject: EnergySolutions/Depleted Uranium
Attachments: DU:EnergySolutions outline.rtf

Dane:

Attached is an outline of the presentation the Utah Physicians for a Healthy Environment would like to make at the July meeting regarding the proposed moratorium on EnergySolutions storing more depleted uranium. Our presentation takes 18 minutes.

Sincerely,

Dr. Brian Moench
President, Utah Physicians for a Healthy Environment

Assumptions necessary to determine that storing DU at Clive is "safe"

1. The DU storage will have an extremely small likelihood of exposing the public

   A. Integrity of the storage cyclinders
   B. Chemical stability of the contents
   C. Possible effect of weather events, including global warming
   D. Political or business effects on long term security of the Clive site.
   E. Earthquake possibilities

2. If the public is exposed, the exposure will be likely be small. and that a low dose exposure of the public will have no, or negligible impact on public health
   A. History of the nuclear industry, miscalculations, deceptions, fraud
   B. What do the science experts say about low dose exposure?
   C. What evidence is there that groups already exposed that have had health impacts?

3. Precautionary principle in medical practice

V. Radioactive Waste (Board Action Item)

a. Responses from the U.S. Nuclear Regulatory Commission (NRC) to Board Questions Regarding Disposal of Depleted Uranium

State of Utah
GARY R. HERBERT
Governor

Department of
Environmental Quality

Amanda Smith
Acting Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

August 25, 2009

Mr. Larry Camper
Division of Waste Management
and Environmental Protection
U.S. Nuclear Regulatory Commission
Mailstop T-8F5
Washington, D.C. 20555

Dear Mr. Camper:

In my letter of August 4, 2009, I mentioned that the Utah Radiation Control Board would provide questions to you in anticipation of the September 22, 2009, Board meeting, about the proposed rule-making on Depleted Uranium. The questions from the Board are attached.

The questions can be the framework for our discussion and no doubt the answers will lead to additional areas of inquiry. Please contact Dane Finerfrock, Division of Radiation Control at 801-536-4250, if you need assistance.

For the Utah Radiation Control Board

Sincerely,

Original signed by Peter Jenkins
Peter A Jenkins
Chairman

Attachment

State of Utah
GARY R. HERBERT
Governor

Department of
Environmental Quality

Amanda Smith
Acting Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

Attachment

List of Questions for Nuclear Regulatory Commission to Respond to at the DRC Board Meeting on September 22, 2009:

1. What were the criteria used by the NRC staff in their report to the NRC Commissioners, regarding the possible re-classification of DU? How did the 3 options vary that were presented?

2. Is there a possibility that the classification of DU will be revisited in the near future? If not, why not? Is the NRC "strongly" considering placing DU as a special subset of Class A waste with different disposal requirements?

3. Please describe the performance analysis that was used to develop the specifications for the waste disposal of DU. For example, source function (i.e. amounts), time scale, and possible events that could impact the outcome?

4. If the State of Utah either banned or placed a moratorium on DU disposal within the State, what would the NRC reaction be? Would this action threaten Utah's inclusion as one of the "agreement states"?

5. What are the long and short-term dangers of DU in an engineered facility? What are the health and safety issues related to DU in an above-ground waste facility as opposed to a geological facility similar to Yucca Mountain?

6. Is it possible that the Energy Solutions site at Clive Utah will not be a suitable disposal site for DU given its above-ground shallow cells? (See question #9)

7. How much DU needs to be disposed, both domestic and foreign? What's DOE's role in this? Is there a pressing need for disposal? What are the projected time frames?

8. What are the health and safety issues associated with DU disposal prior to the final rule making by the NRC? Are preemptive actions required?

9. Does increasing the burial depth to a minimum of 10 feet remove the risks? If not, what does the NRC feel the burial depth should be? This should be asked for short or long term time periods.

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Mailing Address: P.O. Box 144850 • Salt Lake City, UT 84114-4850
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www.deq.utah.gov

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ENERGYSOLUTIONS

HAND DEL.
JUL 28 2009
DIV OF RADIATION

July 27, 2009

CD09-0188

Mr. Dane Finerfrock
Executive Secretary
Utah Radiation Control Board
P.O. Box 144850
Salt Lake City, UT 84114-4850

Re: Radioactive Material License Number UT 2300249 – Request for Amendment

Dear Mr. Finerfrock:

Energy*Solutions* hereby requests an amendment to Radioactive Material License Number UT 2300249. The purpose of this amendment is to capture a commitment made on July 14, 2009 to the Utah Radiation Control Board regarding disposal of depleted uranium. Proposed language is provided below:

> The Licensee shall place all wastes with depleted uranium concentrations greater than 5 percent (by weight) a minimum of 10 feet below the top of the cover. This license condition shall be removed following the completion of the Nuclear Regulatory Commission's rulemaking on Depleted Uranium and subsequent approval by the Division of the site specific performance assessment for the Clive facility.

License Condition 59 is currently reserved, and would be an appropriate location for this new condition.

Enclosed please find check number 101144 for this request. Please contact me at 801-649-2000 with any questions regarding this issue.

Sincerely,

Daniel B. Shrum
Senior Vice President, Regulatory Compliance

423 West 300 South, Suite 200 • Salt Lake City, Utah 84101
801.649.2000 • Fax: 801.321.0453 • www.energysolutions.com

U.S. DEPARTMENT OF
ENERGY

SAVANNAH RIVER OPERATIONS OFFICE
AIKEN, SC 29802

NEWS MEDIA CONTACT:
Jim Giusti, (803) 952-7697
james-r.giusti@srs.gov

FOR IMMEDIATE RELEASE
Friday, July 17, 2009

DOE Awards $3.4 million Contract To Ship Depleted Uranium Oxide Out of South Carolina

Recovery Act in Action

Aiken, SC (July 17) -- The Department of Energy's Savannah River Operations Office announced today the award of $3.4 million contract to Cavanagh Service Group for shipping services of depleted uranium oxide (DUO) under the American Reinvestment and Recovery Act project at the Savannah River Site.

Cavanagh Services Group, Inc., an 8(a) Woman-Owned Small Business, under the fixed-price contract will oversee the loading of railcars with the DUO and the transportation of the loaded railcars to a low level radioactive waste disposal site in Clive, Utah that is owned and operated by Energy Solutions. Over the next 14 months, approximately 14,800 drums of DUO will be shipped out of South Carolina for final disposal using 52 DOE-owned gondola railcars that meet federal shipping requirements.

Additional information on the Department of Energy's Office of Environmental Management and the Savannah River Site can be found at http://www.em.doe.gov or http://www.srs.gov. For more information about the SRS Recovery Act Project, please visit www.srs.gov/recovery. Follow SRS on twitter also: www.twitter.com/SRSNews

-DOE-

SR-2009-15

VII. Other Division Issues (Board Information Item)

a. Division Activities Report

Division of Radiation Control
Activities Report Summary

July & August, 2009

Notices of Violation assigned a Severity Level I, II, or III or where a Monetary Penalty has been imposed.

1. Professional Service Industries (PSI), Oakbrook Terrace, IL; Severity Level III and $25,000.00 civil Penalty

   An inspector investigated an allegation that Professional Service Industries, a licensee of the U.S. Nuclear Regulatory Commission (NRC), was performing industrial radiography in Utah without following the reciprocal recognition licensing requirements. By rule, an out-of-state licensee must notify the Executive Secretary in writing at least three days prior to the use of licensed materials in Utah. Notifications must indicate the location, period, and type of proposed possession and use within Utah and must be accompanied by a copy of the radioactive material license.

2. Bayou Inspection Services, Inc., Amelia, LA; Severity Level III

   This licensee was working in Utah by reciprocal recognition of their State of Louisiana radioactive material license. Two Severity Level III violations were observed and both involved security matters. First, the licensee allowed an individual to have unescorted assess to a large quantity of radioactive material and the individual had not been deemed trustworthy and reliable by the licensee. Second, the licensee stored a large quantity of radioactive material in two vehicles without a representative available at close proximity to respond to a theft or intrusion alarm.