



State of Utah

GARY R. HERBERT  
*Governor*

SPENCER J. COX  
*Lieutenant Governor*

Department of  
Environmental Quality

Alan Matheson  
*Executive Director*

DIVISION OF WASTE MANAGEMENT  
AND RADIATION CONTROL  
Scott T. Anderson  
*Director*

A regular meeting of the Waste Management and Radiation Control Board has been scheduled for December 10, 2015 at 1:30 p.m. at the Department of Environmental Quality, Multi-Agency State Office Building, Conference Room #1015, 195 North 1950 West, SLC.

(One or more Board members may participate telephonically.)

Agenda

- I. Call to Order.
- II. Introductions of new Board members.
- III. Approval of the meeting minutes for the November 12, 2015 Board meeting  
**(Board Action Item)**.
- IV. Underground Storage Tanks Update.
- V. Administrative Rules.
  - A. Approval to proceed with formal rulemaking and 30-day public comment period for proposed changes to Radiation Control Rules, R313-15, R313-19, R313-22, and R313-24  
**(Board Action Item)**.
- VI. Low Level Radioactive Waste.
  - A. EnergySolutions, LLC request for a site-specific treatment variance from the Hazardous Waste Management Rules. EnergySolutions seeks authorization to receive Cemented Uranium Extraction Process Residues for disposal **(Board Action Item)**.
- VII. Director's Report.
- VIII. Other Business.
  - A. Introduction of HEAL – Ashley Ann Soltysiak
  - B. Board Training - Renette Anderson, Planning/Leadership Training, DEQ
  - C. Next Board Meeting

(Over)

IX. Adjourn.

In compliance with the Americans with Disabilities Act, individuals with special needs (including auxiliary communicative aids and services) should contact Dana Powers, Office of Human Resources at (801) 499-2117 TDD (801) 903-3978 or by email at [dpowers@utah.gov](mailto:dpowers@utah.gov).

Waste Management and Radiation Control Board Meeting  
Utah Department of Environmental Quality  
195 North 1950 West (Conference Room #1015) SLC, Utah  
November 12, 2015  
1:30 p.m.

**Board Members Present:** Richard Codell, Marc Franc, Steve McIff, Brett Mickelson, Dennis Riding, Vern Rogers, Shane Whitney and Dwayne Woolley

**Board Members Absent:** Jeremy Hawk and Shawn Milne

**Staff Members Present:** Scott Anderson, Brent Everett, Deborah Ng, Don Verbica, Tom Ball, Otis Willoughby, Ed Costomiris, Dean Henderson, Michelle Weis, Rick Page, Arlene Lovato, Jerry Rogers, Elisa Smith, Raymond Wixom, Ralph Bohn, Rusty Lundberg

**Others Present:** Les Ashwood, Lonnie Brown, Tim Orton, Karen Langley, Ashley Soltysiak, Craig Jones

**I. Call to Order.**

Scott Anderson welcomed all in attendance and called the meeting to order at 1:35 p.m. Scott thanked the Board members for their attendance and participation in the orientation/training meeting that preceded the Board meeting.

**II. Introductions of Board Members.**

Each board member introduced himself and his position on the Board.

Dwayne Woolley is employed by TransJordan Cities and is one of two non-federal government representatives. Mark Franc is employed by Waste Management and represents the private solid waste disposal industry. Brett Mickelson is a professional engineer and fills the Utah-licensed engineer position. Dennis Riding is employed by Maverik Incorporated and represents the fuel industry. Steve McIff has a private dental practice in Pleasant Grove and represents the public. Vern Rogers is employed by EnergySolutions and represents the radioactive waste management industry. Shane Whitney is employed by Clean Harbors and represents the private hazardous waste disposal industry. Richard Codell, a consultant in the nuclear industry and a former member of the Radiation Control Board represents the uranium milling industry.

Scott Anderson excused Shawn Milne, Tooele County Commissioner, one of two non-federal government representatives on the Board and Jeremy Hawk, Radiation Safety Officer for IHC, representing the field of radiation safety.

Mr. Anderson also informed the Board that Danielle Endres has been nominated by the Governor to serve on the Board, but is awaiting confirmation by the Senate; which is anticipated to take place on November 18, 2015. Ms. Endres will fill the position designated for a nongovernmental organization that represents community interests and does not represent industry interests.

**III. Election of Board Chair and Vice Chair.**

Scott Anderson conducted the elections for Board Chair and Vice Chair.

It was moved by Shane Whitney and seconded by Dennis Riding and UNANIMOUSLY CARRIED to elect Dwayne Woolley to serve as the Board Chair. Brett Mickelson commented that Mr. Woolley would be an excellent chairman. Mr. Mickelson noted, however, that it may take away from his thorough review of the meeting minutes because he will be conducting the meetings instead of checking the minutes for accuracy.

It was moved by Shane Whitney and seconded by Steve McIff and UNANIMOUSLY CARRIED to elect Dennis Riding as the Board's Vice-Chair.

(No other Board members expressed an interest in serving as either Board Chair or Vice-Chair.)

#### **IV. Underground Storage Tanks Update.**

Brent Everett, Director of the Division of Environmental Response and Remediation (DERR), explained that the DERR has responsibility for the Underground Storage Tank (UST) program which has rules that come before the Board for approval. He informed the Board that the DERR will regularly report on the financial assurance mechanism, the Petroleum Storage Tank (PST) Trust Fund, which is used by more than 76% of the UST facilities in Utah.

The cash balance of the PST Trust Fund at the end of September 2015 was \$16,211,196.00. The preliminary estimate for the cash balance of the PST Trust Fund for the end of October 2015 is \$16,190,526.00. The cash balance of the PST Trust Fund will experience fluctuations as claims are paid out. There were no questions regarding the PST Trust Fund balance.

Mr. Everett informed the Board that the rule changes implemented as part of the regulatory review of the Federal Underground Storage Tank (UST) Rules were published in the Federal Register on July 15, 2015. The rule changes will require Utah rule revisions to coincide with new federal requirements. Most of the anticipated changes have already been implemented in Utah but in order to conform with the new Federal Rules, there will be additional rule changes proposed to the Board for adoption.

#### **V. Administrative Rules**

##### **a. Final adoption of proposed rule changes R315-15-18, Standards for the Management of Used Oil, Polychlorinated Biphenyls (PCBs), as published in the July 15, 2015 edition of the Utah State Bulletin (Board Action Item).**

Ralph Bohn, Planning and Technical Support Section Manager, reviewed the request for final adoption of proposed changes to Used Oil Rule R315-15-18 of the Utah Administrative Code.

The used oil rules were modified in the fall of 2014. Following a review of the corresponding federal rules, the Director determined that the reference in R315-15-18 to certain concentrations of PCBs should be changed. Specifically, the federal rules regulating PCBs (40 CFR 761) have several levels of PCB concentrations and different requirements for each concentration. Used oil containing less than 50 ppm PCBs that is recycled in a manner other than being burned for energy recovery generally is excluded from TSCA requirements except for issues such as dilution.

Used oil with a PCB concentration of 50 ppm or greater is regulated under TSCA and its use and disposal are restricted. Also, the proposed change to the rule clarifies that the assumptions in 40 CFR 761.2 of the concentration of PCBs and PCB items are appropriate while in use or stored for reuse but when the PCBs are disposed or stored for disposal, the actual PCB concentration must be known. The proposed change clarifies that the actual PCB concentration is obtained from laboratory analysis. The used oil rules adopted in 2014 specified 2 ppm where 50 ppm should have been specified.

The draft rule changes were published in the July 15, 2015 in the Utah State Bulletin to begin the public comment period. No comments were received. The Director recommends that the Board adopt the proposed rule changes and set an effective date of November 12, 2015.

**It was moved by Dennis Riding and seconded by Mark Franc and UNANIMOUSLY CARRIED to approve for final adoption the proposed changes to R315-15-18, Standards for the Management of Used Oil, Polychlorinated Biphenyls (PCBs), as published in the July 15, 2015 edition of the Utah State Bulletin with an effective date of November 12, 2015.**

## **VI. Hazardous Waste Section.**

### **a. Proposed Stipulation and Consent Order between the Board and Emerald Services, Inc. (Board Action Item).**

Deborah Ng, Hazardous Waste Section Manager, reviewed the proposed Stipulation and Consent Order (SCO) to resolve Notice of Violation and Compliance Order (NOV/CO) No. 1307015 issued to Emerald Services Inc. on April 24, 2013.

Emerald Services is an environmental services company with facilities located at 2450 South 800 West and 650 West 500 South in Salt Lake City, Utah. Emerald Services collects, processes, stores and markets used oil under the provisions of R315-15 of the Utah Administrative Code and State-issued Permits UOP-090, UOP-084, UOP-087 and Marketer Registration UOR-077. (The NOV/CO was included in the Board packet.)

All violations cited in the NOV have been corrected by the facility. The SCO includes a penalty of \$73,274.00. Emerald will pay \$26,782.00 in cash and the remaining amount will be separated into two Supplemental Environmental Projects (SEPs) totaling \$46,492.00. The first SEP of \$26,492.00 includes installation of a remote level monitoring system for the bulk used oil storage tanks in Tank Farm #1, and the second SEP includes a \$20,000 donation made to the Utah Public Health Laboratory for new laboratory equipment to process environmental samples.

The public comment for this SCO began on June 11, 2015 and ended on July 10, 2015. No public comments were received. The Director recommends approval of the SCO with Emerald Services.

Marc Franc noted this issue was discussed during the last meeting of the Solid and Hazardous Waste Control Board and felt it was appropriate to re-state his concerns regarding the settlement. Mr. Franc expressed concern that the penalty does not take into account the economic benefit gained by the company's non-compliance.

Ms. Ng responded that the penalty calculation spreadsheet provided in the Board packet addresses economic benefit. Mr. Franc had seen the spreadsheet but did not see an increase in the penalties for economic benefit and he believes an unfair substantial business advantage was gained whether intentional or not as there were numerous violations noted.

Scott Anderson clarified that the Division considers economic benefit in every settlement. Mr. Anderson also explained the difficulty in calculating the dollar value of the economic benefit for each violation when the Division does not have access to the company's business costs. Assumptions can be made but they often lead to disproportionately high penalties so the Division tries to find a balance. Mr. Anderson reminded the Board that it can refuse to approve the settlement and direct the Division to re-negotiate with the company.

Mr. Franc asked how it was decided what portion of the penalty was to be paid in cash. Ms. Ng explained that after the costs of the SEPs were calculated, the remaining portion of the total penalty would be paid in cash.

Dwayne Woolley expressed similar concerns and thought it would be helpful to have a history of compliance issues at the facility. Board members asked if a rule change would be necessary to address the issue of adding economic benefit to penalties. Mr. Anderson stated that a rule change is not necessary since the Division already considers economic benefit in settlements. The Division will look at ways to provide more detailed information to the Board in support of future settlements to address this concern.

**It was moved by Dennis Riding and seconded by Brett Mickelson and majority carried to approve the proposed Stipulation and Consent Order between the Board and Emerald Services, Inc. Mark Franc opposed the motion.**

**b. Clean Harbors, Grassy Mountain, LLC request for a site-specific treatment variance to stabilize a High Mercury- Subcategory Inorganic waste stream that has the characteristic waste code D009 (Board Action Item).**

Ed Costomiris, Environmental Scientist, provided a power point presentation as background for this request. (A copy of the presentation is provided in the meeting minutes.).

Clean Harbors Grassy Mountain, LLC has requested a site-specific treatment variance from the Utah Hazardous Waste Management Rules. The Grassy Mountain Facility seeks authorization to stabilize a High Mercury – Subcategory Inorganic waste stream that has the characteristic waste code D009. The treated waste will then be disposed in a hazardous waste cell at the facility.

The Grassy Mountain Facility proposes to stabilize and dispose of a mercury waste stream that is generated at the Clean Harbors Aragonite Facility and carries the waste code for High Mercury-Inorganic Subcategory along with many other waste codes. The waste stream is generated by the spray dryer at the Aragonite Facility. The technology-based treatment code for this material is RMERC (roasting/retorting followed by mercury recovery). The RMERC process generates a secondary waste stream. Secondary waste streams, when greater than, or equal to, 260 mg/kg total mercury, are required to be further stabilized to a level of 0.20 mg/l using the toxicity characteristic leaching procedure (TCLP). Secondary waste streams, when less than 260 mg/kg total mercury, are required to be treated to 0.025 mg/l TCLP.

The Grassy Mountain Facility proposes to treat all of the waste, regardless of the initial concentration of mercury, to the more restrictive standard of 0.025 mg/L, or less, based on the TCLP. The Grassy Mountain Facility is proposing to treat the waste directly with a stabilization method rather than going through the initial retorting or roasting of the waste. The hardship for Clean Harbors is that there currently is no alternative way for the company to dispose of this waste. Facilities that can retort the waste stream are not permitted to treat waste that have waste codes not associated with mercury and this particular waste stream has numerous codes in addition to the code for mercury.

The Grassy Mountain Facility has conducted a treatability study on the waste stream. The treatment formula developed for this waste stream resulted in mercury concentrations below the requested concentration of 0.025 mg/L TCLP. In addition, LDR compliance will be met with all other waste codes associated with the waste prior to disposal. Clean Harbors Grassy Mountain has requested, and the Board has approved, identical and similar site-specific treatment variances in March 2009, November 2010, June 2013 and February 2015.

A notice for public comment was published in the October 1, 2015 issues of the Salt Lake Tribune, the Deseret News and the Tooele Transcript Bulletin. The comment period began on October 1, 2015 and ended on October 30, 2015. No comments were received. This variance, if granted, will be valid until November 12, 2016.

**It was moved by Vern Rogers and seconded by Dennis Riding and UNANIMOUSLY CARRIED to approve Clean Harbors, Grassy Mountain, LLC request for a site-specific treatment variance to stabilize a High Mercury- Subcategory Inorganic waste stream that has the characteristic waste code D009. Shane Whitney recused himself from voting on this matter.**

## **VII. Low Level Radioactive Waste Section.**

### **a. EnergySolutions, LLC request for a site-specific treatment variance from the Hazardous Waste Management Rules. EnergySolutions seeks authorization to receive Cemented Uranium Extraction Process Residues for disposal (Information Item Only).**

Otis Willoughby, Environmental Scientist, Low-Level Radioactive Waste Section informed the Board that on November 4, 2015, EnergySolutions, LLC submitted a request to the Director of the Division of Waste Management and Radiation Control for a site-specific treatment variance from the Hazardous Waste Management Rules. EnergySolutions seeks authorization to receive Cemented Uranium Extraction Process Residues for disposal.

The Mixed Waste Facility proposes to receive up to 600 cubic feet of cemented monoliths containing enriched uranium residuals. This material retains hazardous waste codes for barium, cadmium, chromium, lead and spent solvents. The generator has encapsulated the waste in concrete for security reasons. EnergySolutions proposes to receive this waste for macroencapsulation in the Mixed Waste Landfill Cell rather than chemical stabilization, as required.

This request is based on the fact that the waste has already been encapsulated in concrete at the generator's site. Treating this waste by the required method would mean grinding the waste and potentially exposing workers to unnecessary contamination. The proposed treatment will further encapsulate the waste and protect it from contact with precipitation, thereby decreasing the potential of leaching. If approved, this variance will be in effect for one year.

A notice for public comment was published in the Salt Lake Tribune, the Deseret News and the Tooele County Transcript Bulletin. The comment period began on November 10, 2015 and will end on December 9, 2015. This is an informational item before the Board. The Director will provide a recommendation at the next Board Meeting.

Tim Orton, EnergySolutions, informed the Board that since 2007 this will be the ninth time this variance request has been presented to the Board. This is a continuing ash waste stream from a DOE generator that contains enriched uranium. According to the current regulations and because of the waste contained in it, this type of waste would normally need a stabilization treatment. However, for security purposes and for transportation purposes, the DOE takes the ash and puts it in a 2 ½ gallon containers and cements it into a 16-gallon cement block monolith. What EnergySolutions actually receives is a 16-gallon cement block. EnergySolutions could shred the cement block and perform a stabilization treatment, but that would not be appropriate from a safety perspective or safe for the environment as there is radioactive material in the cement block.

EnergySolutions would like to do another treatment process, macroencapsulation, where the cement block is placed in a special vault and specially designed cement is poured on it that is less permeable than any other options available. The waste is then encapsulated in a triple-lined landfill cell. The variance request before the Board is to utilize macroencapsulation instead of stabilization as the

regulations require. Mr. Orton informed the Board that this process has worked very well with the other variance requests approved throughout the years, and no degradation has occurred.

Dr. Codell asked for clarification on the degree of enrichment of the uranium and the quantities of uranium. Mr. Orton did not know the uranium content, but noted it meets EnergySolutions licensing requirements. Mr. Orton will provide this information at the next meeting. Dr. Codell stated there are concerns regarding disposal of uranium and therefore the uranium content should be disclosed.

Otis Willoughby clarified that the regulations require a yearly variance request for this ongoing waste stream; the variance is only good for one year. For safety and security reasons, this waste will always be treated as stated above.

Raymond Wixom, Attorney General's Office, further clarified that the basis for the one year period for a variance is a statutory provision. Mr. Wixom reviewed the statute, and stated that to comply with the statute a facility can come before the Board and request a variance on an annual basis.

Mr. Orton reiterated that the DOE's position is that this is the safest, most secure and most effective way to handle this type of waste stream and they are not going to change unless they are required to do so. The volume EnergySolutions expects to receive this year is approximately 300-600 cubic feet. The total received to date at the facility is approximately 7,000 cubic feet (over a 10-year period).

## **VIII. Other Business.**

### **A. Misc. Information Items.**

Dennis Riding commended Ed Costomiris on his power point presentation and requested, if possible, that future presentations follow that format as it was very beneficial.

### **B. Schedule of Board Meetings.**

Scott Anderson discussed options for future board meetings. The Board is required to meet quarterly with one meeting during the Legislative session. Board members chose to meet on the second Thursday of each month at 1:30 pm. Mr. Anderson asked the Board members to notify the Division as soon as possible each month if they will not be able to attend. It was also stated that Board members can participate via the telephone.

### **C. December Board meeting.**

The next Board meeting is scheduled for December 10, 2015 at 1:30 pm.

## **IX. Adjourn.**

The meeting adjourned at 2:20 p.m.

**UST STATISTICAL SUMMARY**  
**September 1, 2014 -- October 31, 2015**

<b>PROGRAM</b>													
	<b>November</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>(+/-) OR Total</b>
<b>Regulated Tanks</b>	3,991	3,990	3,987	3,998	4,000	4,005	3,982	3,972	3,969	3,971	3,993	4,000	<b>9</b>
<b>Tanks with Certificate of Compliance</b>	3,917	3,917	3,908	3,906	3,904	3,914	3,906	3,893	3,893	3,889	3,885	3,889	<b>(28)</b>
<b>Tanks without COC</b>	74	73	79	92	96	91	76	79	76	82	108	111	<b>37</b>
<b>Cumulative Facilities with Registered A Operators</b>	1,346	1,344	1,341	1,339	1,340	1,341	1,336	1,331	1,330	1,330	1,333	1,334	<b>98.09%</b>
<b>Cumulative Facilities with Registered B Operators</b>	1,346	1,344	1,342	1,340	1,341	1,341	1,336	1,331	1,329	1,329	1,334	1,335	<b>98.16%</b>
<b>New LUST Sites</b>	4	3	12	8	4	4	7	6	8	14	7	5	<b>82</b>
<b>Closed LUST Sites</b>	11	2	12	12	10	10	2	12	13	10	6	9	<b>109</b>
<b>Cumulative Closed LUST Sites</b>	4759	4760	4770	4783	4794	4800	4805	4817	4824	4842	4848	4857	<b>98</b>
<b>FINANCIAL</b>													
	<b>November</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>(+/-)</b>
<b>Tanks on PST Fund</b>	2,909	2,911	2,901	2,893	2,891	2,891	2,884	2,870	2,867	2,860	2,846	2,844	<b>(65)</b>
<b>PST Claims (Cumulative)</b>	629	628	629	633	633	633	636	638	638	646	647	648	<b>19</b>
<b>Equity Balance</b>	-\$8,656,486	-\$8,990,620	-\$9,934,333	-\$9,141,111	-\$9,956,153	-\$9,282,773	-\$9,325,810	-\$9,241,227	-\$8,880,024	-\$9,079,617	-\$7,810,251	-\$7,663,788	<b>\$992,698</b>
<b>Cash Balance</b>	\$17,016,530	\$16,682,396	\$16,247,459	\$16,531,905	\$15,716,863	\$16,390,243	\$16,347,205	\$16,431,789	\$16,792,993	\$16,214,452	\$16,211,196	\$16,357,660	<b>(\$658,870)</b>
<b>Loans</b>	0	0	0	1	1	3	0	0	3	0	0	0	<b>0</b>
<b>Cumulative Loans</b>	96	96	97	98	99	102	102	102	105	105	105	105	<b>9</b>
<b>Cumulative Amount</b>	\$2,955,150	\$2,955,150	\$3,105,150	\$3,251,573	\$3,382,883	\$3,691,025	\$3,691,026	\$3,691,026	\$3,727,980	\$3,727,980	\$3,727,980	\$3,727,980	<b>\$772,830</b>
<b>Defaults/Amount</b>	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
	<b>November</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>TOTAL</b>
<b>Speed Memos</b>	32	29	36	29	34	36	28	51	34	34	45	52	<b>440</b>
<b>Compliance Letters</b>	9	6	3	8	8	7	3	4	6	5	3	14	<b>76</b>
<b>Notice of Intent to Revoke</b>	0	0	0	0	0	0	1	0	0	0	0	0	<b>1</b>
<b>Orders</b>	0	0	4	2	5	3	5	2	1	0	0	1	<b>23</b>

WASTE MANAGEMENT AND RADIATION CONTROL BOARD  
 Executive Summary  
 Amendments to Rules R313-15, R313-19, R313-22, and R313-24  
 December 10, 2015

<p><b>What is the issue before the Board?</b></p>	<p>This proposed change amends the appropriate sections of R313-15, <i>Standards for Protection Against Radiation</i>, R313-19, <i>Requirements of General Applicability to Licensing of Radioactive Material</i>, R313-22, <i>Specific Licenses</i>, and R313-24, <i>Uranium Mills and Source Material Mill Tailings Disposal Facility Requirements</i>, by incorporating the federal decommissioning planning regulations promulgated by the Nuclear Regulatory Commission on June 17, 2011 (76 FR 35512).</p>
<p><b>What is the historical background or context for this issue?</b></p>	<p>On June 17, 2011, the Nuclear Regulatory Commission adopted changes to 10 CFR Parts 20, 30 and 40. These regulations were adopted to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site. The amended regulations require licensees to conduct their operations to minimize the introduction of residual radioactivity into the site, which includes the site's subsurface soil and groundwater.</p> <p>Licensees also may be required to perform site surveys to determine whether residual radioactivity is present in subsurface areas and to keep records of these surveys with records important for decommissioning. The amended regulations require licensees to report additional details in their decommissioning cost estimate, eliminate the escrow account and line of credit as approved financial assurance mechanisms and modify other financial assurance requirements. Changes to Utah rules are required to maintain compatibility with NRC rules and status as an Agreement State.</p>
<p><b>What is the governing statutory or regulatory citation?</b></p>	<p>The Board is authorized under Subsection 19-3-104(4)(b) to make rules to meet the requirements of federal law and maintain primacy from the federal government. The draft rule has also met all of the Department of Environmental Quality rulemaking procedures.</p>
<p><b>Is Board action required?</b></p>	<p>Yes, Board action is required to publish the draft rule in the <i>Utah State Bulletin</i> and start a 30-day public comment period.</p>
<p><b>What is the Division Director's recommendation?</b></p>	<p>The Director recommends that the Board approve the rule for publication in the <i>Utah State Bulletin</i> and commencement of a 30-day public comment period.</p>
<p><b>Where can more information be obtained?</b></p>	<p>For questions or additional information, please call Rusty Lundberg at (801) 536-4257.</p>

### **R313. Environmental Quality, Radiation Control.**

#### **R313-15. Standards for Protection Against Radiation.**

##### **R313-15-403. Criteria for License Termination Under Restricted Conditions.**

A site will be considered acceptable for license termination under restricted conditions if:

(1) The licensee can demonstrate that further reductions in residual radioactivity necessary to comply with the provisions of Section R313-15-402 would result in net public or environmental harm or were not being made because the residual levels associated with restricted conditions are ALARA. Determination of the levels which are ALARA must take into account consideration of any detriments, such as traffic accidents, expected to potentially result from decontamination and waste disposal; and

(2) The licensee has made provisions for legally enforceable institutional controls that provide reasonable assurance that the total effective dose equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 0.25 mSv (0.025 rem) per year; and

(3) The licensee has provided sufficient financial assurance to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site. Acceptable financial assurance mechanisms are:

(a) Funds placed into an account segregated from the licensee's assets outside the licensee's administrative control, and in which the adequacy of the trust funds is to be assessed based on an assumed annual one percent real rate of return on investment[ as described in Subsection R313-22-35(6)(a)];

(b) ~~[Surety method, insurance, or other guarantee method as described in Subsection R313-22-35(6)(b);~~

~~—(e)—~~A statement of intent in the case of Federal, State, or local Government licensees, as described in Subsection R313-22-35(6)(d); or

~~(c)(d)~~ When a governmental entity is assuming custody and ownership of a site, an arrangement that is deemed acceptable by such governmental entity; and

(4) The licensee has submitted a decommissioning plan or license termination plan to the Director indicating the licensee's intent to decommission in accordance with Subsection R313-22-36(4) and specifying that the licensee intends to decommission by restricting use of the site. The licensee shall document in the license termination plan or decommissioning plan how the advice of individuals and institutions in the community who may be affected by the decommissioning has been sought and incorporated, as appropriate, following analysis of that advice;

(a) Licensees proposing to decommission by restricting use of the site shall seek advice from such affected parties regarding the following matters concerning the proposed decommissioning:

(i) Whether provisions for institutional controls proposed by the licensee;

(A) Will provide reasonable assurance that the total effective dose equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 0.25 mSv (0.025 rem) total effective dose equivalent per year;

(B) Will be enforceable; and

(C) Will not impose undue burdens on the local community or other affected parties; and

(ii) Whether the licensee has provided sufficient financial assurance to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site; and

(b) In seeking advice on the issues identified in Subsection R313-15-403(4)(a), the licensee shall provide for:

(i) Participation by representatives of a broad cross section of community interests who may be affected by the decommissioning;

(ii) An opportunity for a comprehensive, collective discussion on the issues by the participants represented; and

(iii) A publicly available summary of the results of all such discussions, including a description of the individual viewpoints of the participants on the issues and the extent of agreement and disagreement among the participants on the issues; and

(5) Residual radioactivity at the site has been reduced so that if the institutional controls were no longer in effect, there is reasonable assurance that the total effective dose equivalent from residual radioactivity

distinguishable from background to the average member of the critical group is as low as reasonably achievable and would not exceed either:

- (a) one mSv (0.1 rem) per year; or
- (b) five mSv (0.5 rem) per year provided the licensee:
  - (i) Demonstrates that further reductions in residual radioactivity necessary to comply with the one mSv (0.1 rem) per year value of Subsection R313-15-403(5)(a) are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm;
  - (ii) Makes provisions for durable institutional controls; and
  - (iii) Provides sufficient financial assurance to enable a responsible government entity or independent third party, including a governmental custodian of a site, both to carry out periodic rechecks of the site no less frequently than every five years to assure that the institutional controls remain in place as necessary to meet the criteria of Subsection R313-15-403(2) and to assume and carry out responsibilities for any necessary control and maintenance of those controls. Acceptable financial assurance mechanisms are those in Subsection R313-15-403(3).

**R313-15-404. Alternate Criteria for License Termination.**

(1) The Director may terminate a license using alternative criteria greater than the dose criterion of Section R313-15-402, and Subsections R313-15-403(2) and R313-15-403(4)(a)(i)(A), if the licensee:

- (a) Provides assurance that public health and safety would continue to be protected, and that it is unlikely that the dose from all man-made sources combined, other than medical, would be more than the one mSv (0.1 rem) per year limit of Subsection R313-15-301(1)(a), by submitting an analysis of possible sources of exposure; and
- (b) Has employed, to the extent practical, restrictions on site use according to the provisions of Section R313-15-403 in minimizing exposures at the site; and
- (c) Reduces doses to ALARA levels, taking into consideration any detriments such as traffic accidents expected to potentially result from decontamination and waste disposal; and
- (d) Has submitted a decommissioning plan or license termination plan to the Director indicating the licensee's intent to decommission in accordance with Subsection R313-22-36(4), and specifying that the licensee proposes to decommission by use of alternate criteria. The licensee shall document in the decommissioning plan or license termination plan how the advice of individuals and institutions in the community who may be affected by the decommissioning has been sought and addressed, as appropriate, following analysis of that advice. In seeking such advice, the licensee shall provide for:
  - (i) Participation by representatives of a broad cross section of community interests who may be affected by the decommissioning; and
  - (ii) An opportunity for a comprehensive, collective discussion on the issues by the participants represented; and
  - (iii) A publicly available summary of the results of all such discussions, including a description of the individual viewpoints of the participants on the issues and the extent of agreement and disagreement among the participants on the issues.
- (e) Has provided sufficient financial assurance in the form of a trust fund to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site.

(2) The use of alternate criteria to terminate a license requires the approval of the Director after consideration of recommendations from the Division's staff, comments provided by federal, state and local governments, and any public comments submitted pursuant to Section R313-15-405.

**R313-15-406. Minimization of Contamination.**

(1) Applicants for licenses, other than renewals, shall describe in the application how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of waste.

(2) Licensees shall, to the extent practical, conduct operations to minimize the introduction of residual radioactivity into the site, including the subsurface, in accordance with the existing radiation protection

requirements in Section R313-15-101 and radiological criteria for license termination in Sections R313-15-1401 through R313-15-1406.

**R313-15-501. Surveys and Monitoring - General.**

(1) Each licensee or registrant shall make, or cause to be made, surveys of areas, including the subsurface, that:

- (a) ~~Are~~ May be necessary for the licensee or registrant to comply with Rule R313-15; and
- (b) Are ~~necessary~~ reasonable under the circumstances to evaluate:
  - (i) The magnitude and the extent of radiation levels; and
  - (ii) Concentrations or quantities of residual radioactive material; and
  - (iii) The potential radiological hazards of the radiation levels and residual radioactivity detected.

(2) Notwithstanding R313-15-1103(1), records from surveys describing the location and amount of subsurface residual radioactivity identified at the site shall be kept with records important for decommissioning, and such records shall be retained in accordance with R313-22-35(7), as applicable.

~~(2)~~(3) The licensee or registrant shall ensure that instruments and equipment used for quantitative radiation measurements, for example, dose rate and effluent monitoring, are calibrated at intervals not to exceed 12 months for the radiation measured, except when a more frequent interval is specified in another applicable part of these rules or a license condition.

~~(3)~~(4) All personnel dosimeters, except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to any extremity, that require processing to determine the radiation dose and that are used by licensees and registrants to comply with Section R313-15-201, with other applicable provisions of these rules, or with conditions specified in a license or registration shall be processed and evaluated by a dosimetry processor:

- (a) Holding current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology; and
- (b) Approved in this accreditation process for the type of radiation or radiations included in the NVLAP program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored.

~~(4)~~(5) The licensee or registrant shall ensure that adequate precautions are taken to prevent a deceptive exposure of an individual monitoring device.

**KEY: radioactive materials, contamination, waste disposal, safety**  
**Date of Enactment or Last Substantive Amendment: March 17, 2015**  
**Notice of Continuation: December 3, 2012**  
**Authorizing, and Implemented or Interpreted Law: 19-3-104; 19-3-108**

NOTICE OF  
PROPOSED RULE AMENDMENT

- The agency identified below in box 1 provides notice of proposed rule change pursuant to Utah Code Section 63G-3-301.
- Please address questions regarding information on this notice to the agency.
- The full text of all rule filings is published in the Utah State Bulletin unless excluded because of space constraints.
- The full text of all rule filings may also be inspected at the Division of Administrative Rules.

Rule Information

DAR file no: \_\_\_\_\_ Date filed: \_\_\_\_\_  
 State Admin Rule Filing Key: 156913  
 Utah Admin. Code ref. (R no.): R313-15

Agency Information

1. Agency: ENVIRONMENTAL QUALITY - Radiation Control  
 Room no.: Third Floor  
 Building:  
 Street address 1: 195 N 1950 W  
 Street address 2:  
 City, state, zip: SALT LAKE CITY UT 84116-3085  
 Mailing address 1: PO BOX 144850  
 Mailing address 2:  
 City, state, zip: SALT LAKE CITY UT 84114-4850

Contact person(s):

Name:	Phone:	Fax:	E-mail:	Remove:
Ralph Bohn	801-536-0212	801-536-0222	rbohn@utah.gov	

(Interested persons may inspect this filing at the above address or at DAR during business hours)

Rule Title

2. Title of rule or section (catchline):  
 Standards for Protection Against Radiation.

Notice Type

3. Type of notice: Amendment

Rule Purpose

4. Purpose of the rule or reason for the change:  
 As an agreement state Utah is required to have rules that are compatible with NRC rules. The rule changes are required to maintain compatibility.

Response Information

5. This change is a response to comments by the Administrative Rules Review Committee.

No  Yes

#### Rule Summary

6. Summary of the rule or change:

Sets the assumed annual rate of return to be used in assessing sufficiency of financial assurance of trust funds. removes insurance or other guarantees as financial assurance options. Adds a condition for termination of having sufficient financial assurance. Adds an operating standard that requires that operations will be conducted to minimize introduction of residual radioactivity to the site. Requires site surveys to include the subsurface. Changes "necessary" to "reasonable." Sets recording keeping requirements for site surveys.

#### Aggregate Cost Information

7. Aggregate anticipated cost or savings to:

A) State budget:

Affected:  No  Yes

The rule changes will not require any state resources above that already required to review licenses.

B) Local government:

Affected:  No  Yes

No local governments will be affected by the rule change

C) Small businesses:

Affected:  No  Yes

("small business" means a business employing fewer than 50 persons)

The rule change will not affect small business as they do not handle radioactive material of the type covered by the rule. The NRC in its rulemaking that necessitated the change in Utah rule noted that small business were not affected.

D) Persons other than small businesses, businesses, or local government entities:

Affected:  No  Yes

("person" means any individual, partnership, corporation, association, governmental entity, or public or private organization of any character other than an agency)

The rule change will not affect persons other than businesses.

#### Compliance Cost Information

8. Compliance costs for affected persons:

Changes in this rule along with changes in R313-19, R313-22, and R313-24 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,00 over a 15 year period or \$1,333 per year.

#### Department Head Comments

9. A) Comments by the department head on the fiscal impact the rule may have on businesses:

Changes in this rule along with changes in R313-19, R313-22, and R313-24 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,00 over a 15 year period or \$1,333 per

year. The number of businesses affected in Utah is unknown but is estimated to be less than 10 for a total cost per year of \$13,333.

B) Name and title of department head commenting on the fiscal impacts:

Alan Matheson

Citation Information

10. This rule change is authorized or mandated by state law, and implements or interprets the following state and federal laws.  
 State code or constitution citations (required) (e.g., Section 63G-3-402; Subsection 63G-3-601 (3); Article IV) :  
 19-6-107, 19-3-104

Incorporated Materials

11. This rule adds, updates, or removes the following title of materials incorporated by references (a copy of materials incorporated by reference must be submitted to DAR; if none, leave blank) :

<p style="text-align: center;">Official Title of Materials Incorporated (from title page)</p> <p style="text-align: center;">Publisher</p> <p style="text-align: center;">Date Issued (mm/dd/yyyy)</p> <p style="text-align: center;">Issue, or version (including partial dates)</p> <p style="text-align: center;">ISBN Number</p> <p style="text-align: center;">ISSN Number</p> <p style="text-align: center;">Cost of Incorporated Reference</p> <p style="text-align: center;">Adds, updates, removes-- SELECT ONE --</p>
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Comments

12. The public may submit written or oral comments to the agency identified in box 1. (The public may also request a hearing by submitting a written request to the agency. The agency is required to hold a hearing if it receives requests from ten interested persons or from an association having not fewer than ten members. Additionally, the request must be received by the agency not more than 15 days after the publication of this rule in the Utah State Bulletin. See Section 63G-3-302 and Rule R15-1 for more information.)

A) Comments will be accepted until 5:00 p.m. on (mm/dd/yyyy) : 02/01/2016

B) A public hearing (optional) will be held:

On (mm/dd/yyyy): At (hh:mm AM/PM): At (place):

Proposed Effective Date

13. This rule change may become effective on (mm/dd/yyyy): 02/08/2016

NOTE: The date above is the date on which this rule MAY become effective. It is NOT the effective date. After a minimum of seven days following the date designated in Box 12(A) above, the agency must submit a Notice of Effective Date to the Division of Administrative

Rules to make this rule effective. Failure to submit a Notice of Effective Date will result in this rule lapsing and will require the agency to start the rulemaking process over.

Indexing Information

14. Indexing information - keywords (maximum of four, one term per field, in lower case, except for acronyms (e.g., "GRAMA") or proper nouns (e.g., "Medicaid")):  
radioactive materials, contamination, safety, waste disposal

File Information

15. Attach an RTF document containing the text of this rule change (filename):  
There is a document associated with this rule filing.

To the Agency

Information requested on this form is required by Sections 63G-3-301, 302, 303, and 402. Incomplete forms will be returned to the agency for completion, possibly delaying publication in the Utah State Bulletin, and delaying the first possible effective date.

Agency Authorization

Agency head or designee, and title:	Alan Matheson Executive Director	Date (mm/dd/yyyy): 11/04/2015
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### **R313. Environmental Quality, Radiation Control.**

#### **R313-19. Requirements of General Applicability to Licensing of Radioactive Material.**

##### **R313-19-34. Terms and Conditions of Licenses.**

(1) Licenses issued pursuant to Rule R313-19 shall be subject to provisions of the Act, now or hereafter in effect, and to all rules, and orders of the Director.

(2) (a) Licenses issued or granted under Rules R313-21 and R313-22 and rights to possess or utilize radioactive material granted by a license issued pursuant to Rules R313-21 and R313-22 shall not be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of a license to a person unless the Director shall, after securing full information find that the transfer is in accordance with the provisions of the Act now or hereafter in effect, and to all rules, and orders of the Director, and shall give his consent in writing.

(b) An application for transfer of license shall include:

(i) The identity, technical and financial qualifications of the proposed transferee; and

(ii) Financial assurance for decommissioning information required by R313-22-35.

(3) Persons licensed by the Director pursuant to Rules R313-21 and R313-22 shall confine use and possession of the material licensed to the locations and purposes authorized in the license.

(4) Licensees shall notify the Director in writing and request termination of the license when the licensee decides to terminate activities involving materials authorized under the license.

(5) Licensees shall notify the Director in writing immediately following the filing of a voluntary or involuntary petition for bankruptcy under any Chapter of Title 11, Bankruptcy, of the United States Code by or against:

(a) the licensee;

(b) an entity, as that term is defined in 11 USC 101(15), controlling the licensee or listing the license or licensee as property of the estate; or

(c) an affiliate, as that term is defined in 11 USC 101(2), of the licensee.

(6) The notification specified in Subsection R313-19-34(5) shall indicate:

(a) the bankruptcy court in which the petition for bankruptcy was filed; and

(b) the date of the filing of the petition.

(7) Licensees required to submit emergency plans pursuant to Subsection R313-22-32(8) shall follow the emergency plan approved by the Director. The licensee may change the approved plan without the Director's approval only if the changes do not decrease the effectiveness of the plan. The licensee shall furnish the change to the Director and to affected off-site response organizations within six months after the change is made. Proposed changes that decrease, or potentially decrease, the effectiveness of the approved emergency plan may not be implemented without prior application to and prior approval by the Director.

(8) Each licensee preparing technetium-99m radiopharmaceuticals from molybdenum-99/technetium-99m generators or rubidium-82 from strontium-82/rubidium-82 generators shall test the generator eluates for molybdenum-99 breakthrough or strontium-82 and strontium-85 contamination, respectively, in accordance with Rule R313-32 (incorporating 10 CFR 35.204 by reference). The licensee shall record the results of each test and retain each record for three years after the record is made.

(9) Each portable gauge licensee shall use a minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal, whenever portable gauges are not under the control and constant surveillance of the licensee.

(10) (a) Authorization under Subsection R313-22-32(9) to produce Positron Emission Tomography (PET) radioactive drugs for noncommercial transfer to medical use licensees in its consortium does not relieve the licensee from complying with applicable FDA, other Federal, and State requirements governing radioactive drugs.

(b) A licensee authorized under Subsection R313-22-32(9) to produce PET radioactive drugs for noncommercial transfer to medical use licensees in its consortium shall:

(i) Satisfy the labeling requirements in Subsection R313-22-75(9)(a)(iv) for each PET radioactive drug transport radiation shield and each syringe, vial, or other container used to hold a PET radioactive drug intended for noncommercial distribution to members of its consortium.

(ii) Possess and use instrumentation to measure the radioactivity of the PET radioactive drugs intended for noncommercial distribution to members of its consortium and meet the procedural, radioactivity measurement, instrument test, instrument check, and instrument adjustment requirements in Subsection R313-22-75(9)(c).

(c) A licensee that is a pharmacy authorized under Subsection R313-22-32(9) to produce PET radioactive drugs for noncommercial transfer to medical use licensees in its consortium shall require that any individual that prepares PET radioactive drugs shall be:

(i) an authorized nuclear pharmacist that meets the requirements in Subsection R313-22-75(9)(b)(ii); or

(ii) an individual under the supervision of an authorized nuclear pharmacist as specified in Rule R313-32 (incorporating 10 CFR 35.27 by reference).

(d) A pharmacy authorized under Subsection R313-22-32(9) to produce PET radioactive drugs for noncommercial transfer to medical use licensees in its consortium that allows an individual to work as an authorized nuclear pharmacist, shall meet the requirements of Subsection R313-22-75(9)(b)(v).

**KEY: license, reciprocity, transportation, exemptions**

**Date of Enactment or Last Substantive Amendment: Jun 16, 2015**

**Notice of Continuation: September 23, 2011**

**Authorizing, and Implemented or Interpreted Law: 19-3-104; 19-3-108**

NOTICE OF  
PROPOSED RULE AMENDMENT

- The agency identified below in box 1 provides notice of proposed rule change pursuant to Utah Code Section 63G-3-301.
- Please address questions regarding information on this notice to the agency.
- The full text of all rule filings is published in the Utah State Bulletin unless excluded because of space constraints.
- The full text of all rule filings may also be inspected at the Division of Administrative Rules.

Rule Information

DAR file no: \_\_\_\_\_ Date filed: \_\_\_\_\_  
 State Admin Rule Filing Key: 156884  
 Utah Admin. Code ref. (R no.): R313-19-34

Agency Information

1. Agency: ENVIRONMENTAL QUALITY - Radiation Control  
 Room no.: Third Floor  
 Building:  
 Street address 1: 195 N 1950 W  
 Street address 2:  
 City, state, zip: SALT LAKE CITY UT 84116-3085  
 Mailing address 1: PO BOX 144850  
 Mailing address 2:  
 City, state, zip: SALT LAKE CITY UT 84114-4850

Contact person(s):

Name:	Phone:	Fax:	E-mail:	Remove:
Ralph Bohn	801-536-0212	801-536-0222	rbohn@utah.gov	

(Interested persons may inspect this filing at the above address or at DAR during business hours)

Rule Title

2. Title of rule or section (catchline):  
 Terms and Conditions of Licenses.

Notice Type

3. Type of notice: Amendment

Rule Purpose

4. Purpose of the rule or reason for the change:  
 Incorporate changes to the federal decommissioning planning regulations promulgated by the Nuclear Regulatory Commission on June 17, 2011 (76 FR 35512). As an agreement state Utah is required to have rules that are compatible with corresponding NRC regulations. The rule changes are required to maintain compatibility.

## Response Information

5. This change is a response to comments by the Administrative Rules Review Committee.

No  Yes

## Rule Summary

6. Summary of the rule or change:

The changes add requirements for license transfer including technical and financial qualifications.

## Aggregate Cost Information

7. Aggregate anticipated cost or savings to:

A) State budget:

Affected:  No  Yes

The rule changes will not require any state resources above that already required to review licenses.

B) Local government:

Affected:  No  Yes

No local governments will be affected by the rule change.

C) Small businesses:

Affected:  No  Yes

("small business" means a business employing fewer than 50 persons)

The rule change will not affect small business as they do not handle radioactive material of the type covered by the rule. The NRC in its rulemaking that necessitated the change in Utah rule noted that small businesses were not affected.

D) Persons other than small businesses, businesses, or local government entities:

Affected:  No  Yes

("person" means any individual, partnership, corporation, association, governmental entity, or public or private organization of any character other than an agency)

The rule change will not affect persons other than businesses.

## Compliance Cost Information

8. Compliance costs for affected persons:

Changes in this rule along with changes in R313-15, R313-22, and R313-24 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,000 over a 15 year period or \$1,333 per year.

## Department Head Comments

9. A) Comments by the department head on the fiscal impact the rule may have on businesses:

Changes in this rule along with changes in R313-15, R313-22, and R313-24 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,000 over a 15 year period or \$1,333 per year. The number of businesses affected in Utah is unknown but is estimated to be less than 10 for a total cost per year of \$13,333.

B) Name and title of department head commenting on the fiscal impacts:

Alan Matheson

#### Citation Information

10. This rule change is authorized or mandated by state law, and implements or interprets the following state and federal laws.  
 State code or constitution citations (required) (e.g., Section 63G-3-402; Subsection 63G-3-601 (3); Article IV) :  
 19-6-107, 19-3-104

#### Incorporated Materials

11. This rule adds, updates, or removes the following title of materials incorporated by references (a copy of materials incorporated by reference must be submitted to DAR; if none, leave blank) :

Official Title of Materials Incorporated (from title page)  
 Publisher  
 Date Issued (mm/dd/yyyy)  
 Issue, or version (including partial dates)  
 ISBN Number  
 ISSN Number  
 Cost of Incorporated Reference  
 Adds, updates, removes-- SELECT ONE --

#### Comments

12. The public may submit written or oral comments to the agency identified in box 1. (The public may also request a hearing by submitting a written request to the agency. The agency is required to hold a hearing if it receives requests from ten interested persons or from an association having not fewer than ten members. Additionally, the request must be received by the agency not more than 15 days after the publication of this rule in the Utah State Bulletin. See Section 63G-3-302 and Rule R15-1 for more information.)

A) Comments will be accepted until 5:00 p.m. on (mm/dd/yyyy) : 02/01/2016

B) A public hearing (optional) will be held:

On (mm/dd/yyyy): At (hh:mm AM/PM): At (place):

#### Proposed Effective Date

13. This rule change may become effective on (mm/dd/yyyy): 02/08/2016

NOTE: The date above is the date on which this rule MAY become effective. It is NOT the effective date. After a minimum of seven days following the date designated in Box 12(A) above, the agency must submit a Notice of Effective Date to the Division of Administrative Rules to make this rule effective. Failure to submit a Notice of Effective Date will result in this rule lapsing and will require the agency to start the rulemaking process over.

Indexing Information

14. Indexing information - keywords (maximum of four, one term per field, in lower case, except for acronyms (e.g., "GRAMA") or proper nouns (e.g., "Medicaid")):  
license, decommissioning, transportation, radiation

File Information

15. Attach an RTF document containing the text of this rule change (filename):  
There is a document associated with this rule filing.

To the Agency

Information requested on this form is required by Sections 63G-3-301, 302, 303, and 402. Incomplete forms will be returned to the agency for completion, possibly delaying publication in the Utah State Bulletin, and delaying the first possible effective date.

Agency Authorization

Agency head or designee,  
and title:

Brad Johnson  
Deputy Director

Date  
(mm/dd/yyyy): 10/21/2015

### **R313. Environmental Quality, Radiation Control.**

#### **R313-22. Specific Licenses.**

##### **R313-22-35. Financial Assurance and Recordkeeping for Decommissioning.**

(1)(a) Applicants for a specific license authorizing the possession and use of unsealed radioactive material of half-life greater than 120 days and in quantities exceeding  $10^5$  times the applicable quantities set forth in Appendix B of 10 CFR 30.1 through 30.72, 2010, which is incorporated by reference, shall submit a decommissioning funding plan as described in Subsection R313-22-35(5). The decommissioning funding plan shall also be submitted when a combination of radionuclides is involved if  $R$  divided by  $10^5$  is greater than one, where  $R$  is defined here as the sum of the ratios of the quantity of each radionuclide to the applicable value in Appendix B of 10 CFR 30.1 through 30.72, 2010, which is incorporated by reference.

(b) Holders of, or applicants for, a specific license authorizing the possession and use of sealed sources or plated foils of half-life greater than 120 days and in quantities exceeding  $10^{12}$  times the applicable quantities set forth in Appendix B of 10 CFR 30.1 through 30.72, 2010, which is incorporated by reference, or when a combination of isotopes is involved if  $R$ , as defined in Subsection R313-22-35(1)(a), divided by  $10^{12}$  is greater than one, shall submit a decommissioning funding plan as described in Subsection R313-22-35(5).

(c) Applicants for a specific license authorizing the possession and use of more than 100 mCi of source material in a readily dispersible form shall submit a decommissioning funding plan as described in Subsection R313-22-35(5).

(2) Applicants for a specific license authorizing possession and use of radioactive material of half-life greater than 120 days and in quantities specified in Subsection R313-22-35(4), or authorizing the possession and use of source material greater than 10 mCi but less than or equal to 100 mCi in a readily dispersible form shall either:

(a) submit a decommissioning funding plan as described in Subsection R313-22-35(5); or

(b) submit a certification that financial assurance for decommissioning has been provided in the amount prescribed by Subsection R313-22-35(4) using one of the methods described in Subsection R313-22-35(6). Applicants for a specific license authorizing the possession and use of source material in a readily dispersible form shall submit a certification that financial assurance for decommissioning has been provided in the amount of \$225,000 by October 20, 2007. For an applicant subject to this subsection, this certification may state that the appropriate assurance will be obtained after the application has been approved and the license issued but before the receipt of licensed material. If the applicant defers execution of the financial instrument until after the license has been issued, a signed original of the financial instrument obtained to satisfy the requirements of Subsection R313-22-35(6) shall be submitted to the Director before receipt of licensed material. If the applicant does not defer execution of the financial instrument, the applicant shall submit to the Director, as part of the certification, a signed original of the financial instrument obtained to satisfy the requirements in Subsection R313-22-35(6).

(3)(a) Holders of a specific license issued on or after October 20, 2006, which is of a type described in Subsections R313-22-35(1) or (2), shall provide financial assurance for decommissioning in accordance with the criteria set forth in Section R313-22-35.

(b) Holders of a specific license issued before October 20, 2006, and of a type described in Subsection R313-22-35(1), shall submit by October 20, 2007, a decommissioning funding plan as described in Subsection R313-22-35(5) or a certification of financial assurance for decommissioning in an amount at least equal to \$1,125,000 in accordance with the criteria set forth in Section R313-22-35. If the licensee submits the certification of financial assurance rather than a decommissioning funding plan, the licensee shall include a decommissioning funding plan in any application for license renewal.

(c) Holders of a specific license issued before October 20, 2006, and of a type described in Subsection R313-22-35(2), shall submit by October 20, 2007, a decommissioning funding plan as described in Subsection R313-22-35(5) or a certification of financial assurance for decommissioning in accordance with the criteria set forth in Section R313-22-35.

(d) A licensee who has submitted an application before October 20, 2006, for renewal of license in accordance with Section R313-22-37, shall provide financial assurance for decommissioning in accordance with Subsections R313-22-35(1) and (2).

(e) Waste collectors and waste processors, as defined in Appendix G of 10 CFR 20.1001 to 20.2402, [2010]2015, which is incorporated by reference, shall provide financial assurance in an amount based on a decommissioning funding plan as described in Subsection R313-22-35(5). The decommissioning funding plan shall include the cost of disposal of the maximum amount (curies) of radioactive material permitted by the license, and the cost of disposal of the maximum quantity, by volume, of radioactive material which could be present at the licensee's facility at any time, in addition to the cost to remediate the licensee's site to meet the license termination criteria of Rule R313-15.

(f) If, in surveys made under R313-15-501(1), residual radioactivity in the facility and environment, including the subsurface, is detected at levels that would, if left uncorrected, prevent the site from meeting the R313-15-402 criteria for unrestricted use, the licensee shall submit a decommissioning funding plan within one year of when the survey is completed.

~~(g)~~(g) Holders of a specific license issued prior to October 20, 2006, which is of a type described in Subsections R313-22-35(1), (2), or (3)~~(g)~~(h), shall submit a decommissioning funding plan to the Director on or before October 20, 2007. Holders of a specific license issued on or after October 20, 2006, which is of a type described in Subsections R313-22-35(1), (2), or (3)~~(g)~~(h), shall submit a decommissioning funding plan to the Director as a part of the license application.

~~(h)~~(h) Applicants for a specific license authorizing the possession and use of radioactive materials in sufficient quantities that require financial assurance and recordkeeping for decommissioning under Section R313-22-35 shall assure that all documents submitted to the Director for the purpose of demonstrating compliance with financial assurance and recordkeeping requirements meet the applicable criteria contained in the Nuclear Regulatory Commission's document NUREG-1757, Volume 3, "Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness" (9/2003).

~~(i)~~(i) Documents provided to the Director under Subsection R313-22-35(3)~~(g)~~(h) shall provide that legal remedies be sought in a court of appropriate jurisdiction within Utah.

(4) Table of required amounts of financial assurance for decommissioning by quantity of material. Licensees required to submit an amount of financial assurance listed in this table must do so during a license application or as part of an amendment to an existing license. Licensees having possession limits exceeding the upper bounds of this table must base financial assurance on a decommissioning funding plan.

TABLE

Greater than  $10^4$  but less than or equal to  $10^5$  times the applicable quantities of radioactive material, as defined in Appendix B of 10 CFR 30.1 through 30.72 (2010) which is incorporated by reference, in unsealed form. For a combination of radionuclides, if R, as defined in Subsection R313-22-35(1)(a) divided by  $10^4$  is greater than one but R divided by  $10^5$  is less than or equal to one: \$1,125,000

Greater than  $10^3$  but less than or equal to  $10^4$  times the applicable quantities of radioactive material, as defined in Appendix B of 10 CFR 30.1 through 30.72 (2010) which is incorporated by reference, in unsealed form. For a combination of radionuclides, if R, as defined in Subsection R313-22-35(1)(a) divided by  $10^3$  is greater than one but R

divided by  $10^4$  is less than or equal to one: \$225,000  
Greater than  $10^{10}$  but less than or equal to  $10^{12}$  times the applicable quantities of radioactive material, as defined in Appendix B of 10 CFR 30.1 through 30.72 (2010) which is incorporated by reference, in sealed sources or plated foils. For combination of radionuclides, if R, as defined in R313-22-35(1)(a), divided by  $10^{10}$  is greater than one, but R divided by  $10^{12}$  is less than or equal to one: \$113,000

~~[(5) A decommissioning funding plan shall contain a cost estimate for decommissioning and a description of the method of assuring funds for decommissioning from Subsection R313-22-35(6), including means for adjusting cost estimates and associated funding levels periodically over the life of the facility. Cost estimates shall be adjusted at intervals not to exceed 3 years. The decommissioning funding plan shall also contain a certification by the licensee that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning and a signed original of the financial instrument obtained to satisfy the requirements of Subsection R313-22-35(6).]~~

(5) (a) Each decommissioning funding plan shall be submitted for review and approval and shall contain -

(i) A detailed cost estimate for decommissioning, in an amount reflecting:

(A) The cost of an independent contractor to perform all decommissioning activities;

(B) The cost of meeting the R313-15-402 criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of R313-15-403, the cost estimate may be based on meeting the R313-15-403 criteria;

(C) The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination; and

(D) An adequate contingency factor.

(ii) Identification of and justification for using the key assumptions contained in the decommissioning cost estimate;

(iii) A description of the method of assuring funds for decommissioning from R313-22-35(6), including means for adjusting cost estimates and associated funding levels periodically over the life of the facility;

(iv) A certification by the licensee that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning; and

(v) A signed original of the financial instrument obtained to satisfy the requirements of R313-22-35(6) (unless a previously submitted and accepted financial instrument continues to cover the cost estimate for decommissioning).

(b) At the time of license renewal and at intervals not to exceed 3 years, the decommissioning funding plan must be resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. If the amount of financial assurance will be adjusted downward, this cannot be done until the updated decommissioning funding plan is approved. The decommissioning funding plan shall update the information submitted with the original or prior approved plan, and shall specifically consider the effect of the following events on decommissioning costs:

(i) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material;

(ii) Waste inventory increasing above the amount previously estimated;

(iii) Waste disposal costs increasing above the amount previously estimated;

(iv) Facility modifications;

(v) Changes in authorized possession limits;

(vi) Actual remediation costs that exceed the previous cost estimate;

(vii) Onsite disposal; and

(viii) Use of a settling pond.

(6) Financial assurance for decommissioning shall be provided by one or more of the following methods:

(a) Prepayment. Prepayment is the deposit prior to the start of operation into an account segregated from licensee assets and outside the licensee's administrative control of cash or liquid assets so that the amount of funds would be sufficient to pay decommissioning costs. Prepayment may be in the form of a trust, escrow account, government fund, certificate of deposit, or deposit of government securities;

(b) A surety method, insurance, or other guarantee method. These methods shall guarantee that decommissioning costs will be paid. A surety method may be in the form of a surety bond, letter of credit, or line of credit. A parent company guarantee of funds for decommissioning costs based on a financial test may be used if the guarantee and test are as contained in Subsection R313-22-35(8). A parent company guarantee may not be used in combination with other financial methods to satisfy the requirements of Section R313-22-35. A guarantee of funds by the applicant or licensee for decommissioning costs based on a financial test may be used if the guarantee and test are as contained in Subsection R313-22-35(9). A guarantee by the applicant or licensee may not be used in combination with any other financial methods to satisfy the requirements of Section R313-22-35 or in any situation where the applicant or licensee has a parent company holding majority control of the voting stock of the company. A surety method or insurance used to provide financial assurance for decommissioning shall contain the following conditions:

(i) the surety method or insurance shall be open-ended or, if written for a specified term, such as five years, shall be renewed automatically unless 90 days or more prior to the renewal date the issuer notifies the Director, the beneficiary, and the licensee of its intention not to renew. The surety method or insurance shall also provide that the full face amount be paid to the beneficiary automatically prior to the expiration without proof of forfeiture if the licensee fails to provide a replacement acceptable to the Director within 30 days after receipt of notification of cancellation,

(ii) the surety method or insurance shall be payable to a trust established for decommissioning costs. The trustee and trust shall be acceptable to the Director. An acceptable trustee includes an appropriate state or federal government agency or an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or State agency, and

(iii) the surety method or insurance shall remain in effect until the Director has terminated the license;

(c) An external sinking fund in which deposits are made at least annually, coupled with a surety method or insurance, the value of which may decrease by the amount being accumulated in the sinking fund. An external sinking fund is a fund established and maintained by setting aside funds periodically in an account segregated from licensee assets and outside the licensee's administrative control in which the total amount of funds would be sufficient to pay decommissioning costs at the time termination of operation is expected. An external sinking fund may be in the form of a trust, escrow account, government fund, certificate of deposit, or deposit of government securities. The surety or insurance provisions shall be as stated in Subsection R313-22-35(6)(b);

(d) In the case of Federal, State or local government licensees, a statement of intent containing a cost estimate for decommissioning or an amount based on the Table in Subsection R313-22-35(4) and indicating that funds for decommissioning will be obtained when necessary; or

(e) When a governmental entity is assuming custody and ownership of a site, an arrangement that is deemed acceptable by such governmental entity.

(7) Persons licensed under Rule R313-22 shall keep records of information important to the decommissioning of a facility in an identified location until the site is released for unrestricted use. Before licensed activities are transferred or assigned in accordance with Subsection R313-19-34(2), licensees shall transfer all records described in Subsections R313-22-35(7)(a) through (d) to the new licensee. In this case, the new licensee will be responsible for maintaining these records until the license is terminated. If records important to the decommissioning of a facility are kept for other purposes, reference to these records and their locations may be used. Information the Director considers important to decommissioning consists of the following:

(a) records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site. These records may be limited to instances when contamination remains after any

cleanup procedures or when there is reasonable likelihood that contaminants may have spread to inaccessible areas as in the case of possible seepage into porous materials such as concrete. These records shall include any known information on identification of involved nuclides, quantities, forms, and concentrations;

(b) as-built drawings and modification of structures and equipment in restricted areas where radioactive materials are used or stored, and of locations of possible inaccessible contamination such as buried pipes which may be subject to contamination. If required drawings are referenced, each relevant document need not be indexed individually. If drawings are not available, the licensee shall substitute appropriate records of available information concerning these areas and locations;

(c) except for areas containing only sealed sources, provided the sources have not leaked or no contamination remains after a leak, or radioactive materials having only half-lives of less than 65 days, a list contained in a single document and updated every two years, including all of the following:

(i) all areas designated and formerly designated as restricted areas as defined under Section R313-12-3;

(ii) all areas outside of restricted areas that require documentation under Subsection R313-22-35(7)(a);

(iii) all areas outside of restricted areas where current and previous wastes have been buried as documented under Section R313-15-1109; and

(iv) all areas outside of restricted areas which contain material such that, if the license expired, the licensee would be required to either decontaminate the area to meet the criteria for decommissioning in Sections R313-15-401 through R313-15-406, or apply for approval for disposal under Section R313-15-1002; and

(d) records of the cost estimate performed for the decommissioning funding plan or of the amount certified for decommissioning, and records of the funding method used for assuring funds if either a funding plan or certification is used.

(8) Criteria relating to use of financial tests and parent company guarantees for providing reasonable assurance of funds for decommissioning.

(a) To pass the financial test referred to in Subsection R313-22-35(6)(b), the parent company shall meet one of the following criteria:

(i) The parent company shall have all of the following:

(A) Two of the following three ratios: a ratio of total liabilities to net worth less than 2.0; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; and a ratio of current assets to current liabilities greater than 1.5;

(B) Net working capital and tangible net worth each at least six times the current decommissioning cost estimates, or prescribed amount if a certification is used;

(C) Tangible net worth of at least \$10 million; and

(D) Assets located in the United States amounting to at least 90 percent of total assets or at least six times the current decommissioning cost estimates, or prescribed amount if a certification is used; or

(ii) The parent company shall have all of the following:

(A) A current rating for its most recent bond issuance of AAA, AA, A, or BBB as issued by Standard and Poor's or Aaa, Aa, A or Baa as issued by Moody's;

(B) Tangible net worth at least six times the current decommissioning cost estimate, or prescribed amount if a certification is used;

(C) Tangible net worth of at least \$10 million; and

(D) Assets located in the United States amounting to at least 90 percent of total assets or at least six times the current decommissioning cost estimates, or prescribed amount if certification is used.

(b) The parent company's independent certified public accountant shall have compared the data used by the parent company in the financial test, which is derived from the independently audited, year end financial statements for the latest fiscal year, with the amounts in such financial statement. In connection with that procedure the licensee shall inform the Director within 90 days of any matters coming to the auditor's attention which cause the auditor to believe that the data specified in the financial test should be adjusted and that the company no longer passes the test.

(c)(i) After the initial financial test, the parent company shall repeat the passage of the test within 90 days after the close of each succeeding fiscal year.

(ii) If the parent company no longer meets the requirements of Subsection R313-22-35(8)(a) the licensee shall send notice to the Director of intent to establish alternative financial assurance as specified in Section R313-22-35. The notice shall be sent by certified mail within 90 days after the end of the fiscal year for which the year end financial data show that the parent company no longer meets the financial test requirements. The licensee shall provide alternate financial assurance within 120 days after the end of such fiscal year.

(d) The terms of a parent company guarantee which an applicant or licensee obtains shall provide that:

(i) The parent company guarantee will remain in force unless the guarantor sends notice of cancellation by certified mail to the licensee and the Director. Cancellation may not occur, however, during the 120 days beginning on the date of receipt of the notice of cancellation by both the licensee and the Director, as evidenced by the return receipts.

(ii) If the licensee fails to provide alternate financial assurance as specified in Section R313-22-35 within 90 days after receipt by the licensee and Director of a notice of cancellation of the parent company guarantee from the guarantor, the guarantor will provide such alternative financial assurance in the name of the licensee.

(iii) The parent company guarantee and financial test provisions shall remain in effect until the Director has terminated the license.

(iv) If a trust is established for decommissioning costs, the trustee and trust shall be acceptable to the Director. An acceptable trustee includes an appropriate State or Federal Government agency or an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or State agency.

(9) Criteria relating to use of financial tests and self guarantees for providing reasonable assurance of funds for decommissioning.

(a) To pass the financial test referred to in Subsection R313-22-35(6)(b), a company shall meet all of the following criteria:

(i) Tangible net worth at least ten times the total current decommissioning cost estimate, or the current amount required if certification is used, for all decommissioning activities for which the company is responsible as self-guaranteeing licensee and as parent-guarantor;

(ii) Assets located in the United States amounting to at least 90 percent of total assets or at least ten times the total current decommissioning cost estimate, or the current amount required if certification is used, for all decommissioning activities for which the company is responsible as self-guaranteeing licensee and as parent-guarantor; and

(iii) A current rating for its most recent bond issuance of AAA, AA, or A as issued by Standard and Poor's, or Aaa, Aa, or A as issued by Moody's.

(b) To pass the financial test, a company shall meet all of the following additional requirements:

(i) The company shall have at least one class of equity securities registered under the Securities Exchange Act of 1934;

(ii) The company's independent certified public accountant shall have compared the data used by the company in the financial test which is derived from the independently audited, yearend financial statements for the latest fiscal year, with the amounts in such financial statement. In connection with that procedure, the licensee shall inform the Director within 90 days of any matters coming to the attention of the auditor that cause the auditor to believe that the data specified in the financial test should be adjusted and that the company no longer passes the test; and

(iii) After the initial financial test, the company shall repeat passage of the test within 90 days after the close of each succeeding fiscal year.

(c) If the licensee no longer meets the requirements of Subsection R313-22-35(9)(a), the licensee shall send immediate notice to the Director of its intent to establish alternate financial assurance as specified in Section R313-22-35 within 120 days of such notice.

(d) The terms of a self-guarantee which an applicant or licensee furnishes shall provide that:

(i) The guarantee will remain in force unless the licensee sends notice of cancellation by certified mail to the Director. Cancellation may not occur, however, during the 120 days beginning on the date of receipt of the notice of cancellation by the Director, as evidenced by the return receipt.

(ii) The licensee shall provide alternative financial assurance as specified in Section R313-22-35 within 90 days following receipt by the Director of a notice of a cancellation of the guarantee.

(iii) The guarantee and financial test provisions shall remain in effect until the Director has terminated the license or until another financial assurance method acceptable to the Director has been put in effect by the licensee.

(iv) The licensee shall promptly forward to the Director and the licensee's independent auditor all reports covering the latest fiscal year filed by the licensee with the Securities and Exchange Commission pursuant to the requirements of section 13 of the Securities and Exchange Act of 1934.

(v) If, at any time, the licensee's most recent bond issuance ceases to be rated in a category of "A" or above by either Standard and Poor's or Moody's, the licensee shall provide notice in writing of such fact to the Director within 20 days after publication of the change by the rating service. If the licensee's most recent bond issuance ceases to be rated in any category of A or above by both Standard and Poor's and Moody's, the licensee no longer meets the requirements of Subsection R313-22-35(9)(a).

(vi) The applicant or licensee shall provide to the Director a written guarantee, a written commitment by a corporate officer, which states that the licensee will fund and carry out the required decommissioning activities or, upon issuance of an order by the Director, the licensee shall set up and fund a trust in the amount of the current cost estimates for decommissioning.

**KEY: specific licenses, decommissioning, broad scope, radioactive materials**

**Date of Enactment or Last Substantive Amendment: October 21, 2014**

**Notice of Continuation: September 23, 2011**

**Authorizing, and Implemented or Interpreted Law: 19-3-104; 19-3-108**

NOTICE OF  
PROPOSED RULE AMENDMENT

- The agency identified below in box 1 provides notice of proposed rule change pursuant to Utah Code Section 63G-3-301.
- Please address questions regarding information on this notice to the agency.
- The full text of all rule filings is published in the Utah State Bulletin unless excluded because of space constraints.
- The full text of all rule filings may also be inspected at the Division of Administrative Rules.

Rule Information

DAR file no: \_\_\_\_\_ Date filed: \_\_\_\_\_  
 State Admin Rule Filing Key: 156920  
 Utah Admin. Code ref. (R no.): R313-22

Agency Information

1. Agency: ENVIRONMENTAL QUALITY - Radiation Control  
 Room no.: Third Floor  
 Building:  
 Street address 1: 195 N 1950 W  
 Street address 2:  
 City, state, zip: SALT LAKE CITY UT 84116-3085  
 Mailing address 1: PO BOX 144850  
 Mailing address 2:  
 City, state, zip: SALT LAKE CITY UT 84114-4850

Contact person(s):

Name:	Phone:	Fax:	E-mail:	Remove:
Ralph Bohn	801-536-0212	801-536-0222	rbohn@utah.gov	

(Interested persons may inspect this filing at the above address or at DAR during business hours)

Rule Title

2. Title of rule or section (catchline):  
 Specific Licenses

Notice Type

3. Type of notice: Amendment

Rule Purpose

4. Purpose of the rule or reason for the change:  
 As an agreement state Utah is required to have rules that are compatible with NRC rules. The rule changes are required to maintain compatibility.

Response Information

5. This change is a response to comments by the Administrative Rules Review Committee.

No  Yes

#### Rule Summary

6. Summary of the rule or change:

Clarify the conditions under which a licensee must submit a decommissioning funding plan.

Clarify the contents of a decommissioning plan.

#### Aggregate Cost Information

7. Aggregate anticipated cost or savings to:

A) State budget:

Affected:  No  Yes

The rule changes will not require any state resources above that already required to review licenses.

B) Local government:

Affected:  No  Yes

No local governments will be affected by the rule change

C) Small businesses:

Affected:  No  Yes

("small business" means a business employing fewer than 50 persons)

The rule change will not affect small business as they do not handle radioactive material of the type covered by the rule. The NRC in its rulemaking that necessitated the change in Utah rule noted that small business were not affected.

D) Persons other than small businesses, businesses, or local government entities:

Affected:  No  Yes

("person" means any individual, partnership, corporation, association, governmental entity, or public or private organization of any character other than an agency)

The rule change will not affect persons other than businesses.

#### Compliance Cost Information

8. Compliance costs for affected persons:

Changes in this rule along with changes in R313-15, R313-19, and R313-24 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,00 over a 15 year period or \$1,333 per year.

#### Department Head Comments

9. A) Comments by the department head on the fiscal impact the rule may have on businesses:

Changes in this rule along with changes in R313-15, R313-19, and R313-24 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,00 over a 15 year period or \$1,333 per year. The number of businesses affected in Utah is unknown but is estimated to be less than 10 for a total cost per year of \$13,333.

B) Name and title of department head commenting on the fiscal impacts:

Alan Matheson

## Citation Information

10. This rule change is authorized or mandated by state law, and implements or interprets the following state and federal laws.  
 State code or constitution citations (required) (e.g., Section 63G-3-402; Subsection 63G-3-601 (3); Article IV) :  
 19-6-107, 19-3-104

## Incorporated Materials

11. This rule adds, updates, or removes the following title of materials incorporated by references (a copy of materials incorporated by reference must be submitted to DAR; if none, leave blank) :

<p style="text-align: center;">Official Title of Materials Incorporated (from title page)          Publisher          Date Issued (mm/dd/yyyy)          Issue, or version (including partial dates)          ISBN Number          ISSN Number          Cost of Incorporated Reference          Adds, updates, removes-- SELECT ONE --</p>
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## Comments

12. The public may submit written or oral comments to the agency identified in box 1. (The public may also request a hearing by submitting a written request to the agency. The agency is required to hold a hearing if it receives requests from ten interested persons or from an association having not fewer than ten members. Additionally, the request must be received by the agency not more than 15 days after the publication of this rule in the Utah State Bulletin. See Section 63G-3-302 and Rule R15-1 for more information.)

A) Comments will be accepted until 5:00 p.m. on (mm/dd/yyyy) : 02/01/2016

B) A public hearing (optional) will be held:

On (mm/dd/yyyy): At (hh:mm AM/PM): At (place):

## Proposed Effective Date

13. This rule change may become effective on (mm/dd/yyyy): 02/08/2016  
 NOTE: The date above is the date on which this rule MAY become effective. It is NOT the effective date. After a minimum of seven days following the date designated in Box 12(A) above, the agency must submit a Notice of Effective Date to the Division of Administrative Rules to make this rule effective. Failure to submit a Notice of Effective Date will result in this rule lapsing and will require the agency to start the rulemaking process over.

Indexing Information

14. Indexing information - keywords (maximum of four, one term per field, in lower case, except for acronyms (e.g., "GRAMA") or proper nouns (e.g., "Medicaid")):  
specific licenses, decommissioning, radioactive material, broad scope

File Information

15. Attach an RTF document containing the text of this rule change (filename):  
There is a document associated with this rule filing.

To the Agency

Information requested on this form is required by Sections 63G-3-301, 302, 303, and 402. Incomplete forms will be returned to the agency for completion, possibly delaying publication in the Utah State Bulletin, and delaying the first possible effective date.

Agency Authorization

Agency head or designee, and title:	Alan Matheson Executive Director	Date (mm/dd/yyyy): 11/04/2015
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### **R313. Environmental Quality, Radiation Control.**

#### **R313-24. Uranium Mills and Source Material Mill Tailings Disposal Facility Requirements.**

##### **R313-24-1. Purpose and Authority.**

(1) The purpose of this rule is to prescribe requirements for possession and use of source material in milling operations such as conventional milling, in-situ leaching, or heap-leaching. The rule includes requirements for the possession of byproduct material, as defined in Section R313-12-3 (see "byproduct material" definition (b)), from source material milling operations, as well as, possession and maintenance of a facility in standby mode. In addition, requirements are prescribed for the receipt of byproduct material from other persons for possession and disposal. The rule also prescribes requirements for receipt of byproduct material from other persons for possession and disposal incidental to the byproduct material generated by the licensee's source material milling operations.

(2) The rules set forth herein are adopted pursuant to the provisions of Subsections 19-3-104(4) and 19-3-104(8).

(3) The requirements of Rule R313-24 are in addition to, and not substitution for, the other applicable requirements of Title R313. In particular, the provisions of Rules R313-12, R313-15, R313-18, R313-19, R313-21, R313-22, and R313-70 apply to applicants and licensees subject to Rule R313-24.

(4) See R313-17-4 for special procedures for decisions associated with licenses for activity which results in the production or disposal of byproduct material.

##### **R313-24-2. Scope.**

(1) The requirements in Rule R313-24 apply to source material milling operations, byproduct material, and byproduct material disposal facilities.

##### **R313-24-3. Environmental Analysis.**

(1) Each new license application, renewal, or major amendment shall contain an environmental report describing the proposed action, a statement of its purposes, and the environment affected. The environmental report shall present a discussion of the following:

(a) An assessment of the radiological and nonradiological impacts to the public health from the activities to be conducted pursuant to the license or amendment;

(b) An assessment of any impact on waterways and groundwater resulting from the activities conducted pursuant to the license or amendment;

(c) Consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to the license or amendment; and

(d) Consideration of the long-term impacts including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to the license or amendment.

(2) Commencement of construction prior to issuance of the license or amendment shall be grounds for denial of the license or amendment.

(3) The Director shall provide a written analysis of the environmental report which shall be available for public notice and comment pursuant to R313-17-2.

##### **R313-24-4. Clarifications or Exceptions.**

For the purposes of Rule R313-24, 10 CFR 40.2a through 40.4; 40.12; 40.20(a); 40.21; 40.26(a) through (c); 40.31(h); the introductory paragraph of 40.36 and 40.36(a),(b),(d) and (f); 40.41(c); the introduction to 40.42(k) and 40.42(k)(3)(i); ~~40.46~~; 40.61(a) and (b); 40.65; and Appendix A to Part 40 (2015) are incorporated by reference with the following clarifications or exceptions:

(1) The exclusion and substitution of the following:

(a) Exclude 10 CFR 40.26(c)(1) and replace with "(1) The provisions of Sections R313-12-51, R313-12-52, R313-12-53, R313-19-34, R313-19-50, R313-19-61, R313-24-1, Rules R313-14, R313-15, R313-18, and R313-24 (incorporating 10 CFR 40.2a, 40.3, 40.4, and 40.26 by reference)";

(b) In Appendix A to 10 CFR 40, exclude Criterion 5B(1) through 5H, Criterion 7A, Criterion 13, and replace the excluded Criterion with "Utah Administrative Code, R317-6, Ground Water Quality Protection"; and

(c) In Appendix A to 10 CFR 40, exclude Criterion 11A through 11F and Criterion 12;

- (2) The substitution of the following:
- (a) "10 CFR 40" for reference to "this part" as found throughout the incorporated text;
  - (b) "Director" for reference to "Commission" in the first and fourth references contained in 10 CFR 40.2a, in 10 CFR 40.3, 40.20(a), 40.26, 40.36(f), 40.41(c), 40.46 (a), 40.61, and 40.65; and "Director" for reference to "NRC" in 10 CFR 40.36(b);
  - (c) "Rules R313-19, R313-21, or R313-22" for "Section 62 of the Act" as found in 10 CFR 40.12(a);
  - (d) "Rule R313-15-402" for reference to "10 CFR 20.1402" and "Rule R313-15-403" for reference to "10 CFR 20.1403" in 10 CFR 40.36(d);
  - (e) "Rule R313-15-1109" for reference to "10 CFR 20.2108" in 10 CFR 40.36(f);
  - ~~(f)~~(f) "Rules R313-21 or R313-22" for reference to "the regulations in this part" in 10 CFR 40.41(c);
  - ~~(e)~~(g) "Section R313-19-100" for reference to "part 71 of this chapter" as found in 10 CFR 40.41(c);
  - ~~(f)~~(h) In 10 CFR 40.42(k)(3)(i), "R313-15-401 through R313-15-406" for reference to "10 CFR part 20, subpart E";
  - ~~(g)~~(i) "source material milling" for reference to "uranium milling, in production of uranium hexafluoride, or in a uranium enrichment facility" as found in 10 CFR 40.65(a);
  - ~~(h)~~(j) "Director" for reference to "appropriate NRC Regional Office shown in Appendix D to 10 CFR part 20 of this chapter, with copies to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555," as stated in 10 CFR 65(a)(1);
  - ~~(i)~~(k) "require the licensee to" for reference to "require to" in 10 CFR 40.65(a)(1); and
  - ~~(j)~~(l) In Appendix A to 10 CFR part 40, the following substitutions:
    - (i) "R313-12-3" for reference to "Sec. 20.1003 of this chapter" as found in 10 CFR 40.36(f) and in the first paragraph of the introduction to Appendix A;
    - (ii) "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5;
    - (iii) "Director as defined in Subsection 19-5-102(6)" for reference to "Commission" in the definition of "compliance period," in paragraph five of the introduction and in Criterion 5A(3);
    - (iv) "Director" for reference to "Commission" in the definition of "closure plan", in paragraph five of the introduction, and in Criteria 6(2), 6(4), 6(6), 6A(2), 6A(3), 9, and 10 of Appendix A;
    - (v) "license issued by the Director" for reference to "Commission license" in the definition of "licensed site," in the introduction to Appendix A;
    - (vi) "Director" for reference to "NRC" in Criterion 4D;
    - (vii) "representatives of the Director" for reference to "NRC staff" in Criterion 6(6);
    - (viii) "Director-approved" for reference to "Commission-approved" in Criterion 6A(1) and Criterion 9;
    - (ix) "Director" for reference to "appropriate NRC regional office as indicated in Criterion 8A" as found, Criterion 8, paragraph 2 or for reference to "appropriate NRC regional office as indicated in Appendix D to 10 CFR part 20 of this chapter, or the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555," as stated in Criterion 8A; and
    - (x) "Director" for reference to "the Commission or the State regulatory agency" in Criterion 9, paragraph 2.

**KEY: environmental analysis, uranium mills, tailings, byproduct material**

**Date of Enactment or Last Substantive Amendment: June 16, 2015**

**Notice of Continuation: May 24, 2012**

**Authorizing, and Implemented or Interpreted Law: 19-3-104; 19-3-108**

NOTICE OF  
PROPOSED RULE AMENDMENT

- The agency identified below in box 1 provides notice of proposed rule change pursuant to Utah Code Section 63G-3-301.
- Please address questions regarding information on this notice to the agency.
- The full text of all rule filings is published in the Utah State Bulletin unless excluded because of space constraints.
- The full text of all rule filings may also be inspected at the Division of Administrative Rules.

Rule Information

DAR file no: \_\_\_\_\_ Date filed: \_\_\_\_\_  
 State Admin Rule Filing Key: 156980  
 Utah Admin. Code ref. (R no.): R313-24

Agency Information

1. Agency: ENVIRONMENTAL QUALITY - Radiation Control  
 Room no.: Third Floor  
 Building:  
 Street address 1: 195 N 1950 W  
 Street address 2:  
 City, state, zip: SALT LAKE CITY UT 84116-3085  
 Mailing address 1: PO BOX 144850  
 Mailing address 2:  
 City, state, zip: SALT LAKE CITY UT 84114-4850

Contact person(s):

Name:	Phone:	Fax:	E-mail:	Remove:
Ralph Bohn	801-536-0212	801-536-0222	rbohn@utah.gov	

(Interested persons may inspect this filing at the above address or at DAR during business hours)

Rule Title

2. Title of rule or section (catchline):  
 Uranium Mills and Source Material Mill Tailings Disposal Facility Requirements.

Notice Type

3. Type of notice: Amendment

Rule Purpose

4. Purpose of the rule or reason for the change:  
 Incorporate changes to the federal decommissioning planning regulations promulgated by the Nuclear Regulatory Commission on June 17, 2011 (76 FR 35512). As an agreement state Utah is required to have rules that are compatible with corresponding NRC regulations. The rule changes are required to maintain compatibility.

## Response Information

5. This change is a response to comments by the Administrative Rules Review Committee.

No  Yes

## Rule Summary

6. Summary of the rule or change:

The changes add requirements for license transfer including technical and financial qualifications.

## Aggregate Cost Information

7. Aggregate anticipated cost or savings to:

A) State budget:

Affected:  No  Yes

The rule changes will not require any state resources above that already required to review licenses.

B) Local government:

Affected:  No  Yes

No local governments will be affected by the rule change.

C) Small businesses:

Affected:  No  Yes

("small business" means a business employing fewer than 50 persons)

The rule change will not affect small business as they do not handle radioactive material of the type covered by the rule. The NRC in its rulemaking that necessitated the change in Utah rule noted that small businesses were not affected.

D) Persons other than small businesses, businesses, or local government entities:

Affected:  No  Yes

("person" means any individual, partnership, corporation, association, governmental entity, or public or private organization of any character other than an agency)

The rule change will not affect persons other than businesses.

## Compliance Cost Information

8. Compliance costs for affected persons:

Changes in this rule along with changes in R313-15, R313-19, and R313-22 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,000 over a 15 year period or \$1,333 per year.

## Department Head Comments

9. A) Comments by the department head on the fiscal impact the rule may have on businesses:

Changes in this rule along with changes in R313-15, R313-19, and R313-22 are considered as one. Financial analysis done by the NRC for the federal rule that the Utah changes are based on stated that the cost to a affected person would be \$20,000 over a 15 year period or \$1,333 per year. The number of businesses affected in Utah is unknown but is estimated to be less than 10 for a total cost per year of \$13,333.

B) Name and title of department head commenting on the fiscal impacts:

Alan Matheson

#### Citation Information

10. This rule change is authorized or mandated by state law, and implements or interprets the following state and federal laws.  
 State code or constitution citations (required) (e.g., Section 63G-3-402; Subsection 63G-3-601 (3); Article IV) :  
 19-3-104, 19-6-107

#### Incorporated Materials

11. This rule adds, updates, or removes the following title of materials incorporated by references (a copy of materials incorporated by reference must be submitted to DAR; if none, leave blank) :

Official Title of Materials Incorporated (from title page)  
 Publisher  
 Date Issued (mm/dd/yyyy)  
 Issue, or version (including partial dates)  
 ISBN Number  
 ISSN Number  
 Cost of Incorporated Reference  
 Adds, updates, removes-- SELECT ONE --

#### Comments

12. The public may submit written or oral comments to the agency identified in box 1. (The public may also request a hearing by submitting a written request to the agency. The agency is required to hold a hearing if it receives requests from ten interested persons or from an association having not fewer than ten members. Additionally, the request must be received by the agency not more than 15 days after the publication of this rule in the Utah State Bulletin. See Section 63G-3-302 and Rule R15-1 for more information.)

A) Comments will be accepted until 5:00 p.m. on (mm/dd/yyyy) : 02/01/2016

B) A public hearing (optional) will be held:

On (mm/dd/yyyy): At (hh:mm AM/PM): At (place):

#### Proposed Effective Date

13. This rule change may become effective on (mm/dd/yyyy): 02/08/2016

NOTE: The date above is the date on which this rule MAY become effective. It is NOT the effective date. After a minimum of seven days following the date designated in Box 12(A) above, the agency must submit a Notice of Effective Date to the Division of Administrative Rules to make this rule effective. Failure to submit a Notice of Effective Date will result in this rule lapsing and will require the agency to start the rulemaking process over.

Indexing Information

14. Indexing information - keywords (maximum of four, one term per field, in lower case, except for acronyms (e.g., "GRAMA") or proper nouns (e.g., "Medicaid")):  
environmental analysis, uranium mills, byproduct material

File Information

15. Attach an RTF document containing the text of this rule change (filename):  
There is a document associated with this rule filing.

To the Agency

Information requested on this form is required by Sections 63G-3-301, 302, 303, and 402. Incomplete forms will be returned to the agency for completion, possibly delaying publication in the Utah State Bulletin, and delaying the first possible effective date.

Agency Authorization

Agency head or designee, and title:	Brad Johnson Deputy Director	Date (mm/dd/yyyy): 12/02/2015
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10 CFR Part 40

DOMESTIC LICENSING OF SOURCE MATERIAL

**§40.36 Financial assurance and recordkeeping for decommissioning.**

Except for licenses authorizing the receipt, possession, and use of source material for uranium or thorium milling, or byproduct material at sites formerly associated with such milling, for which financial assurance requirements are set forth in appendix A of this part, criteria for providing financial assurance for decommissioning are as follows:

(a) Each applicant for a specific license authorizing the possession and use of more than 100 mCi of source material in a readily dispersible form shall submit a decommissioning funding plan as described in paragraph (d) of this section.

(b) Each applicant for a specific license authorizing possession and use of quantities of source material greater than 10 mCi but less than or equal to 100 mCi in a readily dispersible form shall either—

(1) Submit a decommissioning funding plan as described in paragraph (d) of this section; or

(2) Submit a certification that financial assurance for decommissioning has been provided in the amount of \$225,000 by June 2, 2005 using one of the methods described in paragraph (e) of this section. For an applicant, this certification may state that the appropriate assurance will be obtained after the application has been approved and the license issued but before the receipt of licensed material. If the applicant defers execution of the financial instrument until after the license has been issued, a signed original of the financial instrument obtained to satisfy the requirements of paragraph (e) of this section must be submitted to NRC prior to receipt of licensed material. If the applicant does not defer execution of the financial instrument, the applicant shall submit to NRC, as part of the certification, a signed original of the financial instrument obtained to satisfy the requirements of paragraph (e) of this section.

(c)(1) Each holder of a specific license issued on or after July 27, 1990, which is covered by paragraph (a) or (b) of this section, shall provide financial assurance for decommissioning in accordance with the criteria set forth in this section.

(2) Each holder of a specific license issued before July 27, 1990, and of a type described in paragraph (a) of this section shall submit a decommissioning funding plan as described in paragraph (d) of this section or a certification of financial assurance for decommissioning in an amount at least equal to \$1,125,000 in accordance with the criteria set forth in this section. If the licensee submits the certification of financial assurance rather than a decommissioning funding plan, the licensee shall include a decommissioning funding plan in any application for license renewal. Licensees required to submit the \$1,125,000 amount must do so by December 2, 2004.

(3) Each holder of a specific license issued before July 27, 1990, and of a type described in paragraph (b) of this section shall submit, on or before July 27, 1990, a decommissioning funding plan, as described in paragraph (d) of this section, or a certification of financial assurance for decommissioning in accordance with the criteria set forth in this section.

(4) Any licensee who has submitted an application before July 27, 1990, for renewal of license in accordance with §40.43 shall provide financial assurance for decommissioning in accordance with paragraphs (a) and (b) of this section. This assurance must be submitted when this rule becomes effective November 24, 1995.

(5) If, in surveys made under 10 CFR 20.1501(a), residual radioactivity in the facility and environment, including the subsurface, is detected at levels that would, if left uncorrected, prevent the site from meeting the 10 CFR 20.1402 criteria for unrestricted use, the licensee must submit a decommissioning funding plan within one year of when the survey is completed.

(d)(1) Each decommissioning funding plan must be submitted for review and approval and must contain—

(i) A detailed cost estimate for decommissioning, in an amount reflecting:

(A) The cost of an independent contractor to perform all decommissioning activities;

(B) The cost of meeting the 10 CFR 20.1402 criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of 10 CFR 20.1403, the cost estimate may be based on meeting the 10 CFR 20.1403 criteria;

(C) The volume of onsite subsurface material containing residual radioactivity that will require remediation; and

(D) An adequate contingency factor.

(ii) Identification of and justification for using the key assumptions contained in the DCE;

(iii) A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility;

(iv) A certification by the licensee that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning; and

(v) A signed original, or if permitted, a copy, of the financial instrument obtained to satisfy the requirements of paragraph (e) of this section (unless a previously submitted and accepted financial instrument continues to cover the cost estimate for decommissioning).

(2) At the time of license renewal and at intervals not to exceed 3 years, the decommissioning funding plan must be resubmitted with adjustments as necessary to account for changes in costs and the extent of contamination. If the amount of financial assurance will be adjusted downward, this can not be done until the updated decommissioning funding plan is approved. The decommissioning funding plan must update the information submitted with the original or prior approved plan, and must specifically consider the effect of the following events on decommissioning costs:

(i) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material;

(ii) Waste inventory increasing above the amount previously estimated;

(iii) Waste disposal costs increasing above the amount previously estimated;

(iv) Facility modifications;

(v) Changes in authorized possession limits;

- (vi) Actual remediation costs that exceed the previous cost estimate;
- (vii) Onsite disposal; and
- (viii) Use of a settling pond.

(e) The financial instrument must include the licensee's name, license number, and docket number; and the name, address, and other contact information of the issuer, and, if a trust is used, the trustee. When any of the foregoing information changes, the licensee must, within 30 days, submit financial instruments reflecting such changes. The financial instrument submitted must be a signed original or signed original duplicate, except where a copy is specifically permitted. Financial assurance for decommissioning must be provided by one or more of the following methods:

(1) *Prepayment.* Prepayment is the deposit before the start of operation into an account segregated from licensee assets and outside the licensee's administrative control of cash or liquid assets such that the amount of funds would be sufficient to pay decommissioning costs. Prepayment must be made into a trust account, and the trustee and the trust must be acceptable to the Commission.

(2) *A surety method, insurance, or other guarantee method.* These methods guarantee that decommissioning costs will be paid. A surety method may be in the form of a surety bond, or letter of credit. A parent company guarantee of funds for decommissioning costs based on a financial test may be used if the guarantee and test are as contained in appendix A to part 30 of this chapter. For commercial corporations that issue bonds, a guarantee of funds by the applicant or licensee for decommissioning costs based on a financial test may be used if the guarantee and test are as contained in appendix C to part 30 of this chapter. For commercial companies that do not issue bonds, a guarantee of funds by the applicant or licensee for decommissioning costs may be used if the guarantee and test are as contained in appendix D to part 30 of this chapter. For nonprofit entities, such as colleges, universities, and nonprofit hospitals, a guarantee of funds by the applicant or licensee may be used if the guarantee and test are as contained in appendix E to part 30 of this chapter. Except for an external sinking fund, a parent company guarantee or guarantee by the applicant or licensee may not be used in combination with any other financial methods used to satisfy the requirements of this section. A guarantee by the applicant or licensee may not be used in any situation where the applicant or licensee has a parent company holding majority control of the voting stock of the company. Any surety method or insurance used to provide financial assurance for decommissioning must contain the following conditions:

(i) The surety method or insurance must be open-ended or, if written for a specified term, such as five years, must be renewed automatically unless 90 days or more prior to the renewal date, the issuer notifies the Commission, the beneficiary, and the licensee of its intention not to renew. The surety method or insurance must also provide that the full face amount be paid to the beneficiary automatically prior to the expiration without proof of forfeiture if the licensee fails to provide a replacement acceptable to the Commission within 30 days after receipt of notification of cancellation.

(ii) The surety method or insurance must be payable to a trust established for decommissioning costs. The trustee and trust must be acceptable to the Commission. An acceptable trustee includes an appropriate State or Federal government agency or an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or State agency.

(iii) The surety method or insurance must remain in effect until the Commission has terminated the license.

(3) *An external sinking fund in which deposits are made at least annually, coupled with a surety method, insurance, or other guarantee method, the value of which may decrease by the amount being accumulated in the sinking fund.* An external sinking fund is a fund established and maintained by setting aside funds periodically in an account segregated from licensee assets and outside the licensee's

administrative control in which the total amount of funds would be sufficient to pay decommissioning costs at the time termination of operation is expected. An external sinking fund must be in the form of a trust. If the other guarantee method is used, no surety or insurance may be combined with the external sinking fund. The surety, insurance, or other guarantee provisions must be as stated in paragraph (e)(2) of this section.

(4) In the case of Federal, State, or local government licensees, a statement of intent containing a cost estimate for decommissioning or an amount based on paragraph (b) of this section, and indicating that funds for decommissioning will be obtained when necessary.

(5) When a government entity is assuming custody and ownership of a site, an arrangement that is deemed acceptable by such government entity.

(f) Each person licensed under this part shall keep records of information important to the decommissioning of a facility in an identified location until the site is released for unrestricted use. Before licensed activities are transferred or assigned in accordance with §40.41(b) licensees shall transfer all records described in this paragraph to the new licensee. In this case, the new licensee will be responsible for maintaining these records until the license is terminated. If records important to the decommissioning of a facility are kept for other purposes, reference to these records and their locations may be used. Information the Commission considers important to decommissioning consists of—

(1) Records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site. These records may be limited to instances when contamination remains after any cleanup procedures or when there is reasonable likelihood that contaminants may have spread to inaccessible areas as in the case of possible seepage into porous materials such as concrete. These records must include any known information on identification of involved nuclides, quantities, forms, and concentrations.

(2) As-built drawings and modifications of structures and equipment in restricted areas where radioactive materials are used and/or stored, and of locations of possible inaccessible contamination such as buried pipes which may be subject to contamination. If required drawings are referenced, each relevant document need not be indexed individually. If drawings are not available, the licensee shall substitute appropriate records of available information concerning these areas and locations.

(3) Except for areas containing depleted uranium used only for shielding or as penetrators in unused munitions, a list contained in a single document and updated every 2 years, of the following:

(i) All areas designated and formerly designated as restricted areas as defined under 10 CFR 20.1003;

(ii) All areas outside of restricted areas that require documentation under §40.36(f)(1);

(iii) All areas outside of restricted areas where current and previous wastes have been buried as documented under 10 CFR 20.2108; and

(iv) All areas outside of restricted areas that contain material such that, if the license expired, the licensee would be required to either decontaminate the area to meet the criteria for decommissioning in 10 CFR part 20, subpart E, or apply for approval for disposal under 10 CFR 20.2002.

(4) Records of the cost estimate performed for the decommissioning funding plan or of the amount certified for decommissioning, and records of the funding method used for assuring funds if either a funding plan or certification is used.

(g) In providing financial assurance under this section, each licensee must use the financial assurance funds only for decommissioning activities and each licensee must monitor the balance of funds held to account for market variations. The licensee must replenish the funds, and report such actions to the NRC, as follows:

(1) If, at the end of a calendar quarter, the fund balance is below the amount necessary to cover the cost of decommissioning, but is not below 75 percent of the cost, the licensee must increase the balance to cover the cost, and must do so within 30 days after the end of the calendar quarter.

(2) If, at any time, the fund balance falls below 75 percent of the amount necessary to cover the cost of decommissioning, the licensee must increase the balance to cover the cost, and must do so within 30 days of the occurrence.

(3) Within 30 days of taking the actions required by paragraph (g)(1) or (g)(2) of this section, the licensee must provide a written report of such actions to the Director, Office of Nuclear Material Safety and Safeguards, and state the new balance of the fund.

[53 FR 24047, June 27, 1988, as amended at 58 FR 39633, July 26, 1993; 58 FR 67661, Dec. 22, 1993; 58 FR 68731, Dec. 29, 1993; 59 FR 1618, Jan. 12, 1994; 60 FR 38238, July 26, 1995; 61 FR 24674, May 16, 1996; 62 FR 39090, July 21, 1997; 63 FR 29543, June 1, 1998; 68 FR 57336, Oct. 3, 2003; 76 FR 35568, June 17, 2011; 78 FR 34247, June 7, 2013; 78 FR 75450, Dec. 12, 2013]

#### **§40.46 Inalienability of licenses.**

(a) No license issued or granted pursuant to the regulations in this part shall be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of any license to any person, unless the Commission shall after securing full information, find that the transfer is in accordance with the provisions of this act, and shall give its consent in writing.

(b) An application for transfer of license must include:

(1) The identity, technical and financial qualifications of the proposed transferee; and

(2) Financial assurance for decommissioning information required by §40.36 or Appendix A to this part, as applicable.

[26 FR 284, Jan. 14, 1961, as amended at 76 FR 35569, June 17, 2011]

WASTE MANAGEMENT AND RADIATION CONTROL BOARD  
 Executive Summary  
 REQUEST FOR A SITE-SPECIFIC TREATMENT VARIANCE  
 EnergySolutions LLC  
 November 12, 2015

<p>What is the issue before the Board?</p>	<p>On November 4, 2015, EnergySolutions LLC submitted a request to the Director of the Division of Waste Management and Radiation Control for a one-time site-specific treatment variance from the Utah Hazardous Waste Management Rules. EnergySolutions seeks authorization receive Cemented Uranium Extraction Process Residues for disposal.</p>
<p>What is the historical background or context for this issue?</p>	<p>The Mixed Waste Facility proposes to receive up to 600 cubic feet of cemented monoliths containing enriched uranium residuals.</p> <p>This material retains hazardous waste codes for barium, cadmium, chromium, lead, and spent solvents. The generator has encapsulated the waste in concrete for security reasons.</p> <p>EnergySolutions proposes to receive this waste for macroencapsulation in the Mixed Waste Landfill Cell rather than chemical stabilization, as required. This request is based on the fact that the waste has already been encapsulated in concrete at the generator's site. Treating this waste by the required method would mean grinding the waste and potentially exposing workers to unnecessary contamination.</p> <p>The proposed treatment will further encapsulate the waste and protect it from contact with precipitation, thereby decreasing the potential of leaching.</p> <p>A notice for public comment was published in <i>The Salt Lake Tribune</i>, the <i>Deseret Morning News</i> and the <i>Tooele County Transcript Bulletin</i>. The comment period began November 10, 2015, and will end on December 9, 2015.</p>
<p><b>What is the governing statutory or regulatory citation?</b></p>	<p>Variances are provided for in 19-6-111 of the Utah Solid and Hazardous Waste Act and R315-2-13 of the Utah Administrative Code. This is a one-time site-specific variance from an applicable treatment standard as allowed by R315-13-1 (40 CFR 268.44(h)(2) by reference).</p>
<p><b>Is Board action required?</b></p>	<p>Yes, this is an action item before the Board.</p>
<p><b>What is the Division/Director's recommendation?</b></p>	<p>The Director recommends approval of this variance request. The Director's recommendation of approval of this variance is based on the following findings: the proposed alternative treatment method meets the regulatory basis for a variance, will be as safe to human health and the environment as the required method, and the required method would create additional waste, and require waste handling that could possibly expose workers to unnecessary contact with the waste.</p>

**Where can more information be obtained?**

For technical questions, please contact Otis Willoughby (801) 536-0220.  
For legal questions, please contact Raymond Wixom at (801) 536-0290.

DSHW-2015-012330

Attachment: DSHW-2015-011435  
DSHW-2015-012331  
DSHW-2015-012333  
DSHW-2015-012332



NOV - 4 2015

DSHW-2015-011435

November 4, 2015

CD15-0254

Mr. Scott T. Anderson  
Director  
Division of Waste Management and Radiation Control  
195 North 1950 West  
Salt Lake City, UT 84114-4880

Subject: EPA ID Number UTD982598898 ✓  
Request for a Site-Specific Treatment Variance for Cemented Uranium  
Extraction Process Residues

Dear Mr. Anderson:

EnergySolutions hereby requests an exemption from the treatment standards of 40 CFR 268.40(a)(2) for uranium extraction process residuals that retain the hazardous waste codes D005 (barium); D006 (cadmium); D007 (chromium); D008 (lead); D030 (2,4-dinitrotoluene); D032 (hexachlorobenzene) and F001, F002, and F005 (spent solvents) and are encased in cement. This exemption is requested for the purposes of safety, security, and transportation of the radioactive waste.

This request is submitted in accordance with R315-13-1 (40 CFR 268.44 incorporated by reference) which allows a site-specific variance from an applicable treatment standard provided the following condition is met:

40 CFR 268.44(h)(2) It is inappropriate to require the waste to be treated to the level specified in the treatment standard or by the method specified as the treatment standard, even though such treatment is technically possible.

This request is submitted in accordance with the requirements of 40 CFR 260.20(b).

**40 CFR 260.20(b)(1):** This petition is being submitted by

EnergySolutions LLC  
299 South Main Street, Suite 1700  
Salt Lake City, UT 84111

**40 CFR 260.20(b)(2):** EnergySolutions requests approval to receive, macroencapsulate, and dispose, in EnergySolutions' Clive Facility Mixed Waste Landfill Cell, approximately 600 cubic feet of cemented (monolithic) uranium extraction process residues that retains the characteristic hazardous waste codes D005, D006, D007, D008, D030, and D032; and the listed hazardous waste codes F001, F002, and F003. All actions requested in this variance will be performed in accordance with EnergySolutions' State-issued Part B Permit.

**40 CFR 260.20(b)(3):** EnergySolutions proposes that the monolithic waste forms, after acceptance at the facility in accordance with EnergySolutions' Clive Facility State-issued Part B Permit, be macroencapsulated in accordance with permit requirements and disposed in the Mixed Waste Landfill Cell.

**40 CFR 260.20(b)(4):** The need and justification for this action are as follows.

This variance is being requested for approximately 600 cubic feet of cemented uranium extraction process residuals from EnergySolutions generator 9061-06. The waste is generated as part of a uranium recovery process that involves creating an enriched uranium contaminated ash through a thermal process and then recovering the enriched uranium through an organic solvent extraction process. The residual waste from this extraction system is collected in small cans (~ 2 ½ gallons each) and stored at the generator's facility. The process residuals within these cans are in the form of an ash generated through this process. The process residuals within the cans have been characterized through a random sampling and analysis process. At the beginning of this campaign, approximately 2,000 cans of process residues were collected and stored by the generator. The process is ongoing and additional cans are being generated every year. Further, due to safety concerns, some of the cans are being split prior to the repackaging process described below; thereby generating more total material for disposal than originally anticipated.

F-listed solvent codes within this waste are derived from rags that are burned in a furnace in order to recover the uranium present within them. None of the F-listed constituents were present above Universal Treatment Standard (UTS) concentrations within the random characterization samples of the process residues. The random characterization samples were also analyzed for metals using the Toxicity Characteristic Leaching Procedure (TCLP). These samples detected elevated concentrations of barium (up to 6,740 mg/L TCLP), cadmium (up to 16.4 mg/L TCLP), chromium (up to 15.2 mg/L TCLP), and lead (up to 10.5 mg/L TCLP). Based on these elevated metal concentrations, the characteristic waste codes D005, D006, D007, and D008 were applied to the process residue. Slightly elevated concentrations of 2,4-dinitrotoluene (D030) and hexachlorobutadiene (D032) were also detected in separate analyses. The residue may potentially contain these codes also.

The uranium content within the process residues is enriched. From a health and safety standpoint, the enrichment makes the waste more hazardous to employees managing the waste. Further, enriched material has increased security concerns and must be managed appropriately. To ensure the enriched uranium concentration limits required for worker safety, security, and transportation of this waste are met, appropriate packaging procedures were created and are currently being utilized at the generator's facility. These packaging procedures include repackaging the cans into 16-gallon drums and filling the void spaces with cement; formal treatment for the elevated metals concentrations is not performed during this process. The

generator has assessed other options, including treatment for the hazardous constituents; however, additional processing introduced unacceptable hazards from a health and safety, and security viewpoint. Additionally, the waste within the cans is inherently safe from a criticality aspect and the generator concluded that it is unwise to perform extra processing that could potentially change this aspect. Furthermore, encasing enriched uranium within concrete is the preferred method of stabilization as recommended by the Nuclear Regulatory Commission (NRC). The waste material packaged in these 16-gallon monolithic forms is inherently safe and is the form that will be shipped and received at the EnergySolutions Clive facility.

The characteristic hazardous waste codes associated with the process residues has numerical concentration-based treatment standards based upon the leachability of the contaminants. Treatment of the monolithic form for these concentration-based treatment standards would entail a process that includes shredding of the monolith followed by mixing with a stabilizing reagent in a permitted mixer. Both of these steps could mobilize the enriched uranium and possibly cause airborne contamination, increasing the potential for releases to the environment as well as the potential for personnel exposure; thereby violating radiation protection (ALARA) principles. Also, the shredding of the solidified uranium ash results in a more accessible form of enriched uranium with potential security ramifications.

EnergySolutions proposes to macroencapsulate the waste, thereby isolating the waste from potential leaching media. Macroencapsulation is a permitted process utilized at the Clive facility that significantly reduces the potential for migration (leaching) of waste. Macroencapsulation requires less handling of the waste and creates a waste form for disposal that is protective of human health and the environment. Macroencapsulation also adds a further level of security to the access of the enriched uranium.

In summary, a variance should be granted based upon three considerations:

1. for both health and security reasons, enriched uranium concentration within the waste precludes actual treatment of the waste;
2. processing this waste in preparation for stabilization treatment would increase worker exposures and the potential for releases to the environment; and
3. the leachability of the waste would be significantly reduced through macroencapsulation, thereby protecting human health and the environment.

EnergySolutions requested this same variance for this generator in letters dated July 20, 2007, July 28, 2008, July 15, 2009, July 15, 2010, July 28, 2011, August 13, 2012, July 15, 2013, and July 25, 2015. These previous requests were approved on September 13, 2007, September 13,

2008, September 10, 2009, September 9, 2010, September 8, 2011, September 13, 2012, September 12, 2013, and August 14, 2014.

Shipments began in April, 2008 and have been relatively continuous since that time. Since the last variance was approved, EnergySolutions has received approximately 374 cubic feet of this waste (the 16-gallon monoliths). EnergySolutions has received approximately 7,050 cubic feet of this waste since the first variance approval in 2008. This variance request is for the ongoing processing and disposal of additional uranium extraction process residues created by the generator.

EnergySolutions requests that a variance be granted to allow the receipt, macroencapsulation treatment, and disposal of approximately 600 cubic feet of cemented uranium extraction process residuals that retain hazardous waste codes.

Upon approval of this variance, the monolithic waste will be managed as debris.

The name, phone number, and address of the person who should be contacted to notify EnergySolutions of decisions by the Director is:

Mr. Vern C. Rogers  
Manager, Compliance and Permitting  
EnergySolutions LLC  
299 South Main Street, Suite 1700  
Salt Lake City, UT 84111  
(801) 649-2000

Should there be any questions to this request, please contact me at 801-649-2144.

Sincerely,



Timothy L. Orton, P.E.  
Environmental Engineer

cc: Don Verbica, DWMRC

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

9061-06 Shipments (11-01-14 to 11-13-15)

		U-235 (mCi)	U-235 (pCi/g)	U-235 Grams	U-235 EU%
6.2E+09 pCi/g (Specific Activity of U-234)	<b>Min</b>	2.16E-03	1.61E+01	9.83E-01	46%
2.2E+06 pCi/g (Specific Activity of U-235)	<b>Max</b>	1.06E-01	8.28E+02	4.82E+01	86%
3.4E+05 pCi/g (Specific Activity of U-238)	<b>Average</b>	5.73E-02	4.42E+02	2.60E+01	82%
	<b>Shipments</b>	10			
	<b>Containers</b>	119			

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Search No	Cntr	Isotope	mCi		U-235 (mCi)	U-235 (pCi/g)	U-235 Grams	U-235 EU%
			Values Act mCi	Conc pCi/g				
9061-06-0218	1	U-234	7.52E-02	5.80E+02				
		U-235	2.16E-03	1.67E+01	2.16E-03	1.67E+01	9.83E-01	46%
		U-238	3.96E-04	3.05E+00				
9061-06-0219	1	U-234	9.32E-01	7.06E+03				
		U-235	3.03E-02	2.29E+02	3.03E-02	2.29E+02	1.38E+01	86%
		U-238	7.04E-04	5.33E+00				
	2	U-234	1.37E+00	1.08E+04				
		U-235	4.32E-02	3.41E+02	4.32E-02	3.41E+02	1.97E+01	86%
		U-238	1.01E-03	7.94E+00				
	3	U-234	2.80E+00	2.20E+04				
		U-235	9.08E-02	7.15E+02	9.08E-02	7.15E+02	4.13E+01	86%
		U-238	2.11E-03	1.67E+01				
	4	U-234	3.73E-01	2.90E+03				
		U-235	1.30E-02	1.01E+02	1.30E-02	1.01E+02	5.90E+00	86%
		U-238	3.02E-04	2.34E+00				
	5	U-234	8.08E-01	6.27E+03				
		U-235	2.59E-02	2.01E+02	2.59E-02	2.01E+02	1.18E+01	86%
		U-238	6.03E-04	4.68E+00				
	6	U-234	1.74E+00	1.38E+04				
		U-235	5.62E-02	4.44E+02	5.62E-02	4.44E+02	2.56E+01	86%
		U-238	1.31E-03	1.04E+01				
	7	U-234	1.86E+00	1.46E+04				
		U-235	6.05E-02	4.73E+02	6.05E-02	4.73E+02	2.75E+01	86%
		U-238	1.41E-03	1.10E+01				
	8	U-234	1.43E+00	1.13E+04				
		U-235	4.54E-02	3.58E+02	4.54E-02	3.58E+02	2.06E+01	86%
		U-238	1.06E-03	8.33E+00				
9	U-234	6.22E-01	4.74E+03					
	U-235	1.95E-02	1.48E+02	1.95E-02	1.48E+02	8.85E+00	86%	
	U-238	4.54E-04	3.46E+00					
10	U-234	3.73E-01	2.90E+03					
	U-235	1.30E-02	1.01E+02	1.30E-02	1.01E+02	5.90E+00	86%	
	U-238	3.02E-04	2.35E+00					
11	U-234	2.67E+00	2.11E+04					
	U-235	8.65E-02	6.84E+02	8.65E-02	6.84E+02	3.93E+01	86%	
	U-238	2.01E-03	1.59E+01					
12	U-234	2.55E+00	1.98E+04					
	U-235	8.22E-02	6.38E+02	8.22E-02	6.38E+02	3.73E+01	86%	
	U-238	1.91E-03	1.49E+01					
13	U-234	3.11E+00	2.45E+04					

<b>13</b>	U-235	9.95E-02	7.83E+02	9.95E-02	7.83E+02	4.52E+01	86%
	U-238	2.32E-03	1.82E+01				
<b>14</b>	U-234	3.01E-01	2.25E+03				
	U-235	8.65E-03	6.44E+01	8.65E-03	6.44E+01	3.93E+00	46%
	U-238	1.58E-03	1.18E+01				
<b>15</b>	U-234	3.23E+00	2.50E+04				
	U-235	1.04E-01	8.03E+02	1.04E-01	8.03E+02	4.72E+01	86%
	U-238	2.42E-03	1.87E+01				
<b>16</b>	U-234	2.80E+00	2.16E+04				
	U-235	9.08E-02	7.02E+02	9.08E-02	7.02E+02	4.13E+01	86%
	U-238	2.11E-03	1.64E+01				
<b>17</b>	U-234	2.61E+00	2.07E+04				
	U-235	8.43E-02	6.69E+02	8.43E-02	6.69E+02	3.83E+01	86%
	U-238	1.97E-03	1.56E+01				
<b>18</b>	U-234	2.05E+00	1.58E+04				
	U-235	6.70E-02	5.15E+02	6.70E-02	5.15E+02	3.05E+01	86%
	U-238	1.56E-03	1.20E+01				
<b>19</b>	U-234	5.28E-01	3.88E+03				
	U-235	1.51E-02	1.11E+02	1.51E-02	1.11E+02	6.88E+00	46%
	U-238	2.76E-03	2.03E+01				
<b>20</b>	U-234	2.26E-01	1.69E+03				
	U-235	6.49E-03	4.83E+01	6.49E-03	4.83E+01	2.95E+00	46%
	U-238	1.18E-03	8.82E+00				
<b>21</b>	U-234	3.01E-01	2.25E+03				
	U-235	8.65E-03	6.44E+01	8.65E-03	6.44E+01	3.93E+00	46%
	U-238	1.58E-03	1.18E+01				
<b>1</b>	U-234	4.53E-01	3.39E+03				
	U-235	1.30E-02	9.73E+01	1.30E-02	9.73E+01	5.90E+00	46%
	U-238	2.37E-03	1.78E+01				
<b>2</b>	U-234	2.36E+00	1.81E+04				
	U-235	7.57E-02	5.79E+02	7.57E-02	5.79E+02	3.44E+01	86%
	U-238	1.76E-03	1.35E+01				
<b>3</b>	U-234	1.86E+00	1.40E+04				
	U-235	6.05E-02	4.54E+02	6.05E-02	4.54E+02	2.75E+01	86%
	U-238	1.41E-03	1.06E+01				
<b>4</b>	U-234	2.55E+00	1.95E+04				
	U-235	8.22E-02	6.29E+02	8.22E-02	6.29E+02	3.73E+01	86%
	U-238	1.91E-03	1.47E+01				
<b>5</b>	U-234	2.36E+00	1.83E+04				
	U-235	7.57E-02	5.85E+02	7.57E-02	5.85E+02	3.44E+01	86%
	U-238	1.76E-03	1.36E+01				
<b>6</b>	U-234	3.05E+00	2.33E+04				
	U-235	9.73E-02	7.45E+02	9.73E-02	7.45E+02	4.42E+01	86%
	U-238	2.27E-03	1.74E+01				
<b>7</b>	U-234	9.95E-01	7.41E+03				
	U-235	3.24E-02	2.42E+02	3.24E-02	2.42E+02	1.47E+01	86%
	U-238	7.56E-04	5.63E+00				
<b>8</b>	U-234	2.61E+00	2.01E+04				
	U-235	8.43E-02	6.48E+02	8.43E-02	6.48E+02	3.83E+01	86%
	U-238	1.97E-03	1.51E+01				
<b>9</b>	U-234	1.80E+00	1.38E+04				

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9	U-235	5.84E-02	4.47E+02	5.84E-02	4.47E+02	2.65E+01	86%
	U-238	1.36E-03	1.04E+01				
10	U-234	2.74E+00	2.12E+04				
	U-235	8.86E-02	6.86E+02	8.86E-02	6.86E+02	4.03E+01	86%
	U-238	2.07E-03	1.60E+01				
11	U-234	3.01E-01	2.23E+03				
	U-235	8.65E-03	6.40E+01	8.65E-03	6.40E+01	3.93E+00	46%
	U-238	1.58E-03	1.17E+01				
12	U-234	2.26E-01	1.66E+03				
	U-235	6.49E-03	4.77E+01	6.49E-03	4.77E+01	2.95E+00	46%
	U-238	1.18E-03	8.70E+00				
13	U-234	1.21E+00	8.95E+03				
	U-235	3.46E-02	2.57E+02	3.46E-02	2.57E+02	1.57E+01	46%
	U-238	6.32E-03	4.70E+01				
14	U-234	7.52E-02	5.60E+02				
	U-235	2.16E-03	1.61E+01	2.16E-03	1.61E+01	9.83E-01	46%
	U-238	3.96E-04	2.95E+00				
15	U-234	3.01E-01	2.21E+03				
	U-235	8.65E-03	6.34E+01	8.65E-03	6.34E+01	3.93E+00	46%
	U-238	1.58E-03	1.16E+01				
1	U-234	2.86E+00	2.15E+04				
	U-235	9.30E-02	7.00E+02	9.30E-02	7.00E+02	4.23E+01	86%
	U-238	2.17E-03	1.63E+01				
2	U-234	1.74E+00	1.32E+04				
	U-235	5.62E-02	4.26E+02	5.62E-02	4.26E+02	2.56E+01	86%
	U-238	1.31E-03	9.93E+00				
3	U-234	1.55E+00	1.17E+04				
	U-235	4.97E-02	3.74E+02	4.97E-02	3.74E+02	2.26E+01	86%
	U-238	1.16E-03	8.71E+00				
4	U-234	1.62E+00	1.24E+04				
	U-235	5.19E-02	3.97E+02	5.19E-02	3.97E+02	2.36E+01	86%
	U-238	1.21E-03	9.26E+00				
5	U-234	2.30E+00	1.82E+04				
	U-235	7.35E-02	5.81E+02	7.35E-02	5.81E+02	3.34E+01	86%
	U-238	1.71E-03	1.35E+01				
6	U-234	9.95E-01	6.92E+03				
	U-235	3.24E-02	2.26E+02	3.24E-02	2.26E+02	1.47E+01	86%
	U-238	7.56E-04	5.26E+00				
7	U-234	2.36E+00	1.81E+04				
	U-235	7.57E-02	5.81E+02	7.57E-02	5.81E+02	3.44E+01	86%
	U-238	1.76E-03	1.35E+01				
8	U-234	2.36E+00	1.80E+04				
	U-235	7.57E-02	5.75E+02	7.57E-02	5.75E+02	3.44E+01	86%
	U-238	1.76E-03	1.34E+01				
9	U-234	1.62E+00	1.22E+04				
	U-235	5.19E-02	3.93E+02	5.19E-02	3.93E+02	2.36E+01	86%
	U-238	1.21E-03	9.16E+00				
10	U-234	2.74E+00	2.08E+04				
	U-235	8.86E-02	6.74E+02	8.86E-02	6.74E+02	4.03E+01	86%
	U-238	2.07E-03	1.57E+01				
11	U-234	1.93E+00	1.50E+04				

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11	U-235	6.27E-02	4.87E+02	6.27E-02	4.87E+02	2.85E+01	86%	
	U-238	1.46E-03	1.13E+01					
12	U-234	3.11E+00	2.35E+04					
	U-235	9.95E-02	7.53E+02	9.95E-02	7.53E+02	4.52E+01	86%	
	U-238	2.32E-03	1.75E+01					
13	U-234	2.67E+00	2.03E+04					
	U-235	8.65E-02	6.58E+02	8.65E-02	6.58E+02	3.93E+01	86%	
	U-238	2.01E-03	1.53E+01					
14	U-234	1.99E+00	1.59E+04					
	U-235	6.49E-02	5.18E+02	6.49E-02	5.18E+02	2.95E+01	86%	
	U-238	1.51E-03	1.21E+01					
15	U-234	2.42E+00	1.87E+04					
	U-235	7.78E-02	6.00E+02	7.78E-02	6.00E+02	3.54E+01	86%	
	U-238	1.81E-03	1.40E+01					
16	U-234	2.30E+00	1.79E+04					
	U-235	7.35E-02	5.71E+02	7.35E-02	5.71E+02	3.34E+01	86%	
	U-238	1.71E-03	1.33E+01					
17	U-234	1.99E+00	1.57E+04					
	U-235	6.49E-02	5.13E+02	6.49E-02	5.13E+02	2.95E+01	86%	
	U-238	1.51E-03	1.19E+01					
18	U-234	9.32E-01	7.14E+03					
	U-235	3.03E-02	2.32E+02	3.03E-02	2.32E+02	1.38E+01	86%	
	U-238	7.04E-04	5.39E+00					
<hr/>								
<b>9061-06-0222</b>								
	1	U-234	1.51E-01	1.19E+03				
		U-235	4.32E-03	3.39E+01	4.32E-03	3.39E+01	1.97E+00	46%
		U-238	7.88E-04	6.19E+00				
	2	U-234	1.51E-01	1.20E+03				
		U-235	4.32E-03	3.43E+01	4.32E-03	3.43E+01	1.97E+00	46%
		U-238	7.88E-04	6.25E+00				
<hr/>								
<b>9061-06-0223</b>								
	1	U-234	9.95E-01	7.75E+03				
		U-235	3.24E-02	2.53E+02	3.24E-02	2.53E+02	1.47E+01	86%
		U-238	7.56E-04	5.89E+00				
	2	U-234	1.06E+00	8.30E+03				
		U-235	3.46E-02	2.72E+02	3.46E-02	2.72E+02	1.57E+01	86%
		U-238	8.04E-04	6.31E+00				
	3	U-234	1.49E+00	1.17E+04				
		U-235	4.76E-02	3.72E+02	4.76E-02	3.72E+02	2.16E+01	86%
		U-238	1.11E-03	8.67E+00				
	4	U-234	8.70E-01	6.78E+03				
		U-235	2.81E-02	2.19E+02	2.81E-02	2.19E+02	1.28E+01	86%
		U-238	6.55E-04	5.10E+00				
	5	U-234	1.43E+00	1.11E+04				
		U-235	4.54E-02	3.54E+02	4.54E-02	3.54E+02	2.06E+01	86%
		U-238	1.06E-03	8.23E+00				
	6	U-234	2.18E+00	1.69E+04				
		U-235	6.92E-02	5.39E+02	6.92E-02	5.39E+02	3.14E+01	86%
		U-238	1.61E-03	1.26E+01				
	7	U-234	9.32E-01	7.42E+03				
		U-235	3.03E-02	2.41E+02	3.03E-02	2.41E+02	1.38E+01	86%
		U-238	7.04E-04	5.60E+00				
	8	U-234	1.12E+00	8.97E+03				

<b>8</b>	U-235	3.68E-02	2.95E+02	3.68E-02	2.95E+02	1.67E+01	86%
	U-238	8.56E-04	6.87E+00				
<b>9</b>	U-234	1.37E+00	1.09E+04				
	U-235	4.32E-02	3.44E+02	4.32E-02	3.44E+02	1.97E+01	86%
	U-238	1.01E-03	8.03E+00				
<b>10</b>	U-234	1.55E+00	1.26E+04				
	U-235	4.97E-02	4.03E+02	4.97E-02	4.03E+02	2.26E+01	86%
	U-238	1.16E-03	9.38E+00				
<b>11</b>	U-234	1.06E+00	8.12E+03				
	U-235	3.46E-02	2.66E+02	3.46E-02	2.66E+02	1.57E+01	86%
	U-238	8.04E-04	6.18E+00				
<b>12</b>	U-234	1.18E+00	9.43E+03				
	U-235	3.89E-02	3.11E+02	3.89E-02	3.11E+02	1.77E+01	86%
	U-238	9.05E-04	7.23E+00				
<b>1</b>	U-234	2.42E+00	1.84E+04				
	U-235	7.78E-02	5.92E+02	7.78E-02	5.92E+02	3.54E+01	86%
	U-238	1.81E-03	1.38E+01				
<b>2</b>	U-234	1.74E+00	1.37E+04				
	U-235	5.62E-02	4.41E+02	5.62E-02	4.41E+02	2.56E+01	86%
	U-238	1.31E-03	1.03E+01				
<b>3</b>	U-234	3.29E+00	2.58E+04				
	U-235	1.06E-01	8.28E+02	1.06E-01	8.28E+02	4.82E+01	86%
	U-238	2.47E-03	1.93E+01				
<b>4</b>	U-234	1.99E+00	1.53E+04				
	U-235	6.49E-02	5.00E+02	6.49E-02	5.00E+02	2.95E+01	86%
	U-238	1.51E-03	1.17E+01				
<b>5</b>	U-234	2.24E+00	1.71E+04				
	U-235	7.14E-02	5.46E+02	7.14E-02	5.46E+02	3.24E+01	86%
	U-238	1.66E-03	1.27E+01				
<b>6</b>	U-234	2.18E+00	1.71E+04				
	U-235	6.92E-02	5.43E+02	6.92E-02	5.43E+02	3.14E+01	86%
	U-238	1.61E-03	1.27E+01				
<b>7</b>	U-234	1.55E+00	1.15E+04				
	U-235	4.97E-02	3.69E+02	4.97E-02	3.69E+02	2.26E+01	86%
	U-238	1.16E-03	8.60E+00				
<b>8</b>	U-234	2.30E+00	1.73E+04				
	U-235	7.35E-02	5.52E+02	7.35E-02	5.52E+02	3.34E+01	86%
	U-238	1.71E-03	1.28E+01				
<b>9</b>	U-234	2.67E+00	1.98E+04				
	U-235	8.65E-02	6.40E+02	8.65E-02	6.40E+02	3.93E+01	86%
	U-238	2.01E-03	1.49E+01				
<b>10</b>	U-234	1.68E+00	1.26E+04				
	U-235	5.41E-02	4.07E+02	5.41E-02	4.07E+02	2.46E+01	86%
	U-238	1.26E-03	9.47E+00				
<b>11</b>	U-234	1.18E+00	8.68E+03				
	U-235	3.89E-02	2.86E+02	3.89E-02	2.86E+02	1.77E+01	86%
	U-238	9.05E-04	6.65E+00				
<b>12</b>	U-234	1.49E+00	1.13E+04				
	U-235	4.76E-02	3.62E+02	4.76E-02	3.62E+02	2.16E+01	86%
	U-238	1.11E-03	8.44E+00				
<b>13</b>	U-234	2.18E+00	1.60E+04				

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<b>13</b>	U-235	6.92E-02	5.10E+02	6.92E-02	5.10E+02	3.14E+01	86%
	U-238	1.61E-03	1.19E+01				
<b>14</b>	U-234	3.29E+00	2.48E+04				
	U-235	1.06E-01	7.97E+02	1.06E-01	7.97E+02	4.82E+01	86%
	U-238	2.47E-03	1.86E+01				
<b>15</b>	U-234	1.86E+00	1.40E+04				
	U-235	6.05E-02	4.54E+02	6.05E-02	4.54E+02	2.75E+01	86%
	U-238	1.41E-03	1.06E+01				
<b>16</b>	U-234	2.18E+00	1.68E+04				
	U-235	6.92E-02	5.35E+02	6.92E-02	5.35E+02	3.14E+01	86%
	U-238	1.61E-03	1.25E+01				
<b>17</b>	U-234	1.06E+00	7.90E+03				
	U-235	3.46E-02	2.59E+02	3.46E-02	2.59E+02	1.57E+01	86%
	U-238	8.04E-04	6.01E+00				
<b>18</b>	U-234	1.80E+00	1.34E+04				
	U-235	5.84E-02	4.35E+02	5.84E-02	4.35E+02	2.65E+01	86%
	U-238	1.36E-03	1.01E+01				
<b>1</b>	U-234	1.74E+00	1.35E+04				
	U-235	5.62E-02	4.36E+02	5.62E-02	4.36E+02	2.56E+01	86%
	U-238	1.31E-03	1.02E+01				
<b>2</b>	U-234	1.24E+00	9.48E+03				
	U-235	4.11E-02	3.13E+02	4.11E-02	3.13E+02	1.87E+01	86%
	U-238	9.57E-04	7.30E+00				
<b>3</b>	U-234	2.80E+00	2.15E+04				
	U-235	9.08E-02	6.97E+02	9.08E-02	6.97E+02	4.13E+01	86%
	U-238	2.11E-03	1.62E+01				
<b>4</b>	U-234	1.86E+00	1.48E+04				
	U-235	6.05E-02	4.82E+02	6.05E-02	4.82E+02	2.75E+01	86%
	U-238	1.41E-03	1.12E+01				
<b>5</b>	U-234	1.74E+00	1.34E+04				
	U-235	5.62E-02	4.33E+02	5.62E-02	4.33E+02	2.56E+01	86%
	U-238	1.31E-03	1.01E+01				
<b>6</b>	U-234	1.93E+00	1.49E+04				
	U-235	6.27E-02	4.83E+02	6.27E-02	4.83E+02	2.85E+01	86%
	U-238	1.46E-03	1.13E+01				
<b>7</b>	U-234	1.80E+00	1.38E+04				
	U-235	5.84E-02	4.48E+02	5.84E-02	4.48E+02	2.65E+01	86%
	U-238	1.36E-03	1.04E+01				
<b>8</b>	U-234	1.62E+00	1.22E+04				
	U-235	5.19E-02	3.93E+02	5.19E-02	3.93E+02	2.36E+01	86%
	U-238	1.21E-03	9.16E+00				
<b>9</b>	U-234	2.92E+00	2.20E+04				
	U-235	9.51E-02	7.16E+02	9.51E-02	7.16E+02	4.32E+01	86%
	U-238	2.22E-03	1.67E+01				
<b>10</b>	U-234	2.18E+00	1.63E+04				
	U-235	6.92E-02	5.19E+02	6.92E-02	5.19E+02	3.14E+01	86%
	U-238	1.61E-03	1.21E+01				
<b>11</b>	U-234	2.05E+00	1.62E+04				
	U-235	6.70E-02	5.30E+02	6.70E-02	5.30E+02	3.05E+01	86%
	U-238	1.56E-03	1.23E+01				
<b>12</b>	U-234	2.86E+00	2.23E+04				

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<b>12</b>	U-235	9.30E-02	7.24E+02	9.30E-02	7.24E+02	4.23E+01	86%
	U-238	2.17E-03	1.69E+01				
<b>13</b>	U-234	3.23E+00	2.56E+04				
	U-235	1.04E-01	8.20E+02	1.04E-01	8.20E+02	4.72E+01	86%
	U-238	2.42E-03	1.91E+01				
<b>14</b>	U-234	2.55E+00	1.97E+04				
	U-235	8.22E-02	6.33E+02	8.22E-02	6.33E+02	3.73E+01	86%
	U-238	1.91E-03	1.48E+01				
<b>15</b>	U-234	1.99E+00	1.60E+04				
	U-235	6.49E-02	5.20E+02	6.49E-02	5.20E+02	2.95E+01	86%
	U-238	1.51E-03	1.21E+01				
<b>16</b>	U-234	3.23E+00	2.52E+04				
	U-235	1.04E-01	8.08E+02	1.04E-01	8.08E+02	4.72E+01	86%
	U-238	2.42E-03	1.88E+01				
<b>1</b>	U-234	2.05E+00	1.57E+04				
	U-235	6.70E-02	5.13E+02	6.70E-02	5.13E+02	3.05E+01	86%
	U-238	1.56E-03	1.19E+01				
<b>2</b>	U-234	2.55E+00	1.97E+04				
	U-235	8.22E-02	6.33E+02	8.22E-02	6.33E+02	3.73E+01	86%
	U-238	1.91E-03	1.48E+01				
<b>3</b>	U-234	2.74E+00	2.15E+04				
	U-235	8.86E-02	6.98E+02	8.86E-02	6.98E+02	4.03E+01	86%
	U-238	2.07E-03	1.63E+01				
<b>4</b>	U-234	2.49E+00	1.92E+04				
	U-235	8.00E-02	6.17E+02	8.00E-02	6.17E+02	3.64E+01	86%
	U-238	1.86E-03	1.44E+01				
<b>5</b>	U-234	1.49E+00	1.12E+04				
	U-235	4.76E-02	3.58E+02	4.76E-02	3.58E+02	2.16E+01	86%
	U-238	1.11E-03	8.35E+00				
<b>6</b>	U-234	1.86E+00	1.41E+04				
	U-235	6.05E-02	4.57E+02	6.05E-02	4.57E+02	2.75E+01	86%
	U-238	1.41E-03	1.07E+01				
<b>7</b>	U-234	1.62E+00	1.22E+04				
	U-235	5.19E-02	3.90E+02	5.19E-02	3.90E+02	2.36E+01	86%
	U-238	1.21E-03	9.10E+00				
<b>8</b>	U-234	1.68E+00	1.29E+04				
	U-235	5.41E-02	4.15E+02	5.41E-02	4.15E+02	2.46E+01	86%
	U-238	1.26E-03	9.67E+00				
<b>9</b>	U-234	1.55E+00	1.21E+04				
	U-235	4.97E-02	3.87E+02	4.97E-02	3.87E+02	2.26E+01	86%
	U-238	1.16E-03	9.02E+00				
<b>10</b>	U-234	2.05E+00	1.60E+04				
	U-235	6.70E-02	5.22E+02	6.70E-02	5.22E+02	3.05E+01	86%
	U-238	1.56E-03	1.21E+01				
<b>1</b>	U-234	1.80E+00	1.44E+04				
	U-235	5.84E-02	4.65E+02	5.84E-02	4.65E+02	2.65E+01	86%
	U-238	1.36E-03	1.08E+01				
<b>2</b>	U-234	1.99E+00	1.53E+04				
	U-235	6.49E-02	4.98E+02	6.49E-02	4.98E+02	2.95E+01	86%
	U-238	1.51E-03	1.16E+01				
<b>3</b>	U-234	1.55E+00	1.20E+04				

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<b>3</b>	U-235	4.97E-02	3.85E+02	4.97E-02	3.85E+02	2.26E+01	86%
	U-238	1.16E-03	8.95E+00				
<b>4</b>	U-234	6.22E-01	4.93E+03				
	U-235	1.95E-02	1.54E+02	1.95E-02	1.54E+02	8.85E+00	86%
	U-238	4.54E-04	3.60E+00				
<b>5</b>	U-234	1.55E+00	1.23E+04				
	U-235	4.97E-02	3.94E+02	4.97E-02	3.94E+02	2.26E+01	86%
	U-238	1.16E-03	9.18E+00				
<b>6</b>	U-234	2.74E+00	2.14E+04				
	U-235	8.86E-02	6.93E+02	8.86E-02	6.93E+02	4.03E+01	86%
	U-238	2.07E-03	1.62E+01				
<b>Grand Total</b>		<b>2.19E+02</b>	<b>1.69E+06</b>				

Waste stream 9061-06 contains high enriched uranium. EnergySolutions received an exemption from the NRC in 1999 that allows receipt of waste containing Special Nuclear Material (SNM) based on concentration limits as opposed to mass limits prescribed in 10 CFR 150.10. Both the SNM mass and concentration limits ensure criticality safety. The U-235 concentration limits in the EnergySolutions Clive disposal license are 1,900 pCi/g for U-235 enrichment less than 10% and 1,190 pCi/g for enrichment at or greater than 10%. The US DOT has also implemented the SNM concentration limits for shipments of fissile excepted packages but only provided the lower concentration limit for U-235.

EnergySolutions reviewed the last ten shipments from waste stream 9061-06 consisting of 119 manifested packages. The range of U-235 enrichment percentage was 46% to 86%. The maximum manifested U-235 concentration was 828 pCi/g (average 442 pCi/g) and the maximum grams of U-235 in any single package was less than 50 grams (average 26 grams).

October 19, 1998

FOR: The Commissioners  
FROM: L. Joseph Callan /s/  
Executive Director for Operations  
SUBJECT: POST-DISPOSAL CRITICALITY RESEARCH

## PURPOSE:

To inform the Commission of the staff's assessment of whether to continue post-disposal criticality research at low-level waste (LLW) disposal facilities, and to obtain the Commission's direction on additional research.

## BACKGROUND:

This paper responds to the April 29, 1998, Staff Requirements Memorandum (SRM) concerning SECY-98-010, "Petition for Envirocare of Utah, Inc., to Possess SNM in Excess of Current Regulatory Limits" ([Attachment 1](#)). This SRM directed the staff to review the Oak Ridge National Laboratory (ORNL) report on post-disposal criticality at the Barnwell, South Carolina, disposal facility and to inform the Commission of its findings and recommendation on whether to continue post-disposal criticality research. The SRM also directed the staff to consult with the Advisory Committee on Nuclear Waste (ACNW) on generic issues.

As part of the staff's evaluation of the petition for rulemaking submitted by Envirocare of Utah, Inc. (Envirocare), staff performed a bounding analysis to evaluate the potential for special nuclear material (SNM) to migrate and reconfigure at LLW disposal facilities, resulting in an inadvertent criticality. As a result of this bounding analysis, the staff concluded that post-disposal criticality concerns could not be dismissed as a possibility. Given the uncertainties associated with the assumptions and scenarios evaluated, the staff determined that technical assistance was required to further evaluate the hydro-geochemical processes necessary to result in a post-disposal criticality. ORNL was contracted in 1995 to provide this technical assistance, using the Envirocare site as a model. Following the study at Envirocare, the staff concluded that a LLW disposal site, in a humid climate, using different disposal methods, should be evaluated to better determine the likelihood of post-disposal criticality at LLW disposal facilities. The Barnwell disposal facility was selected as a model for this additional study.

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In 1997, the staff identified the need for research in two areas of LLW criticality. The first research need was prompted by the Commission's direction in the SRM on SECY-96-268, "Final Rule to Amend [10 CFR Part 71](#) for Fissile Material Shipments and Exemptions" ([Attachment 2](#)). The revisions to Part 71 set limits on unusual moderators such as beryllium, when shipping fissile material. Babcock and Wilcox (B&W) identified this concern during shipment preparation of a waste product from the down-blending of weapon-usable fissile material that could result in nuclear criticality. The Commission directed staff to consider the criticality issues raised in SECY-96-268 in a broad context and to examine previously unanticipated fissile materials and moderators in other areas of the fuel cycle and waste programs. The second area of research was to develop a generic methodology to quantify the risk associated with post-disposal criticality. These two issues were consolidated, and a statement of work (SOW) was sent to ORNL. In response to the SOW, ORNL submitted a cost proposal on March 29, 1998. This research was placed on hold pending implementation of the Commission's direction in the SRM on SECY-98-010.

Consistent with the SRM on SECY-98-010, the staff briefed the ACNW on July 20, 1998. The presentation described the previous studies (i.e., ORNL's studies of Envirocare and Barnwell and the staff's work in support of the "Draft Environmental Impact Statement for the Shallow Land Disposal Area in Parks Township, PA"), and discussed the limitations of these studies in the context of the research requests. In response to this presentation, ACNW issued a letter dated July 30, 1998, concluding that significant research on post-disposal criticality was not warranted. The Committee stated that the studies contained elements of a risk assessment but lacked consistency of application in propagation of realistic uncertainties through the analytical model. It recommended performing a quantitative risk assessment on a specific site and that this assessment be externally peer-reviewed.

## DISCUSSION:

The staff's evaluations of the Envirocare, Barnwell, and Parks Township studies are discussed in [Attachment 3](#). This evaluation included performing additional hydrologic and geochemical evaluations for the Barnwell site to determine whether additional research should be conducted. A copy of the Barnwell study is included as [Attachment 4](#). As discussed in [Attachment 3](#), if the trench cover remains in place, under reasonably credible scenarios, a post-disposal criticality would be unlikely for 10,000 years. Staff also did an analysis conservatively assuming the trench cover is removed after 500 years, and found that criticality was unlikely for 1000 years. The consequences of a post-disposal criticality were not evaluated for the Barnwell site. Although the uncertainties associated with this likelihood estimate have not been completely quantified, the studies performed to date indicate that, while theoretically possible, post-disposal criticality is unlikely. Based on the additional work, staff concludes that additional research is not a high priority and that the uncertainty does not need to be precisely quantified. However, additional work could be performed if the Commission wishes to quantify this uncertainty.

[Attachment 5](#) is a differing professional view (DPV; as allowed under Management Directive (MD) 10.159) on the conclusions in this Commission Paper, submitted by a staff member on October 2, 1998. The staff will review the DPV in accordance with the procedures in MD 10.159.

With respect to the unusual moderator issue raised in SECY-96-268, the staff responded to the SRM on SECY-96-268 in a memorandum to the Commission, dated May 21, 1997. Staff concluded that the fuel cycle regulatory process is adequate to ensure public safety with respect to criticality issues of unanticipated moderators and fissile material. Staff proposed evaluating whether or not there is a need to restrict or provide constraints on the burial of unusual moderators in LLW facilities. As discussed above, the first research need noted that unusual moderators had not been considered in the previous post-disposal criticality studies. Staff recommended this research in order to reduce any residual uncertainty concerning the issue of unusual moderators in waste.

Unusual moderators as they pertain to emplacement LLW criticality have been evaluated in NUREG/CR-6284, "Criticality Safety Criteria for License Review of Low-Level Waste Facilities." This report states that mass of beryllium should be limited to five times the mass of uranium-235 (U-235) and the mass of carbon (graphite) should be limited to twenty times the mass of U-235. To gain a general sense of the presence of unusual moderators in LLW, staff contacted State officials, familiar with past disposal at LLW sites. Staff was informed that, during the past several years, large quantities of unusual moderators (beryllium and graphite) have not been disposed of at the Barnwell, Richland, and Clive sites, although the presence of such unusual moderators is not routinely noted on LLW manifests. This is consistent with staff's knowledge of LLW disposal practices. With the exception of B&W, staff is not aware of any significant sources of beryllium among facilities licensed by NRC. In addition, large sources of graphite would be more economically disposed of by incineration. Further, 10 CFR Part 71 limits the quantity of unusual moderators in fissile exempt shipments well below the limits identified in NUREG/CR-6284. Even if significant quantities of unusual moderators were present in LLW, it is unlikely that they would be commingled with SNM to create a critical array.

Staff concludes that significant sources of unusual moderators are not present at LLW facilities. In addition, in response to the SRM on SECY-98-010, staff is preparing guidance on emplacement criticality and will emphasize the need to limit significant quantities of unusual moderators in LLW disposal units, which is consistent with existing practices.

#### Options:

The staff has identified the following three options on post-disposal criticality research. If option 1 or 2 is selected, staff would not continue with further evaluation of unusual moderators. For the reasons cited above, staff considers that research on unusual moderators in LLW disposal independent of research on post-disposal criticality is not warranted. If option 3 is selected, unusual moderators would be included as part of the generic methodology.

1. **Cease further review of post-disposal criticality.** Existing studies indicate that long-time frames would be required to reconfigure the SNM into a critical mass. Monitoring of wells and sumps at disposal facilities, as suggested by ORNL, could mitigate any remaining concerns by providing early warning of any sign of reconcentration in the trenches. However, signs of problematic conditions, if they occur, would be expected to take hundreds of years to appear and reliance on long-term monitoring is not consistent with the institutional control provisions in 10 CFR 61.59.

The principal advantage of this option is that no additional resources are required. Option 1 does not provide a comprehensive basis for concluding that post-disposal criticality poses no significant health and safety concern, because the uncertainties have not been fully quantified. Staff's analyses suggest that the likelihood that criticality will occur is very low over thousands of years.

2. **Conduct a limited-scope study to reasonably quantify the associated risk.** This is the approach recommended by the ACNW. To implement this approach, staff would request technical assistance to evaluate an additional two to three trenches at the Barnwell site, using a two-dimensional or three-dimensional flow and transport computer code to model radionuclide transport under variably saturated conditions. Probability density functions would be established for key model parameters to evaluate the uncertainty. A probabilistic approach would be used to calculate the maximum U-235 accumulation and quantify the likelihood of occurrence. The consequences for any potential criticalities would then be determined. The risk would be obtained by multiplying the likelihood times the estimated consequences. If this option is selected, staff would brief the ACNW on this scope and obtain the Committee's input before proceeding with the technical assistance.

The principal advantage of this option is that it may reasonably quantify the risk of a post-disposal criticality with fewer resources than option 3. The results from this effort might provide the staff with a firmer basis for concluding that post-disposal criticality is not a significant concern. However, this option would not develop a generic methodology that could be used to evaluate other sites.

3. **Develop a generic methodology.** This option would develop a methodology, to quantify risk from a post-disposal criticality, that could be used by existing and future LLW disposal facilities. This option would include consideration of unusual moderators in LLW disposal.

The principal advantage of this option is that it produces a tool which could be used in the future to quantify the risk associated with post-disposal criticality. However, expending the resources to complete this option may not be warranted, considering the perceived small risk.

#### RESOURCES:

Option 1 would not require any resources. The staff estimates that the cost to complete option 2 is approximately \$250K in contractor support and approximately 0.3 full-time equivalent (FTE). The staff estimates that the costs to complete option 3 is approximately \$400K in contractor support and approximately 0.5 FTE. Resources to conduct the activities described in these options are currently not included in the FY 1999-2000 budget for the Office of Nuclear Regulatory Research or the Office of Nuclear Material Safety and Safeguards. If option 2 or option 3 is chosen, resources will be reviewed during the next budget cycle.

#### RECOMMENDATIONS:

Considering the current staff workload, budget constraints, and the apparent low likelihood of reconcentration and criticality, the staff considers that

additional technical assistance and/or research is of low priority, and therefore, recommends option 1, cease further review of post-disposal criticality. The staff considers this option to be consistent with the memorandum from the Chairman to the Executive Director for Operations, dated August 7, 1998, which instructed staff to prioritize areas and increase the threshold for commencing new initiatives.

COORDINATION:

The Office of the General Counsel has reviewed this Commission Paper and has no legal objections. The Office of the Chief Financial Officer has reviewed this paper for resource implications and also has no objections.

L. Joseph Callan  
Executive Director for Operations

Attachments: As stated

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ATTACHMENT 1

**SRM on SECY-98-010**

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ATTACHMENT 2

**SRM on SECY-96-268**

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ATTACHMENT 3

**DWM STAFF EVALUATION OF PREVIOUS  
POST-DISPOSAL CRITICALITY STUDIES**

- [A. INTRODUCTION](#)
- [B. SUMMARY OF STAFF ANALYSES FOR PARKS TOWNSHIP](#)
- [C. SUMMARY OF ORNL ANALYSES OF ENVIROCARE AND BARNWELL](#)
- [D. CONCLUSIONS](#)
- [References](#)

A. INTRODUCTION

The U.S. Nuclear Regulatory Commission has evaluated three low-level waste (LLW) and decommissioning sites for post-disposal criticality: (1) Parks Township, Pennsylvania; (2) Envirocare, Utah; and (3) Barnwell, South Carolina. NRC staff evaluated the Parks Township site with some assistance from Oak Ridge National Laboratory (ORNL). ORNL evaluated the Envirocare and Barnwell sites with some assistance from the staff. These three sites have several attributes in common:

1. They disposed of uranium, including depleted uranium (DU) and special nuclear material (SNM) in the form of enriched uranium.
2. There may be sufficient inventory and enrichments of uranium to lead to a theoretical criticality under ideal circumstances.
3. The enriched uranium was widely dispersed with soil or other wastes and often with much-larger quantities of DU or natural uranium.

B. SUMMARY OF STAFF ANALYSES FOR PARKS TOWNSHIP

The Parks Township Shallow Land Disposal Area received waste, including SNM from the Apollo plant (NRC, 1997). The staff analyzed the potential mechanisms of SNM migration from a dispersed state to a concentrated state, with favorable geometry and water content that could lead to criticality. The criticality calculations assumed uranium with an enrichment of 20 percent. The analyses were limited to 15,000 years, judged to be the maximum time that the trenches would remain intact before erosional forces would disperse their contents. A critical configuration would require the migration of uranium from a highly dispersed state to a concentrated state. Vertical migration of uranium would not lead to criticality. Focused flow toward a hypothetical drain with capture of virtually all uranium would be required to accumulate a potential critical mass. However, the staff concluded that the accumulation of a critical mass within a single trench would require a highly efficient concentration mechanism to operate at the expense of other, more likely redistribution processes. Using the available data, the analyses indicated that there was reasonable assurance, making allowances for the time period and uncertainties involved, that the potential for a critical mass to form was so unlikely that criticality need not be considered further. It should be noted that the SNM inventory at the Parks Township site is significantly less than at LLW disposal sites.

C. SUMMARY OF ORNL ANALYSES OF ENVIROCARE AND BARNWELL

The Envirocare study examined mobilization, migration, and concentration of uranium initially dispersed in soil, using geochemical transport models (ORNL, 1997). This study considered the two concentration processes: (1) sorption onto materials such as iron oxide; and (2) precipitation in a chemically reducing zone. The analyses demonstrated that nuclear criticality could occur under certain unlikely conditions by vertical reconcentration of the uranium to a thinner layer at the bottom of the disposal cell, by the process of chemical reduction and precipitation. Sorption processes alone did not lead to any critical conditions for the cases studied. This study assumed that the source was 100 percent enriched uranium at the maximum allowable concentration specified in the State of Utah's license. These conditions do not exist at the Envirocare site, and the actual conditions are much less

conductive to nuclear criticality. The estimated average enrichment of the inventory through 1993 is only 0.42 percent, which is less than natural uranium and the theoretical minimum enrichment necessary for criticality in a water-moderated system.

The Barnwell study examined precipitation of uranium in reducing zones postulated to be caused by decaying organic material such as wood and cardboard, and corroding iron such as steel drums. However, the study noted that reducing zones would require saturated conditions, which do not presently exist in the trenches at the site (ORNL, 1998). This analysis assumed that the uranium was enriched to either 10 percent or 100 percent and initially in containers. Unlike the Envirocare evaluation, the Barnwell study considered both vertical migration of uranium to the bottom of the trench, and then horizontal transport, within the trench, to form a critical geometry of reconcentrated material.

The Barnwell study concluded that the minimum concentration of uranium-235 (U-235) to produce a criticality was 1.6 times greater for 10 percent enrichment than for 100 percent enrichment. Below 10 percent enrichment, significantly greater concentrations of U-235 are required. Assuming the formation of reducing zones under saturated conditions (limiting oxygen in the system), reducing zones may be effective in precipitating uranium and appear to be stable even with the influx of oxidizing water. However, to date, the formation of reducing zones is hypothetical and has not been observed at Barnwell. For the conditions assumed in the Barnwell report, approximately 10,000 years would be required to mobilize and reconfigure the uranium. Based on actual uranium areal density of the disposal trenches, horizontal flow would be required to increase the areal density to pose a criticality concern.

ORNL suggests monitoring the sumps at the site for uranium, iron, and organics. If uranium is detected, its enrichment should be determined, and the redox condition should be evaluated by determining the speciation of iron. ORNL notes that placing caps over the trenches will limit infiltration and promote oxidizing conditions. Commingling SNM and source material (natural and depleted uranium) will reduce the average enrichment and thus reduce the concern of post-disposal criticality. Chem-Nuclear LLC, operator of the Barnwell facility, has been constructing caps over the waste trenches as part of the tritium migration mitigation.

#### 1. Simplifying assumptions and uncertainties

Some of the simplifying assumptions used in the Envirocare and Barnwell analyses included: (1) uniform uranium distribution in waste; (2) one-dimensional flow; (3) saturated conditions; (4) stable reducing zones; and (5) U-235 and U-238 mobilized uniformly. The reports concluded that criticality might be possible under certain unlikely conditions, and long-time frames would be required. Assuming average enrichment and areal density, post-disposal criticality does not appear to be likely at the Envirocare and Barnwell facilities.

One key uncertainty with the ORNL studies is the assumption that the enrichment and U-235 concentration are homogeneous throughout the trench. For trenches 1 to 36, only the quantities of enriched uranium were reported, so it was conservatively assumed in the criticality evaluations that the inventories were 100 percent enriched in U-235. Trenches 37 and above reported both SNM and source material. These records clearly show that large amounts of source material are commingled with the SNM in most trenches, or, in one case, that the amount of disposed SNM was very small. In the Barnwell study, one of the older trenches, for which only SNM was reported, (trench 23) was identified as being of possible concern because of its high mass of U-235. To resolve this concern, the staff obtained trench loading records from the State of South Carolina. ORNL analyzed these records and concluded that there is three orders of magnitude more source material than SNM, and that the materials are commingled sufficiently that the assumption of uniform enrichment is reasonable. However, other trenches might contain localized areas of concentrated and enriched uranium that could pose a potential concern. Localized concentrations of SNM in areas relatively free of source material could lead to accumulation of a critical mass in shorter time frames if there is "funneling" or convergence of flow to a central location; immobilization mechanisms for uranium that worked efficiently; and configuration of the accumulated mass that had favorable neutronic properties. The staff cannot completely rule out this possibility without evaluating detailed disposal records, such as was done for trench 23.

Another area of uncertainty that may be mitigative is that the studies did not consider the effects of kinetics of sorption and redox reactions. Some research suggests that precipitation of uranium does not occur readily at low temperature (Meunier, et. al, 1990; Duff, et. al, 1997). Further, the ORNL studies assumed reducing conditions would exist and be stable for time frames necessary to reconcentrate the SNM, which has not been demonstrated, and in fact is contraindicated in most landfills (e.g., Greenfield, et. al, 1990). Other assumptions that were not considered and could affect the time required to reconcentrate SNM include: (1) transient infiltration and concentrated flow conditions; (2) variable container weathering; and (3) combination or competition of various geochemical processes.

#### 2. Additional analyses at Barnwell

Staff conducted additional analyses for the Barnwell site to determine whether the Agency needs additional research and technical assistance regarding criticality at LLW disposal and decommissioning sites. The staff performed a computer modeling study of flow in the trench under the influence of infiltration at the surface, with and without the soil cap in place. To simulate moisture movement in a typical Barnwell trench, the staff used a two-dimensional, variably saturated flow code (Celia, 1990). The trench was assumed to be 23 meters wide, six meters deep on one side and sloping to seven meters deep on the other side. A one meter deep French drain was modeled on the bottom of the lower side of the trench. The water table was assumed to be five meters below the trench bottom. Recharge in the native soil around the trench was treated as a steady state, constant flux boundary equal to  $1.2 \times 10^{-6}$  cm/s along the top of the model.

The condition of a failed soil cap was treated as a constant flux boundary equal to  $3.8 \times 10^{-6}$  cm/s to conservatively represent no cover over the trench. The staff used a value of hydraulic conductivity in the clayey sand of  $10^{-5}$  cm/s. The modeling exercise with the missing cap showed that a moisture front reaches the trench bottom within the first year. There appears to be some lateral flow into the French drain, but no ponding there because water exfiltrates faster than it can accumulate.

Staff attempted to model moisture movement, assuming a lower hydraulic conductivity of  $1.4 \times 10^{-7}$  cm/s for the clayey sand, but was unable to obtain convergence with the computer code. The staff believes that the higher values are more reasonably applied to the trench-scale model than the lower reported values, which were derived from small core samples. The higher value of hydraulic conductivity is also consistent with a number of field-scale studies at and near the site.

The staff also performed additional analyses using HELP (Schroader et. al, 1988), a quasi-two dimensional water routing code for analyzing water movement in covers. The staff simulated the as-built trench, and concluded that infiltrating water would flow mostly in the vertical direction, with very little diversion ( $0.3 \text{ m}^3/\text{yr}$ ) from the trench to the French drain. The staff's analysis also showed that assuming no soil cap results in a small amount of lateral drainage to the French drain (roughly  $5 \text{ m}^3/\text{year}$  on average). This analysis also showed that the maximum head on the clayey sand layer would be about 0.15 m, and the peak flow to the French drain would be  $2 \text{ m}^3/\text{d}$ , leading to the conclusion that there would be little if any ponding within the trench. These analyses show that with a soil cap on the trench, the time needed to accumulate a sufficient mass of U-235 is on the order of 10,000 years, as predicted by ORNL. Staff also did an analysis in which it conservatively assumed that the trench cap was removed at 500 years and determined that at least another 500 years would be needed to reconfigure the SNM to form a critical mass. These time estimates assume that the reconfigured uranium has an enrichment of 10 percent. However, disposal records indicate that the average enrichment is significantly lower, and in most cases, below the minimum 1 percent enrichment needed to produce a criticality. Therefore, longer timeframes would be required if the enrichment was between one and ten percent. Moreover, there are additional reasons, which are discussed below, why post-disposal criticality is not likely.

Because it had been assumed that reducing conditions would be required to precipitate uranium, the staff also performed additional geochemical calculations, using PHREEQC (Parkhurst, 1995), to determine if uranium could be reconcentrated under oxidizing conditions (i.e., the conditions expected to exist in the Barnwell trenches). The staff modeled the exposure of urananite to water under oxidizing conditions. Such exposure resulted in the conversion of urananite to schoepite (another species of uranium oxide). This solution in a medium containing silica (i.e., sand such as exists in the Barnwell trenches) resulted in the precipitation of soddyite (another species of uranium oxide). The uranium concentration in the solution was significantly decreased, thus immobilizing most of the uranium in solid form. Based on this analysis, the staff concludes that reducing conditions are not required to precipitate uranium. However, the kinetics of these reactions are currently unknown, and so the efficiency of the analyzed mechanism under oxidizing conditions is uncertain.

In summary, there are several lines of reasoning why the staff believes criticality at Barnwell is not likely:

- Actual areal densities of uranium in the trenches requires horizontal flow to accumulate sufficient mass of uranium to form a criticality. With the cover intact, virtually all flow will be vertical in the unsaturated zone, with little if any flow to the French drain. With the cover removed, most flow would still be vertical, but there would be greater diversion, up to  $5 \text{ m}^3/\text{year}$ , to the French drain. There would not likely be any accumulation in the French drain, however, because water would exfiltrate through the clayey sand as fast as it infiltrated.
- Long-term ponding of water to form stable reducing conditions does not appear likely. Because the French drain will be above the water table and generally well-drained, even with the soil cap removed, the environment should be oxidizing, thereby promoting the rapid decay of organic matter. Being near the bottom of the trench, there would be no likely avenues for organic material from the surface (e.g., dead leaves) to accumulate. Even with the cover in place, the sampled groundwater in the trenches is moderately oxidizing.
- Some scientific evidence in the literature indicates that urananite does not form quickly or easily at low temperatures, even in highly reducing zones (e.g., Meunier, 1990; Duff, 1997). However, precipitation of uranium in oxidizing conditions is possible (e.g., Hemingway 1982, Moll et. al, 1996, and Nguyen et. al, 1992). Even if it can be assumed that precipitation of uranium occurs in oxidizing conditions, the uranium would become essentially immobile in the drainage sand layer, and increased concentration of uranium due to horizontal flow would not occur.
- The average enrichment of the uranium in the trenches is likely to be low. Trenches for which the inventories of SNM and source material were reported generally had low average enrichments or very small inventories of SNM. There remains uncertainty about the average enrichment in the older trenches, for which only SNM quantities were reported. However, one of those trenches, trench 23, had less than 0.3 percent average enrichment when monthly disposal records were inspected. Although there might be local pockets of higher enrichment in any of the trenches, the scenario that depends on migration of uranium from a large area to the French drain would also homogenize the enrichments to a uniformly lower level.

#### D. CONCLUSIONS

The NRC staff and its contractors have completed three evaluations of potential in-ground criticality at LLW disposal and decommissioning sites where enriched uranium was disposed. Although the uncertainties have not been fully quantified, these studies conclude that post-disposal criticality, while theoretically possible, is remote or unlikely.

#### REFERENCES

Celia, M. Personal communication, 1990.

Duff, M.C., C. Amrhein, P. Bertsch and D. Hunter, 1997, "The chemistry of uranium in evaporation pond sediment in the San Joaquin Valley, California, USA using X-ray fluorescence and XANES techniques", *Geochimica et Cosmochimica Acta*, Vol 61, no 1, pp 73-81, 1997.

Greenfield, B.F., A. Fosevear, and S.J. Williams, "Review of the microbiological, chemical and radiolytic degradation of organic material likely to be present in intermediate level and low-level radioactive wastes", DOE/HMIP/RR/91/002, Department of Environment, HMIP, England, June 31, 1990.

Hemingway, B.S., 1982, Thermodynamic properties of selected uranium compounds at 298.15 K and 1 bar and at higher temperatures--Preliminary models for the origin of coffinite deposits, USGS Open-File Report 82-619.

Meunier, J.D., P. Landais, and M. Pagel, 1990, "Experimental evidence of uraninite formation from diagenesis of uranium-rich organic matter", *Geochimica et Cosmochimica Acta*, Vol 54, pp 809-817, 1990.

Moll, H., Geipel, G., Matz, W., Bernhard, G., and H. Nitsche, 1996, Solubility and speciation of  $(\text{UO}_2)_2\text{SiO}_4 \cdot 2\text{H}_2\text{O}$  in aqueous systems, *Radiochimica Acta*, Vol. 74, pp 3-7.

Nguyen, S.N., Silva, R.J., Weed, H.C., and J.E. Andrews Jr., 1992, Standard Gibbs free energies of formation at the temperature 303.15 K of four uranyl silicates: soddyite, uranophane, sodium boltwoodite, and sodium weeksite, *J. Chem. Thermodynamics*, Vol. 24, pp 359-376.

NRC, 1997, "Draft Environmental Impact Statement Decommissioning of the Babcock & Wilcox Shallow Land Disposal Area in Parks Township SLDA," NUREG-1613 (withdrawn 1997).

ORNL 1997, "The potential for criticality following disposal of uranium at low-level waste facilities - Uranium blended in soil", NUREG/CR-6505, Vol.1, June 1997.

ORNL 1998, "The potential for criticality following disposal of uranium at low-level waste facilities - Vol. 2: Containerized waste", NUREG/CR-6505, Vol. 2, September 1998.

Parkhurst, D.L., 1995, User's guide to PHREEQC-A computer program for speciation, reaction-path, advective-transport, and inverse geochemical calculations, USGS Water Resources Investigation Report 95-4227.

Schroader, P.R., R.L. Peyton, B.M. McEnroe, and J.W. Sjostrom, 1988, "The Hydrologic Evaluation of Landfill Performance (HELP) Model - User's Guide for Version 2," Vol. 3, U.S. Army Engineer Waterway Experiment Station, October 1988.

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ATTACHMENT 4

**NUREG/CR-6505, Vol. 2,  
"THE POTENTIAL FOR CRITICALITY FOLLOWING  
DISPOSAL OF URANIUM AT LOW-LEVEL  
WASTE FACILITIES"**

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ATTACHMENT 5

**DIFFERING PROFESSIONAL VIEW**