WASTE MANAGEMENT AND RADIATION CONTROL BOARD
Executive Summary
EVALUATION OF CLOSURE, POST-CLOSURE, AND PERPETUAL CARE AND MAINTENANCE FOR COMMERICAL HAZARDOUS WASTE AND RADIOACTIVE WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES
August 15, 2016

What is the issue before the Board?	This is a draft report prepared for the Board by URS Corporation (AECOM) of its evaluation of the adequacy of financial assurance for closure, post-closure care and perpetual care and maintenance for commercial hazardous waste and radioactive waste treatment, storage and disposal facilities. This report is required by statute and must be submitted to the Legislative Management Committee by October 1, 2016. The statute requires a report every five years. The draft report was initially provided to the Board during the July Board Meeting. Two board members have commented on the draft report. These comments and the Division's response to the comments can be accessed electronically. (See link in the Board packet).
What is the historical background or context for this issue?	During the 2005 legislative general session, the Utah Legislature passed Senate Bill 24, which required, among other things, a study to evaluate the adequacy of the funding for closure, post-closure and perpetual care for commercial hazardous waste and radioactive waste treatment, storage and disposal facilities. In addition, the Legislature directed an evaluation of the need for funding for catastrophic failure of a landfill cell, ground water corrective action or major maintenance of a landfill cell.
What is the governing statutory or regulatory citation?	§19-1-307 of the Utah Code Annotated requires the Waste Management and Radiation Control Board to prepare the referenced report for the Legislative Management Committee.
Is Board action required?	Yes. The Board's approval is needed prior to submittal to the Legislative Management Committee.
What is the Division Director's recommendation?	The Director recommends approval of the report.
Where can more information be obtained?	For technical information, please contact Rusty Lundberg, Don Verbica, Deborah Ng or Scott Anderson at (801) 536-0200. For legal information, please contact Raymond Wixom at (801) 536-0213.

COMMENTS FROM

BOARD MEMBER

VERN ROGERS

DRAFT REPORT
July 2016

Link to:
Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Committee Radioactive Waste Treatment, Storage, and Disposal Facilities"

EVALUATION OF CLOSURE, POST-CLOSURE, AND PERPETUAL CARE AND MAINTENANCE FOR COMMERCIAL HAZARDOUS WASTE AND COMMERCIAL RADIOACTIVE WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

March 2016

Revised July 2016

Prepared for
Utah Division of Waste Management and Radiation Control
Utah Department of Environmental Quality

by

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Comment [VR1]: As a general comment, the language and approach between hazardous waste facilities and radioactive waste facilities seems dramatically different (even though many of their characteristics are the same). A uniform approach should be taken for all facilities.

Comment [VR2]: While I agree that this was prepared for the Division. Statute requires it to be prepared for the Board. As such, the board should have prepared the scope of work and had interactions with any contractor from the initial commissioning of this study.

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TABLES

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FIGURES

Figure **Page**

LIST OF ACRONYMS AND INITIALISMS

ALARA	As low as is reasonably achievable
LLRW	Low-level radioactive waste
mrem	millirem; 0.001 of a "roentgen equivalent man"
NAC	Nevada Administrative Code
NYSDEC	New York State Department of Environmental Conservation
OAC	Oklahoma Administrative Code
OIG	Office of Inspector General
URCB	Utah Radiation Control Board
SCCR	South Carolina Code of Regulations
UAC	Utah Administrative Code
UCA	Utah Code Annotated
UDRC	Utah Division of Radiation Control
UDSHW	Utah Division of Solid and Hazardous Waste
UDWMRC	Utah Division of Waste Management and Radiation Control
USHWCB	Utah Solid and Hazardous Waste Control Board
US DOE	United State Department of Energy
US EPA	United States Environmental Protection Agency
UWMRCB	Utah Waste Management and Radiation Control Board

EXECUTIVE SUMMARY

The report has been prepared as an update to the report of the same name dated September 2011 previously prepared by URS Professional Solutions, LLC (URS-PS), an AECOM affiliate. Under direction of the Utah Division of Waste Management and Radiation Control, a~~A~~ppropriate updates and revisions have been made to sections of this report to reflect: ~~(1) information that has become available for commercial hazardous waste management and low level radioactive waste (LLRW) management facilities in other states that are similar in nature to those commercial hazardous waste management and LLRW management facilities permitted or licensed in Utah;~~ (~~2~~1) new information for the commercial hazardous waste management and LLRW management facilities in Utah available after September 2011; ~~(3) proposed changes in regulatory requirements in Utah that could impact assessment of the adequacy financial sureties that are provided for these Utah facilities; and (4) significant organizational changes instituted by statutory amendments.~~ A summary of findings from the compilation and review of the above new information and proposed regulatory changes is presented below. Details and findings from review of the updated information ~~and of the proposed regulatory changes~~ are presented and discussed in applicable sections of this updated report.

Comment [VR3]: This is out of scope. Not required by UCA § 19-1-307.

Comment [VR4]: This is out of scope. Not required by UCA § 19-1-307.

COMMERCIAL HAZARDOUS WASTE MANAGEMENT FACILITIES

Financial Assurances for Commercial Hazardous Waste Management Facilities

- ✓ The amount of financial assurance required and provided for closure and post-closure care of commercial hazardous waste treatment, storage, and disposal facilities under UCA § 19-6-108 are judged to be adequate at current levels and with current rules, controls, and practices.
- ✓ No financial assurance or funds are currently required by rule, and are therefore not provided for the perpetual care of, maintenance of, or corrective actions at commercial hazardous waste land disposal facilities should the need arise following the post-closure periods. The Division ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements.

Commercial Hazardous Waste Treatment, Storage, and Disposal Facilities

Commercial hazardous waste management facilities[1] permitted in Utah and the financial assurances they presently provide are summarized in Table ES-1.

[1] Commercial hazardous waste treatment, storage, and disposal facility means a facility that receives, for profit, hazardous waste for treatment, storage, or disposal. Numerous noncommercial hazardous waste management facilities exist in Utah but are not addressed in this report.

Table ES-1. Financial assurances presently provided by commercial hazardous waste management facility Owners/Permittees in Utah

Facility	~~Closure Financial Assurance Mechanism~~	Closure Financial Assurance Provided	~~Post-Closure Financial Assurance Mechanism~~	Post-Closure Financial Assurance Provided
Clean Harbors Grassy Mountain	~~Insurance~~	$21.3 million	~~Insurance~~	$15.6 million
Energy*Solutions* Mixed Waste Facility[2]	~~Surety Bond and Standby Trust~~	$12 million	~~Surety Bond and Standby Trust~~	$2 million
Clean Harbors Aragonite[3]	~~Insurance~~	$13.4 million	~~Not Applicable~~	Not Applicable
Clean Harbors Clive[3]	~~Insurance~~	$8.9 million	~~Not Applicable~~	Not Applicable
Safety-Kleen Pioneer Road[3]	~~Insurance~~	$0.2 million	~~Not Applicable~~	Not Applicable
Nexeo Solutions[3]	~~Funded Trust~~	$0.4 million	~~Not Applicable~~	Not Applicable

Comment [VR5]: This is out of scope. Not required by UCA § 19-1-307.

Comment [VR6]: This is out of scope. Not required by UCA § 19-1-307.

Comment [VR7]: A footnote as to why "Not Applicable" for last four permittees should be included in this table.

Need for Legal/Regulatory Revisions for Commercial Hazardous Waste Land Disposal Facilities

Under the direction of the Division of Waste Management and Radiation Control, AECom ~~The Utah Waste Management and Radiation Control Board (UWMRCB)~~ has identified the following areas in which it suggests the Utah Waste Management and Radiation Control Board (UWMRCB) support improvements might be made to address the issue of perpetual care at closed commercial hazardous waste disposal facilities:

- ✓ The ~~UWMRCB~~ Division recommends that a perpetual care fund be created and funded to provide for ongoing monitoring and maintenance of commercial hazardous waste land disposal facilities after termination of the post-closure permit. UWMRCB does not concur. The Division already ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements.
- ✓ The ~~UWMRCB~~ Division recommends that the creation of any such fund should take into account the financial impact on current facilities. UWMRCB concurs.

Comment [VR8]: These were not identified by the Board nor are they being suggested by the Board.

Statute directs that an evaluation be made if funds are aqequate. Further speculation is out of scope. Not required by UCA § 19-1-307.

[2] Permitted in connection with Utah Hazardous Waste Permit UTD982598898.

[3] Commercial hazardous waste treatment and/or storage facility. No waste remains following closure.

- ✓ Since protection against these events has already been addressed in design requirements, t~~T~~he ~~UWMRCB~~ Division recommends that additional funds not be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial hazardous waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells to current regulatory standards. All phases of landfill construction are reviewed, monitored, and approved by the Director. The design and construction of landfill cells provide reasonable assurance that wastes are contained as a means to prevent additional Superfund sites. Other factors include the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Industries Corridor, which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities. More details are provided in the discussion under Question 2-20 in this report. UWMRCB concurs.

Comment [VR9]: All of these same conditions equally apply to rad facilities at Clive and support a recommendation that no additional funds be required.

COMMERCIAL RADIOACTIVE WASTE MANAGEMENT FACILITIES

Financial Assurances for Commercial Radioactive Waste Management Facilities

- ✓ The amounts of financial assurance required, provided, and currently approved for closure and institutional control of commercial radioactive waste disposal facilities are judged to be adequate at current levels and with current rules, controls, and practices. UWMRCB concurs.

Comment [VR10]: Independent of AEcom, I think it important to note the UDEQ already conducts an annual evaluation of the adequacy of the closure and post-closure funds.

- ✓ No financial assurance or funds are currently required by US Nuclear Regulatory Commission rule, and are therefore not provided for the perpetual care of, maintenance of, or corrective actions at commercial hazardous waste land disposal facilities should the need arise following the post-closure periods. UWMRBC concurs.

Comment [VR11]: If treated equivalent to Hazardous waste facilities in this report, this statement should be included (see the same statement on page xi.

- ✓ The current ~~future~~ value of the Radioactive Waste Perpetual Care and Maintenance Fund is funded at $13 million dollars. ~~at the end of 100 years of the institutional control period is projected to be $93 million, assuming that the Energy*Solutions* facilities continue active operations for at least 20 more years, that such funds are invested to produce a minimum assumed 2 percent per year real return, and that no monies are paid out from the Fund prior to the end of the 100-year institutional control period. The actual current interest rate for the perpetual care fund for the Energy*Solutions* Clive facility is averaging just below 1 percent (UDWMRC 2016a). For increased conservatism for long-range planning, the Director recommends a similar calculation included in Section 3.14 of this report for estimating the future value for the Radioactive Waste Perpetual Care and Maintenance Fund assuming a minimum 1 percent per year real return on investment.~~ The Division already ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements. UWMRCB concurs

Comment [VR12]: Inapplicable reference.

- ✓ Since protection against these events has already been addressed in design requirements, the Division recommends that additional funds not be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial radioactive waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells to current regulatory standards. All

phases of landfill construction are reviewed, monitored, and approved by the Director. The design and construction of landfill cells provide reasonable assurance that wastes are contained. Other factors include the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Industries Corridor, which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities. UWMRCB concurs.

~~✓~~

~~✓ Based on the current calculation and assumptions described in this report, the bounds of estimated probable costs (or financial risk) for unplanned or unexpected events above the minimal maintenance and monitoring for reasonable risks that may occur following closure of a commercial radioactive waste treatment or disposal facility could range from $1 million to $60 million. The financial risk ranges most probably between $5 and $32 million, and the Radioactive Waste Perpetual Care and Maintenance Account as established by UCA §19-3-106.2 is judged to be adequately funded at current levels and with current rules, controls, and practices. However if the actual return is closer to 1 percent then a risk of $32 million would almost completely deplete the account.~~

✓

Comment [VR13]: Copied from hazardous waste recommendation – as the arguments apply equally to rad facilities.

Comment [VR14]: As with hazardous waste facilities, unexpected events are incorporated into the design and operational quality control.

Radioactive Waste Disposal Facilities

Low-level radioactive waste (LLRW) management facilities licensed in Utah and the financial assurances presently provided are summarized in Table ES-2.

Table ES-2. Financial assurances presently provided by commercial radioactive waste management facility Owners/Licensees in Utah

Facility	~~Closure Financial Assurance Mechanism~~	Closure Financial Assurance Provided	~~Institutional Control Financial Assurance Mechanism~~	Institutional Control Financial Assurance Provided
Energy*Solutions*; LLRW Facility	~~Surety Bond~~	$58.5 million[4]	~~Surety Bond~~	$6.2 million
Energy*Solutions* Mixed Waste Facility	~~Surety Bond~~	$12 million	~~Not Applicable~~	Covered Under Post-Closure
Energy*Solutions*; 11e.(2) Facility	~~Surety Bond~~	$11.8 million	~~US DOE Long-Term Stewardship Program[5]~~	$0.9 million

Comment [VR15]: This is out of scope. Not required by UCA § 19-1-307.

Comment [VR16]: This is out of scope. Not required by UCA § 19-1-307.

[4] Closure and Institutional Control Financial Assurances total $64,681,299 as of March 2015.

Need for Legal/Regulatory Revisions for Commercial Radioactive Waste Management Facilities

The ~~UWMRCB~~ Division recognizes the following:

- ✓ The Radioactive Waste Perpetual Care and Maintenance Fund was established by the Legislature to finance the perpetual care and maintenance of commercial LLRW disposal facilities at the conclusion of the institutional care period and to protect against the possibility of funding shortfall during the institutional control period. Annual payments of $400,000 are required by state law to be paid into this fund. The Division ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements. UWMRCB concurs.

- ✓ US Nuclear Regulatory Commission defines "Class A waste" as waste who's risk to environment and human health generally decays to negligible levels within 100 years (within the Institutional Control Period). While not required by US Nuclear Regulatory Commission rule, EnergySolutions agreed to support the perpetual care fund statute at the time their Class B and C license was nearing approval by the State of Utah. US Nuclear Regulatory Commission defines Class B waste as that whose risk becomes negligible with 300 years and Class C waste as that whose risk becomes negligible in 500 years. Since EnergySolutions can only dispose of Class A waste, there is no technical justification for funds beyond institutional control. While Hazardous waste facilities require a post-closure period of 30 years, their hazardous nature does not change in time beyond that. Conversely, radioactivity – by its very nature – goes away in time. UWMRCB concurs.

- ~~✓ Based on information provided in this report, a minimum amount of $13 million has been established in order for the fund to meet the intended obligations for perpetual care and maintenance. However, if only a 1 percent return on investment is realized the minimum amount would need to be increased to meet the intended obligations for perpetual care and maintenance.~~

- ✓ Since 2008, Energy*Solutions* has set aside the balance of ~~the targeted minimum amount of~~ $13 million utilizing the surety required for financial assurance for closure and institutional care. As the annual payment of $400,000 is made to the perpetual care fund, an equivalent reduction is made to the overall obligation of the liability for closure, institutional care, and perpetual care. UWMRCB concurs.

~~Therefore, the UWMRCB recommends the following:~~

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Comment [VR17]: Speculative and beyond scope required by UCA § 19-1-307

~~[5] Under provisions of the Nuclear Waste Policy Act of 1982, the US Department of Energy (DOE) must by law provide long-term care of 11e.(2) facilities that have been closed and stabilized in compliance with US Nuclear Regulatory Commission requirements. An additional condition of accepting such facilities is that funds sufficient to cover all long-term care costs must be transferred to the US DOE. Accordingly, one disposal unit is subject to being transferred to DOE's care under these provisions: Energy*Solutions* 11e.(2) embankment at Clive, Utah. The Vitro embankment has already been transferred to the Department of Energy.~~

- ✓ ~~The Legislature should consider the ambiguities created by the present exemptions from the land ownership requirements of Utah rules, as they relate to long-term responsibility for monitoring and maintaining the closed and stabilized facility.~~
- ✓ ~~The Legislature should evaluate the existing funding approach for the Radioactive Waste Perpetual Care and Maintenance Account.~~

Comment [VR18]: Out of scope of the review required by 19-1-307.

Comment [VR19]: No equivalent recommendations are included for hazardous waste sites. Criterion cited for not needing these recommendations for hazardous waste sites apply equally to rad licensee.

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1. OVERVIEW

1.1 LEGISLATIVE DIRECTIVE

The Utah Legislature stipulated by Utah Senate Bill 24, dated February 1, 2005 and signed February 25, 2005 that the Utah Solid and Hazardous Waste Control Board (USHWCB) and the Utah Radiation Control Board (URCB), now combined to form the Utah Waste Management and Radiation Control Board (UWMRCB), prepare and submit a report evaluating adequacy of funding and financial assurances provided for the closure, post-closure, and perpetual care and maintenance of hazardous waste and radioactive waste treatment, storage, and disposal facilities. The law was amended in 2010 and 2015 and is reproduced in this update as Appendix A.

For commercial hazardous waste management facilities and prior to July 2015, UCA §19-1-307 required the USHWCB, and as of July 2015 the UWMRCB, to address the following questions every five years:

- ✓ Are adequate financial assurances or funds required for closure and post-closure care of [commercial] hazardous waste treatment, storage, or disposal facilities under 40 CFR 264.140 through 264.151?
- ✓ Are adequate financial assurances or funds required for perpetual care and maintenance following the closure and post-closure period of a commercial hazardous waste treatment, storage, or disposal facility, if found necessary following the evaluation under Subsection (1)(c) of UCA §19-1-307?
- ✓ What costs (above minimal maintenance and monitoring) for reasonable risks that may occur during closure, post-closure, and perpetual care and maintenance of commercial hazardous waste treatment, storage, or disposal facilities including groundwater corrective action, differential settlement failure, or major maintenance of a cell or cells?

The provisions of UCA §19-1-307 required the USHWCB to evaluate in 2006 whether financial assurance or funds are necessary for perpetual care and maintenance following the closure and post-closure period of a commercial hazardous waste treatment, storage, or disposal facility to protect human health and the environment.

For commercial radioactive waste management facilities and prior to July 2015, UCA §19-1-307 required the URCB, and as of July 2015 the UWMRCB, to address similar ~~the following~~ questions every five years:

- ✓ Is the Radioactive Waste Perpetual Care and Maintenance Account ~~restricted account~~ adequate ~~to provide for perpetual care and maintenance of commercial radioactive waste treatment or disposal facilities~~?
- ✓ Is the amount of financial assurance required adequate to provide for closure and post-closure care of commercial radioactive waste treatment or disposal facilities?
- ✓ What costs (above minimal maintenance and monitoring) for reasonable risks that may occur during closure, post-closure, and perpetual care and maintenance of commercial

radioactive waste treatment, storage, or disposal facilities including groundwater corrective action, differential settlement failure, or major maintenance of a cell or cells?

- ✓ ~~What are the costs above the minimal maintenance and monitoring for reasonable risks [including groundwater corrective action; differential settlement failure; or major maintenance of a cell or cells] that may occur during closure, post-closure, and perpetual care and maintenance of commercial radioactive waste treatment or disposal facilities?~~
- ✓ What are the costs under UCA Subsection 19-3-106.2(5)(b) of using the Radioactive Waste Perpetual Care and Maintenance Fund during the period before the end of 100 years following final closure of the facility for maintenance, monitoring, or corrective action in the event that the owner or operator is unwilling or unable to carry out the duties of post-closure maintenance, monitoring, or corrective action?

UCA §19-1-307 requires the UWMRCB to submit a report on the evaluations to the Legislative Management Committee on or before October 1 of the year in which the report is due.

For purposes of this update it is important to note that as a result of legislation enacted during the 2015 General Session of the Utah Legislature (S.B. 244), beginning July 2015, the Division of Solid and Hazardous Waste (DSHW) and the Division of Radiation Control were consolidated into a single organization, the Division of Waste Management and Radiation Control (the Division). The legislation also eliminated both the Solid and Hazardous Waste Control Board and the Radiation Control Board and created the Utah Waste Management and Radiation Control Board. Accordingly, this update incorporates these important organizational changes.

This report has been prepared by URS Professional Solutions, LLC (URS-PS), an AECOM affiliate, under the direction of the Utah Division of Waste Management and Radiation Control~~acting as a contractor to the Utah Department of Environmental Quality, for the UWMRCB. The Board has reviewed and concurs with the results, conclusions, and recommendations expressed in this report~~.

1.2 COMMERCIAL HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL IN UTAH

The Director has permitted six commercial hazardous waste management facilities to treat, store, and/or dispose of hazardous waste. The six facilities and the activities each is permitted to conduct are listed in Table 1-1 on the following page.

After the operating life of any facility, the closure of each disposal facility is followed by a post-closure care period. The duration of this period is stated in Utah Administrative Code (UAC) as 30 years, contingent upon specified Division facility-specific determinations. During this time, the facility is actively maintained, custodial care is provided, and its performance is monitored. Once the closed facility is determined by the Director to satisfy applicable criteria, the post-closure permit is terminated.

The rules that govern the management of hazardous waste at facilities within Utah are found in Title R315 of the Utah Administrative Code and are statutorily required to be equivalent to those promulgated by the US Environmental Protection Agency. These rules require that each

Comment [VR20]: Should be worded consistent with equivalent hazardous waste requirement.

Comment [VR21]: Note that the statute requires a report of costs – not further speculation beyond that.

Comment [VR22]: Inappropriate for the Division's contractor to make this conclusion.

Comment [VR23]: See same sentence in section 1.3 for rad facilities.

commercial hazardous waste land disposal facility's Permittee provide financial assurances sufficient for a third-party contractor to close the facility and to provide post-closure care of the facility following closure (in the event that the permittee is unable or unwilling to complete such activities).

Table 1-1. Commercial hazardous waste management facilities permitted in the State of Utah[6]

Facility	Permitted to:
Clean Harbors Grassy Mountain	Treat, Store, and Dispose
Energy*Solutions* Mixed Waste Facility[7]	Treat, Store, and Dispose
Clean Harbors Aragonite	Treat and Store
Clean Harbors Clive	Store
Safety-Kleen Pioneer Road	Store
Nexeo Solutions	Store

The amount of funding for financial assurance is approved annually by the Director through review and revision of cost estimates updated and submitted by the Permittee. The financial assurances are intended to cover the costs of facility closure and post-closure care (in the event that the permittee is unable or unwilling to complete such activities). No financial assurances are required ~~provided~~ for care of the facility following post-closure permit termination.

Only commercial hazardous waste land disposal facilities are required to provide funds for post-closure care. Currently, ~~only~~ two commercial hazardous waste land disposal facilities exist in Utah that meet this requirement (~~. These are~~ Energy*Solutions*' Mixed Waste Facility and Clean Harbors' Grassy Mountain Facility). Funds for post-closure care of Energy*Solutions*' Mixed Waste Facility are already included ~~is covered beyond the post-closure care period~~ under the Radioactive Waste Perpetual Care and Maintenance Fund. Thus, creation of a perpetual care fund for commercial hazardous waste land disposal facilities would affect only the Clean Harbors Grassy Mountain Facility.

[6] Numerous non-commercial hazardous waste management facilities exist in Utah but are not addressed in this report ***(WHY NOT?)***~~.~~

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[7] Permitted in connection with Utah Hazardous Waste Permit UTD982598898.

1.3 COMMERCIAL RADIOACTIVE WASTE TREATMENT AND DISPOSAL IN UTAH

The Director has licensed three commercial radioactive waste management facilities to treat, store, and/or dispose of radioactive waste. The three facilities and the activities they are licensed to conduct are listed in Table 1-2 on the following page.

The closure of each facility is followed by up to 100 years of institutional controls (comparable to the 30-year post-closure period in the hazardous waste rules). During this time, the facility is actively maintained, custodial care is provided, and its performance is monitored. Following the 100-year institutional control period, ~~monies of~~ the Radioactive Waste Perpetual Care and Maintenance Fund is available to address ~~cover all~~ the minimal costs ~~that might be~~ incurred in the perpetual care ~~maintaining, caring for, monitoring, and taking corrective actions required for~~ of the closed facility.

Table 1-2. Commercial radioactive waste management facilities licensed in the State of Utah

Facility[8]	Licensed to:
Energy*Solutions*; LLRW Facility	Dispose
Energy*Solutions*; 11e.(2) Facility	Dispose
Energy*Solutions* Mixed Waste Facility	Treat[9], Store, and Dispose

The rules that govern the management of radioactive waste at facilities within Utah are found in Title R313-25 of the Utah Administrative Code and are statutorily required to be equivalent to those promulgated by the US Nuclear Regulatory Commission. These rules require that each commercial radioactive waste management facility Owner/Licensee provide financial assurances sufficient for a third-party contractor to close the facility and to provide for institutional control of the facility following closure (in the event that the permittee is unable or unwilling to complete such activities).~~.~~

The amount of financial assurances required are approved annually by the Director through review and revision of cost estimates updated and submitted by the Owner/Licensee. The financial assurances are intended to cover the costs of closure, ~~and~~ institutional control, and any minimal perpetual care of the facilities.

[8] All three facilities are located at Clive, Utah.

[9] Permitted Facility in connection with Utah Hazardous Waste Permit UTD982598898.

1.4 OVERVIEW OF THE EVALUATION

As the Legislature has directed, the UWMRCB has reviewed ~~this~~ the Division's report ~~and concurs with its results and findings~~. The Board submits this report in fulfillment of the Legislature's charge.

~~Issues~~ Review of surety funds associated with commercial hazardous waste management facilities are discussed in Chapter 2, while Chapter 3 addresses review of surety and perpetual care funds ~~issues~~ associated with commercial radioactive waste management facilities. ~~Recommendations are presented in Chapter 4 of this report.~~ Appendices convey information that provides perspective on financial assurances provided for Utah facilities and those permitted or licensed in Utah ~~and other states~~.

Comment [VR24]: Not appropriate for the Division's contractor to presuppose.

Comment [VR25]: Out of scope. Statute requires the Board to review.

Comment [VR26]: This is out of scope. Not required by UCA § 19-1-307.

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2. COMMERCIAL HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

Treatment, storage, and disposal of hazardous waste in Utah are regulated under provisions of R315 of the Utah Administrative Code. Individual hazardous waste management facilities ~~must~~ are required to submit applications for a permit to construct and operate such a facility. Construction and operating plans are required to ensure facility stability with unlikely catastrophic events. The Director reviews permit applications to ensure that all technical and regulatory issues are resolved in accordance with regulatory requirements and guidance.

The purpose of the Director's review is to develop reasonable assurance that applicable regulatory requirements will be satisfied during all phases of facility life, including construction, operation, closure, and for typically 30 years of post-closure care following facility closure. Given that applicable regulations are satisfied, confidence exists that human health and the environment will be properly protected during and after facility operation.~~.~~

Once all regulatory issues are resolved to ensure compliance with regulatory provisions, the Director prepares a draft permit, notifies the public of its intention to issue a permit, receives and responds to public comments, and finally issues the permit. The regulations provide the outline for the more detailed facility-specific requirements given in the permit.

The Director maintains regulatory surveillance during all phases of facility life to ensure compliance with regulatory requirements and all permit conditions. The Director regularly conducts compliance inspections of all aspects of facility operations covered by regulations and permit conditions. Departures from required conditions and performance are addressed through a range of enforcement actions to ensure safe operation and that human health and the environment are properly protected.

The Permittee is required to provide financial assurances to protect against the possibility that it might not be able to meet all costs associated with facility closure and post-closure care.

No mechanism is presently required to cover possible costs associated with minor facility failures and maintenance that might occur after the post-closure care period, except for the Energy*Solutions* Mixed Waste Facility, which is covered by the Radioactive Waste Perpetual Care and Maintenance Fund. The Energy*Solutions* Mixed Waste Facility is covered because mixed waste contains both hazardous and radioactive contaminants.

Comment [VR27]: This same language should be included with rad. Perpetual care addresses "minor facility failures and maintenance …"

In this section, the following are addressed:

- ✓ Commercial facilities permitted by the State of Utah to treat, store, and/or dispose of hazardous waste are identified
- ✓ Commercial facilities required to maintain financial assurances are identified and the nature of assurances they provide are briefly described
- ✓ Representative closure and post-closure activities are described

- ✓ Closure and post-closure financial assurances provided as required are identified and described
- ✓ Potential need for care and maintenance after the post-closure care period
- ✓ Adequacy of current requirements for providing financial assurances for commercial hazardous waste management facility closure and post-closure care
- ✓ Recommendations for revisions to current legal and regulatory requirements

Information regarding the financial assurance available for commercial hazardous waste disposal facilities is presented in a question and answer format below:

2.1 WHAT COMMERCIAL FACILITIES HAS THE STATE OF UTAH PERMITTED TO TREAT, STORE, AND/OR DISPOSE OF HAZARDOUS WASTE?

Table 2-1. Commercial hazardous waste management facilities permitted in the State of Utah

Facility	Permitted to:	Provides financial assurances for:
Clean Harbors Grassy Mountain	Treat, Store, and Dispose	Closure and Post-Closure
Energy*Solutions* Mixed Waste Facility[10]	Treat, Store, and Dispose	Closure and Post-Closure
Clean Harbors Aragonite	Treat and Store	Closure
Clean Harbors Clive	Store	Closure
Safety-Kleen Pioneer Road	Store	Closure
Nexeo Solutions	Store	Closure

The owner of any facility that ~~will~~ manage (that is treat, store, or dispose of) hazardous waste must ensure that funds are available for ~~any costs associated with~~ closing ~~or~~ and maintaining the facility during the post-closure care of that facility. These facility owners provide legally-enforceable financial assurances required under hazardous waste regulations. Financial assurances must be sufficient to cover ~~all cost associated with~~ facility closure and post-closure care.

Comment [VR28]: This is not true. This wording does not accurately reflect the statute and rule.

Only two of the six commercial facilities permitted for hazardous waste management in Utah are required to provide financial assurances for care of the facility following closure, because the wastes are disposed of at the site and are not removed after closure. Accordingly, these two, as

Comment [VR29]: If this is specifically "why", there should be a citation also included.

[10] Permitted in connection with Utah Hazardous Waste Permit UTD982598898.

shown in Table 2-1, provide financial assurances to cover not only closure costs, but also costs expected during post-closure care. As mentioned above, funds for perpetual care of the Energy*Solutions* Mixed Waste Facility ~~is~~ are ~~covered~~ included ~~under~~ in the Radioactive Waste Perpetual Care and Maintenance Fund.

Comment [VR30]: This wording is more accurate than that objected to in VR19 and VR20.

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2.2 WHAT IS THE "LIFE CYCLE" OF A COMMERCIAL HAZARDOUS WASTE MANAGEMENT FACILITY?

The life cycle of a commercial hazardous waste management facility consists of the phases or periods shown generally in Table 2-2.

Table 2-2. General phases of commercial hazardous waste management facility

Phase or Period	Typical Duration (years)	Applicability
Permitting and Initial Development	2 to 5 years	Treatment, Storage, and Disposal Facilities
Operating	15 to 40 years	Treatment, Storage, and Disposal Facilities
Closure	1 to 5 years	Treatment, Storage, and Disposal Facilities
Post-Closure Care	30 years	Disposal Facilities*
Following Permit Termination	Unlimited	Disposal Facilities*

* because waste is not removed after closure.

Comment [VR31]: See VR20

2.3 WHAT IS FACILITY "CLOSURE?"

When the decision is made that the facility will no longer actively operate, it undergoes ~~must go through~~ a formal procedure known as facility closure. The purpose of facility closure is to isolate ~~remove all~~ remaining hazardous wastes ~~associated with hazardous waste management operations~~, to the extent achievable, from the environment or exposure to the general public. If waste is left in place, then post-closure financial assurances ~~are required to~~ covers costs of expected post-closure care. Such is the case for facilities permitted to dispose of hazardous waste.

Comment [VR32]: This is not true.

Facility closure activities include:

- ✓ Disposing or shipment offsite of any waste received but not yet disposed of at the time closure commences
- ✓ Decontaminating of remaining support structures and operating equipment
- ✓ Dismantling and disposing of support structures, support systems, and equipment as required ~~and appropriate~~

Comment [VR33]: You are presupposing a disposal facility here, where above you included other hazardous waste permitted facilities than just disposal.

Comment [VR34]: Only if the structure and/or equipment weren't disposed of.

Comment [VR35]: Subjective. Does not belong in this report.

- ✓ When required by the Permit, c~~C~~ontinuing the operational environmental monitoring program
- ✓ Closing ~~and stabilizing all~~ disposal units according to the design and permit requirements.~~,~~ ~~once all waste has been disposed of~~

In general, f~~F~~acility closure activities do not include ~~such activities as~~:

- ✓ Conducting environmental corrective actions
- ✓ Repairing facility components

~~2.4 WHO PERFORMS A FACILITY CLOSURE?~~

~~Under expected conditions, the Permittee will conduct facility closure at its own expense. Closure activities must be pursued until the Director determines that the facility has been successfully closed and that all hazardous wastes have been removed (or appropriately addressed where wastes remain in place). When the Permittee pays costs associated with facility closure, the terms and conditions for exercising the financial assurances are not fulfilled and no funds are disbursed from the financial assurance fund for closure. Once closure is completed by the facility and the funds for closure are no longer required, the financial assurance mechanism is returned to the control of the Permittee.~~

~~Under unusual conditions, the Permittee may be unable to close the facility. Under these conditions, and in accordance with applicable terms of the mechanism used to provide the required financial assurances, the Director may conduct the closure using an independent third-party contractor. To cover the costs of such closure, the Director would use the financial assurances provided for closure.~~

~~2.5~~2.4 *WHAT IS "POST-CLOSURE CARE?"*

Following facility closure, the facility and the surrounding environment are monitored ~~for a period of time long enough to develop confidence that the hazardous waste management units are performing as required and as expected.~~ This period of time is referred to as the post-closure care period and ~~its exact duration~~ is determined by the Director. At the end of the post-closure care period, the permit is terminated.

The duration of the post-closure care period is not fixed under the Utah Administrative Code. The post-closure care period is typically ~~expected to last for~~ 30 years following facility closure. ~~The Director may, however, shorten this duration if justification to do so is provided and approved. In contrast, however, t~~ The duration of post-closure care may ~~also~~ be extended ~~beyond 30 years~~ if environmental and physical monitoring data reveal that unstable or other unfavorable conditions exist or that residual risks are not or will not likely remain within acceptable limits.

Post-closure care activities typically include ~~such activities as~~:

- ✓ ~~Conducting~~ Continuing the ~~an~~ environmental monitoring program ~~and reporting results~~
- ✓ Performing periodic surveillance

Comment [VR36]: See VR24.

Comment [VR37]: Beyond scope. This is not required in 19-1-307.

Comment [VR38]: Subjective. Not reflected in statute or rule.

Comment [VR39]: In Utah? Or, across the U.S.?

Comment [VR40]: If no time is set in statute and the duration of post-closure is set by the Director, it doesn't make sense to say the director may shorten or lengthen.

Comment [VR41]: Please cite from where this statutory authority is given.

Comment [VR42]: Implied.

- ✓ Providing minor custodial care and maintenance
- ✓ Maintaining records
- ✓ ~~Reporting periodically to the Regulatory Agency~~
- ✓ Carrying out other equivalent activities as determined by the Director
- ✓ ~~Administering funds to cover the costs for these activities~~
- ✓ ~~Conducting corrective actions for failed components or the failed facility~~

~~2.6 WHO PROVIDES POST-CLOSURE CARE?~~

~~Under expected conditions, the Permittee will provide post-closure care of the closed facility at its own expense. Post-closure activities must be pursued until the Director determines that the facility is performing acceptably and that the post-closure permit can be terminated. In this case, the conditions for using the post-closure care financial assurances are not fulfilled and no funds are disbursed for post-closure care. Once post-closure is completed by the facility and the funds for post-closure are no longer required, the financial assurance is returned to the control of the Permittee.~~

~~Under unusual conditions, the Permittee may be unable to provide post-closure care. Under these conditions, and in accordance with applicable terms of the financial mechanism used to provide the financial assurances, the Director may provide post-closure care using an independent third party contractor. To cover the costs of such post-closure care under these circumstances, the Director would use the financial assurances provided for post-closure care.~~

~~2.7 WHAT FORMS OF CLOSURE AND POST-CLOSURE CARE FINANCIAL ASSURANCES (FINANCIAL ASSURANCE MECHANISMS OR FINANCIAL SURETIES) ARE ALLOWED BY THE RULES?~~

~~A Permittee may satisfy the requirements for providing financial assurance for closure and post-closure care of a facility permitted to manage hazardous waste by using one or more of the following mechanisms. The reference in parentheses provides exact wording for each form of financial assurance.~~

- ✓ ~~Trust fund (UAC R315-264-151(a)(1))~~
- ✓ ~~Surety bond guaranteeing payment into a closure trust fund (UAC R315-264-151(b))~~
- ✓ ~~Surety bond guaranteeing performance of closure and/or post-closure care (UAC R315-264-151(c))~~
- ✓ ~~Letter of credit (UACR315-264-151(d))~~
- ✓ ~~Insurance (UACR315-264-151(e))~~
- ✓ ~~Financial test (UAC R315-264-151(f))~~

Comment [VR43]: See VR18.

Comment [VR44]: Implied.

Comment [VR45]: Implied.

Comment [VR46]: Since surety assumes facility operates, this is out of place.

Comment [VR47]: Not required in statue. Beyond the scope of this report.

- ~~Corporate guarantee that meets the certain specifications (UAC R315-264-151(h)(1))~~

~~Specific requirements are stated in the regulations for each form of financial assurance, as noted parenthetically above.~~

Comment [VR48]: A review and/or summation of the forms or their appropriateness is not require by statute. Beyond the scope of this report.

~~2.8~~2.5 *WHAT ARE THE ESTIMATED COSTS TO CLOSE UTAH'S PERMITTED COMMERCIAL HAZARDOUS WASTE MANAGEMENT FACILITIES AND TO PROVIDE POST-CLOSURE CARE?*

The most recent Director's annually-approved cost~~s~~ estimate~~s~~~~d~~ for the closure and post-closure care of commercial hazardous waste management facilities permitted by Utah are presented in Table 2-3. ~~These estimated costs are the most recent closure costs revised and updated by Permittees.~~ The Director annually reviews and approves the ~~proposed~~ financial assurance amounts ~~s once the proposed provisions are determined to satisfy applicable requirements~~.

Table 2-3. Summary of estimated facility closure and post-closure care costs for commercial hazardous waste management facilities permitted by the State of Utah

Facility	Estimated Facility Closure Cost	Estimated Post-Closure Care Cost
Clean Harbors Grassy Mountain	$21.3 million	$15.6 million
Energy*Solutions* Mixed Waste Facility	$12 million	$2 million
Clean Harbors Aragonite	$13.4 million	Not Applicable
Clean Harbors Clive	$8.9 million	Not Applicable
Safety-Kleen Pioneer Road	$0.2 million	Not Applicable
Nexeo Solutions	$0.4 million	Not Applicable

Comment [VR49]: Please footnote table 2-3 to explain to the reader why "not applicable"

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Estimated costs ~~are~~ can be influenced by such factors as:

Comment [VR50]: Not always true.

- ~~Specifics of plans to~~C~~-c~~losure and ~~provide~~ post-closure care plan specifications
- Changes in ~~unit~~ volume or costs of items or activities required to close or provide post-closure care ~~(such as the price of fuel, reduced availability of materials, and changes in qualified labor supply)~~
- Site-specific conditions (such as ~~geotechnical and hydraulic characteristics of soils, meteorological conditions, and~~ characteristics of waste~~s~~ managed at the facility) ~~available at or near the facility~~

Comment [VR51]: Do these site-specific conditions really change in a manner that needs to be reflected via surety change? Are you worried here about global climate change?

- ~~Recent developments in technologies that could improve the conduct of any activity required during closure or post-closure care~~

Comment [VR52]: Ambiguous. Improve cost? Improve effectiveness? Improve how?

Closure costs must ~~be estimated making allowances for~~ address applicable requirements. For example:

- ✓ The Permittee must design, operate and close the facility so that the need for further maintenance is minimized.
- ✓ The Permittee must design, operate and close the facility so that the potential for post-closure release of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products is controlled, minimized, or eliminated.
- ~~✓ The estimated closure cost must be determined at the time in the facility's active life when the extent and manner of operation would make the closure most expensive.~~
- ✓ The cost estimate must assume that an independent third party will be hired to perform ~~all~~ closure activities and post-closure care.
- ✓ The closure cost estimate may not ~~must~~ take ~~no~~ credit for ~~any~~ salvage value of hazardous waste, non-hazardous waste, structures, equipment, land, or other assets associated with the hazardous waste management facility.

~~2.9~~2.6 *HOW MUCH FINANCIAL ASSURANCE MUST BE PROVIDED TO CLOSE A FACILITY AND PROVIDE POST-CLOSURE CARE?*

Sufficient f~~F~~inancial assurances must be provided in an amount equal to ~~or greater than~~ those reasonable activities estimated to be associated with closing a facility and providing post-closure care. The Permittee must estimate closure and post-closure costs and submit them for regulatory review as part of the initial permitting process. These cost estimates must account for ~~all~~ activities and costs that are reasonably expected to ~~will~~ be required to close the facility and to care for it during the post-closure care period.

After the permit is issued, the Permittee must update and submit annually the closure and post-closure care cost estimates for review by the Director. ~~Having considered effects of any changes in closure plans, technological developments, and inflation,~~ the Director will approve the amount of financial assurance for the coming year, until the next revised cost estimates is submitted and reviewed.

When permittee actions significantly affect the activities and/or costs projected for closure or post-closure care, ~~If the facility modifies its permit to bring new hazardous waste management units on line, increased~~ adjusted financial assurance must be provided within 60 days of the permit modification approval.

~~2.10~~2.7 *WHAT CLOSURE AND POST-CLOSURE FINANCIAL ASSURANCES ARE CURRENTLY BEING PROVIDED FOR UTAH'S PERMITTED FACILITIES?*

As of 2015, financial assurances listed in Table 2-4 are currently being provided to cover the costs of closing and providing post-closure care at Utah's permitted commercial hazardous waste management facilities.

Comment [VR53]: Self-evident.

Comment [VR54]: Not always true. Inappropriate here. Closure at the time of thermos-nuclear war or alien invasion may be "most expensive".

Comment [VR55]: Third-party won't conduct the regulatory inspections, etc….

Comment [VR56]: Not true, by statute.

Comment [VR57]: The Director's review is not limited to these components.

Comment [VR58]: May? The director doesn't always approve.

Comment [VR59]: While not of equivalent risk, this statement applies to decreases, as well as increases.

Table 2-4. Financial assurances presently provided by Permittees in Utah

Facility	~~Closure Financial Assurance Mechanism~~	Closure Financial Assurance Provided	~~Post-Closure Financial Assurance Mechanism~~	Post-Closure Financial Assurance Provided
Clean Harbors Grassy Mountain	~~Insurance~~	$21.3 million	~~Insurance~~	$15.6 million
Energy*Solutions* Mixed Waste Facility	~~Surety Bond and Standby Trust~~	$12 million	~~Surety Bond and Standby Trust~~	$2 million
Clean Harbors Aragonite	~~Insurance~~	$13.4 million	~~Not Applicable~~	Not Applicable
Clean Harbors Clive	~~Insurance~~	$8.9 million	~~Not Applicable~~	Not Applicable
Safety-Kleen Pioneer Road	~~Insurance~~	$0.2 million	~~Not Applicable~~	Not Applicable
Nexeo Solutions	~~Funded Trust~~	$0.4 million	~~Not Applicable~~	Not Applicable

Comment [VR60]: Why?

Comment [VR61]: Out of scope of the report.

Comment [VR62]: Out of scope.

~~*2.11 WHO IS RESPONSIBLE FOR OVERSEEING THE CLOSED FACILITY AFTER THE PERMIT IS TERMINATED?*~~

~~Once the permit is terminated, the Division continues to monitor the performance of the closed facility. Although the State and Federal government could seek reimbursement from responsible parties, no financial assurances or other funds are provided for costs that might be incurred after permit termination.~~

Comment [VR63]: Out of scope.

~~2.12~~2.8 *WHAT FINANCIAL ASSURANCES OR FUNDS ARE PROVIDED TO COVER THE COSTS THAT MIGHT BE INCURRED AFTER THE PERMIT IS TERMINATED?*

No financial assurance or other funds are explicitly provided for the perpetual care of, maintenance of, or corrective actions at commercial hazardous waste land disposal facilities should the need arise following the closure and post-closure care periods and termination of the post-closure permit. The Division ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements.

~~2.13~~2.9 *WHAT IS "PERPETUAL CARE AND MAINTENANCE"?*

The term "perpetual care and maintenance" is not defined in the Utah Administrative Code or US Environmental Protection Requirement. ~~For commercial hazardous waste land disposal~~

facilities, perpetual care and maintenance activities that might be necessary following post-closure permit termination include:

- ✓ Maintaining appropriate levels of site security
- ✓ Providing minor repairs to components whose failure could compromise the stability and safety of the closed facility
- ✓ Performing routine maintenance of site and support structures and systems (such as landscaping, painting, maintaining fences, and repairing minor damage to cover systems
- ✓ Complying with applicable regulatory or legal requirements
- ✓ Pumping and treating groundwater contaminated beyond acceptable levels by the closed facility
- ✓ Restoring groundwater systems contaminated beyond acceptable levels by the closed facility
- ✓ Excavating and re-disposing of waste previously disposed of at the closed facility

2.14 DOES THE UTAH ADMINISTRATIVE CODE PROVIDE FOR PERPETUAL CARE AND MAINTENANCE OF CLOSED HAZARDOUS WASTE MANAGEMENT FACILITIES?

The Utah Administrative Code is based on rules developed and promulgated by the US Environmental Protection Agency (EPA). Neither EPA's rules nor the Utah Administrative Code provides for the perpetual care and maintenance of closed commercial hazardous waste management facilities following post-closure permit termination.

EPA's financial assurance requirements for hazardous waste management facilities have not explicitly addressed the need for maintenance, monitoring, or corrective actions following the facility's post-closure period and permit termination. EPA's rules assume that each facility's post-closure care period is not complete and the permit is not terminated until the facility has demonstrated that it is meeting and is likely to continue to meet applicable standards and requirements. Moreover, EPA's rules also implicitly assume that once the permit has been terminated, the disposal unit will continue to perform as designed so that no continuing attention is required.

Current estimates of the annual costs of monitoring and maintaining the closed Grassy Mountain facility total about $50,000[11] per year. Approximately $2.5 million invested at an assumed interest rate 2 percent per year would generate sufficient interest earnings to cover costs of this magnitude. However, if the real return on investment is closer to 1 percent then funds in excess of $2.5 million would be needed.

[11] This cost is based on sampling and analyzing groundwater once every five years, annual inspection of the facility, and annual minor maintenance of the landfill cover.

Comment [VR64]: Facility must be designed and models estimate what happens if all security is lost at permit termination.

Comment [VR65]: The Division ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements. Required repairs reflect inspection failure in addition to permittee failure.

Comment [VR66]: Not reflected anywhere in statute, requirement, or guidance.

Comment [VR67]: This must be shown PRIOR to permit termination.

Comment [VR68]: Permit will not be terminated if these activities are ongoing.

Comment [VR69]: See VR61

Comment [VR70]: See VR58.

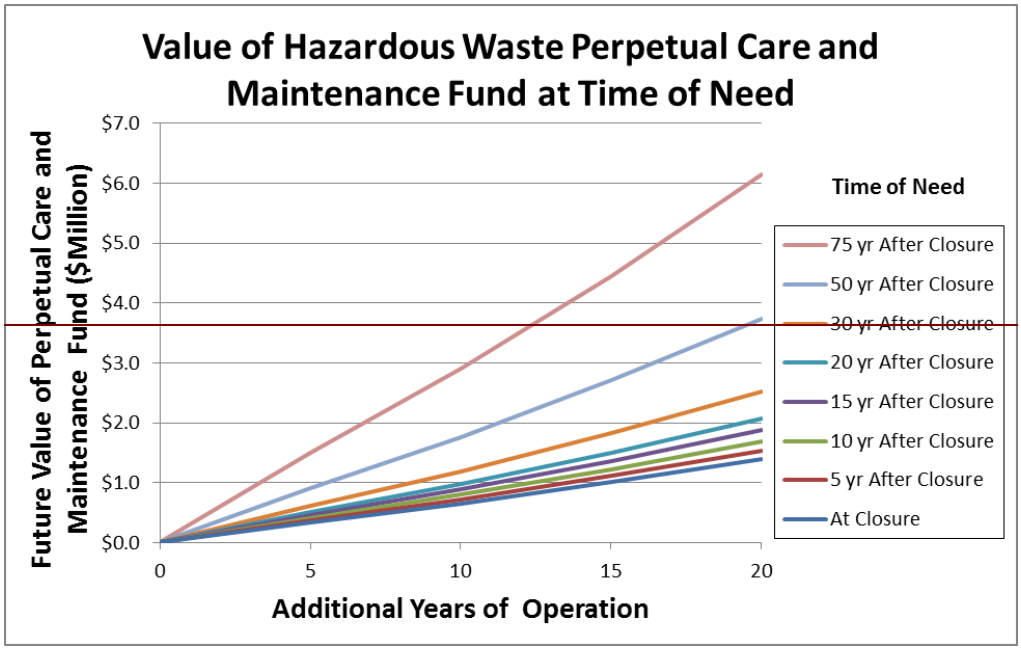
Comment [VR71]: Out of scope. Statute requires Board to assess if perpetual care funds are adequate, not if there is statutory justification for them.

~~2.15 WHAT WILL BE THE VALUE OF A HAZARDOUS WASTE PERPETUAL CARE FUND IN THE FUTURE?~~

Comment [VR72]: Out of scope. Statute requires you to assess if adequate. If NO hazardous perpetual care fund exists, statute does not require you to project its future value.

~~Monies deposited into a hazardous waste perpetual care fund would be invested according to Utah State Treasurer Rules. Investments must be made in secure financial instruments that have very small probability of failure or loss. Typically, such investments include US Treasury notes and bonds. Over the past century, these financial instruments have produced interest earnings of about 2 percent per year over and above prevailing inflation rates (RFF 2002, MSDW 1999). That is, they have a real interest rate of about 2 percent per year. Investments in such financial instruments grow faster than inflation by about 2 percent per year. However, since 2008 the return on investment has been less than 1 percent.~~

~~Given annual deposits of $54,000 plus interest earnings to a hazardous waste perpetual care fund, and an assumed real interest rate of 2 percent per year, Figure 2-1 and Table 2-5 present projected future values of the fund. Knowing the number of years from now that the facility closes and the time after that when the fund might be required, the value at the time of need can be determined. For example, if the facility terminates operations and is properly closed 20 years from now (shaded below) and the fund is required after 30 years of post-closure care (shaded below), its value is projected to be $2.5 million (shaded below), as shown in Table 2-5, assuming no monies are prematurely withdrawn from the fund or $1.8 million at an assumed real interest rate of 1 percent per year, as shown in Table 2-5a.~~



~~**Figure 2-1. Projected Future Value; Hazardous Waste Perpetual Care and Maintenance Fund (assumes 2% average annual real return)**~~

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Table 2-5. Projected Future Value; Hazardous Waste Perpetual Care and Maintenance Fund (for 2% average annual real return)					
	Time of Facility Closure (years from today)				
	0 yr	5 yr	10 yr	20 yr	
Collections Through Closure ($ million)	0.0	0.3	0.5	1.1	
Future Value ($ million)	$0.0	$0.3	$0.7	$1.4	
Time of Need (years after Closure)	Value at Time of Need ($ million)				
5 Years	$0.0	$0.4	$0.7	$1.5	
10 Years	$0.0	$0.4	$0.8	$1.7	
15 Years	$0.0	$0.5	$0.9	$1.9	
20 Years	$0.0	$0.5	$1.0	$2.1	
30 Years	$0.0	$0.6	$1.2	$2.5	
50 Years	$0.0	$0.9	$1.8	$3.7	
75 Years	$0.0	$1.5	$2.9	$6.1	

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Table 2-5a. Projected Future Value; Hazardous Waste Perpetual Care and Maintenance Fund (for 1% average annual real return)					
	Time of Facility Closure (years from today)				
	0 yr	5 yr	10 yr	20 yr	
Collections Through Closure ($ million)	0.0	0.3	0.5	1.1	
Future Value ($ million)	$0.0	$0.4	$0.7	$1.3	
Time of Need (years after Closure)	Value at Time of Need ($ million)				
5 Years	$0.0	$0.4	$0.7	$1.4	
10 Years	$0.0	$0.4	$0.7	$1.4	
15 Years	$0.0	$0.4	$0.8	$1.5	
20 Years	$0.0	$0.5	$0.8	$1.6	
30 Years	$0.0	$0.5	$0.9	$1.8	
50 Years	$0.0	$0.6	$1.1	$2.2	

Table 2-5a. Projected Future Value; Hazardous Waste Perpetual Care and Maintenance Fund (for 1% average annual real return)					
	Time of Facility Closure (years from today)				
	0 yr	5 yr	10 yr	20 yr	
75 Years	$0.0	$0.8	$1.4	$2.8	

In general, the value of the fund grows faster than costs inflate. As a general rule, the future value of a hazardous waste perpetual care fund grows:

- ✓ When the facility continues to operate so that deposits continue to be made into the fund
- ✓ When the need for the fund is delayed
- ✓ If annual deposits to the fund increase

Comment [VR73]: Only according to the assumptions included in the projections. This is inappropriately declarative.

Comment [VR74]: See VR65.

2.16 WHAT MIGHT BE THE FUTURE VALUE OF A HAZARDOUS WASTE PERPETUAL CARE FUND IF GREATER ANNUAL FEES WERE IMPOSED?

Comment [VR75]: Speculative, beyond scope of statute. You are required to assess is current hazardous was perpetual care fund is adequate. If NOT in existence, the answer is simple (Yes, No).

If larger annual fees were required to be deposited into a hazardous waste perpetual care fund, more monies would be available after 20 additional years of operations and 30 years of post closure care, as shown in Table 2-6, assuming no monies were prematurely withdrawn from the fund, and the fund were invested at an assumed real interest rate of 2 percent per year.

Table 2-6. Dependence of Perpetual Care Fund future value on annual fee (for 2% average annual real return)	
Annual Fee ($ per year)	Future Value[12] ($ million)
$15,000	$0.7
$25,000	$1.2
$35,000	$1.6
$45,000	$2.1
$75,000	$3.5
$100,000	$4.7

[12] After 20 more years of deposits (disposal operations) and 30 years of post-closure care at an assumed real interest rate of 2 percent per year.

Table 2-6a. Dependence of Perpetual Care Fund future value on annual fee (for 1% average annual real return)	
Annual Fee ($ per year)	Future Value[13] ($ million)
$15,000	$0.5
$25,000	$0.8
$35,000	$1.1
$45,000	$1.3
$75,000	$2.2
$100,000	$2.9

2.17 WHAT MIGHT BE THE CONSEQUENCES TO PERMITTEES OF IMPOSING GREATER ANNUAL FEES FOR A HAZARDOUS WASTE PERPETUAL CARE FUND?

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AT LEAST TWO CONSEQUENCES MIGHT RESULT FROM MORE AGGRESSIVELY ACCUMULATING MONIES WITHIN A HAZARDOUS WASTE PERPETUAL CARE FUND. THESE CONSEQUENCES ARE:

- Higher fees make competitive commercial activity less profitable
- Greater accumulations without current need might allow funds to be diverted for other purposes

Higher fees that would generate greater deposits to a hazardous waste perpetual care fund may have one of two commercial effects:

- Decrease the facility's profit margin because they do not or cannot raise the price of their services
- Decrease competitiveness with facilities offering similar service because the Utah facility has raised the price of their services

Both of these effects encumber the commercial viability of such facilities. Without raising prices, the facility's profitability is reduced and the company's ability to attract capital is diminished.

[13] After 20 more years of deposits (disposal operations) and 30 years of post-closure care at an assumed real interest rate of 1 percent per year.

~~Increased prices mean the facility is less able to sell its service to those who require them, as long as alternative commercial facilities are available. Because hazardous waste treatment, storage, and disposal services are available at numerous facilities throughout the US, facilities permitted and offering such services in Utah are subject to significant competitive pressures. Thus, increasing its prices to cover any annual fees would probably weaken their commercial viability.~~

~~Another down side to accumulating funds in any publicly owned and administered fund is the susceptibility of the fund to political expediency. History has proven that publicly owned and administered funds established for one purpose relinquish their monies, upon appropriate legislative revision, to fund other purposes.~~

~~2.18~~2.10 ARE SUFFICIENT FINANCIAL ASSURANCES PROVIDED TO COVER THE COSTS OF CLOSURE, POST-CLOSURE CARE~~, AND UNPLANNED AND UNANTICIPATED EVENTS?~~.

The amount of financial assurance required and presently provided for closure and post-closure care of commercial hazardous waste treatment, storage, or disposal facilities is judged to be adequate.

The State currently does not require financial assurances nor does it require ~~has it established a~~ funds be pledged to cover costs associated with closed hazardous waste management facilities following post-closure care.

~~As noted above, a minimum fund balance of about $2.5 million, when invested at an assumed 2 percent per year real interest rate, should provide sufficient interest earnings to cover the costs of routine monitoring and maintenance. With an annual fee of $54,000, the fund could amount to approximately $2.5 million, assuming 20 additional years of operations and 30 years of post closure care, during which time no monies are withdrawn from the fund.~~

~~A hazardous waste perpetual care fund balance of $2.5 million invested at 2 percent real per year would produce interest earnings of more than $50,000 per year, without reducing the value of the fund. This would be sufficient to cover the costs of routine monitoring and maintenance. Additional funds would be required to cover the costs associated with unplanned and unanticipated events.~~

~~The financial and competitive effects of imposing fees on Clean Harbors to fund this account at the rate of $54,000 per year should be evaluated. If it causes the facility to terminate active operations, based on this estimate, no money will be available for any perpetual care, though the possibility of the need of such funds will persist.~~

While their impact is minimized by the Director's annual review, f~~F~~actors that could, at least in theory, contribute to potential deficiencies in closure and post-closure care cost estimates prepared for commercial hazardous waste treatment, storage, or disposal facilities, include the following:

- A drastic change in market price conditions (e.g., could impact labor rates, material costs, etc.) from those assumed when developing the cost estimates;

Comment [VR76]: Out of scope. This is not a question posed by Statute for this review.

Comment [VR77]: Statutory requirements do not include consideration of "unplanned and unanticipated events."

Comment [VR78]: Is this adequate or not?

Comment [VR79]: Out of scope. Statute requires judgement if perpetual care fund is adequate or not. If not present, judgment is Yes/No – not speculative on the possible performance of a hypothetical fund.

Comment [VR80]: See VR72

Comment [VR81]: See VR72

- ~~Acceptance and disposal of unauthorized waste or an unauthorized volume of waste at the site;~~
- Occurrence/generation of unexpected contamination at the site;
- Cost associated with implementing measures necessary to address unanticipated technical/engineering issues ~~(e.g., changes in designs and/or materials and construction methods required to address a change in a closure requirement, e.g., an alternative landfill cover, installation of an additional required secondary containment feature, etc.);~~
- ~~Delays experienced in implementing closure activities at a site, which could affect closure costs; and/or~~
- ~~Occurrence of a natural disaster (e.g., hurricane; flood, etc.) that could increase closure costs.~~

~~Based on review of the available information in preparing this report update, a return on investment of less than 2 percent may not be sufficient to realize the minimum amount needed to meet the intended obligations for perpetual care and maintenance.~~

Section 3.13 below discusses this topic in additional detail.

~~2.19~~2.11 WHAT OTHER COSTS MIGHT BE ANTICIPATED FOLLOWING POST-CLOSURE PERMIT TERMINATION?

Some ~~Significant~~ U~~u~~ncertainties inherent with predicting any future conditions are associated with determining costs associated with major maintenance of cells, differential settlement failure or groundwater corrective action at closed commercial hazardous waste land disposal facilities. These uncertainties are minimized through requirements for detailed modeling and design specifications with inherent factors of safety incorporated therein. ~~However, an effort has been made to quantify a range of costs if one of these events occurred. These inexact estimated costs are summarized in Table 2-7.~~

~~**Table 2-7. Summary of inexact costs of unplanned and unanticipated future events**~~

~~Potential Future Event~~	~~Inexact Cost Range[14]~~
~~Major Maintenance of Cells~~	~~$1 to $50 million~~
~~Differential Settlement Failure~~	~~$10 to $70 million~~
~~Groundwater Corrective Action~~	~~$10 to $50 million~~
~~Aggregate Probability-Weighted Total~~	~~$5 to $30 million~~

~~The State of South Carolina has conducted a more detailed evaluation of costs associated with unexpected or unplanned events at the LLRW disposal facility located near Barnwell, SC (Baird 2008). In these evaluations, the following events were addressed:~~

~~[14] Rounded to the nearest $10 million or one figure of significance because of extreme uncertainty.~~

Comment [VR82]: This is an operational issue related to the adequacy of inspection, not closure / post-closure.

Comment [VR83]: See VR75. This further relates to the adequacy of the operational environmental monitoring program.

Comment [VR84]: Not accurate.

Comment [VR85]: Cover must be constructed, as permitted

Comment [VR86]: See VR75

Comment [VR87]: Funds would continue to accrue interest if left unspent.

Comment [VR88]: Required to be incorporated in permitted facility design and models.

Comment [VR89]: This conclusion is out of scope. Is the current perpetual care fund balance sufficient for hazardous waste disposal sites?

Comment [VR90]: Untrue. Cells are required to be designed to minimize uncertainty and the need for active major maintenance, differential settlement, and groundwater corrective actions.

Comment [VR91]: Speculative and inaccurate, given the rigorous design, operation, and closure requirements and modeling required by permit.

- ~~✓ Decreased Precipitation~~
- ~~✓ Adjacent Site Development~~
- ~~✓ Trench Collapse~~
- ~~✓ Burrowing Animals~~
- ~~✓ Increased Precipitation~~
- ~~✓ Worker Exposure~~
- ~~✓ Negative Media Coverage~~
- ~~✓ Regulatory Changes~~
- ~~✓ Mine/Quarry Activity at Site~~
- ~~✓ Spent Nuclear Fuel Rod~~
- ~~✓ Health Claims~~
- ~~✓ Invalid Geotechnical Model~~
- ~~✓ Property Values Depressed~~
- ~~✓ Extreme Weather~~

~~The analysis concluded with 65 percent confidence that the total chance occurrence cost of unplanned events, consequences, and responses would not exceed $28 million (the amount of funds available after meeting the costs of planned activities). With 80 percent confidence, these unplanned costs are estimated not to exceed about $53 million, and with 95 percent confidence, they are estimated not to exceed about $155 million.~~

~~2.20~~2.12 ~~*SHOULD*~~ *ARE* *FUNDS* ~~*BE*~~ *REQUIRED FOR COSTS THAT MIGHT BE INCURRED FOR MAJOR EVENTS FOLLOWING POST-CLOSURE PERMIT TERMINATION* *ADEQUATE*?

Substantial regulatory effort has been, continues to be, ~~and will in the future be~~ committed to provide assurance that the hazardous waste disposal facilities permitted in Utah ~~will~~ perform as required and as planned (refer to Question 2-21). ~~Furthermore~~Therefore, The Division considers additional funds for the potential events and conditions identified above are not considered necessary at this time for the following reasons:

- ✓ Engineering controls employed ~~to~~ in the construction of the landfill cells: When EPA developed the rules for landfill construction it took into consideration that landfill cells would need to be stable for many years. The landfill cells are required to have a compacted clay liner upon which multiple synthetic liners are placed to contain the waste and prevent ground water contamination. The waste is treated before it can be placed in a landfill cell to reduce its concentration and to stabilize it so that it minimizes the chance of migration. The waste is placed in the cell in compacted layers to minimize the chance of differential settlement after cell closure. The cell cap is designed to encompass the waste, shed precipitation, prevent erosion, and to withstand natural degradation. UWMRC Board concurs.
- ✓ Design and monitoring prior to permit termination: The cap design and corresponding ground water monitoring ensure that no leachate is being generated and that the ground water contamination risk approaches zero. The leachate generation risk of zero is expected to be achieved in the first 10 years. Consequently, more than 20 years of cap performance are verified by the absence of leachate production and the ground water monitoring results.

Comment [VR92]: This is a rad facility (not hazardous waste – as discussed in Chapter 2). This is also a Class B and C facility (with radiological hazards exceeding 100 year). This facility was also designed and operated before the current rigorous modeling and design requirements were promulgated. It is NOT comparable to any Utah hazardous waste facilities. Nor is it comparable to Utah's radiological facilities discussed in Chapter 3.

Comment [VR93]: This is the question required to be evaluated by statute.

Comment [VR94]: How can AEcom force what action a regulator will take in the future?

Comment [VR95]: This is the answer to the question asked in Statute.

- ✓ Remote location of the facility: The location of the facility is away from locations of interest. For example, the Grassy Mountain Facility is located approximately 80 miles west of Salt Lake City in a remote area of Tooele County. UWMRC Board concurs.
- ✓ Lack of nearby population center: The location of the facility is away from population centers. For example, the nearest population center to the Grassy Mountain Facility is Grantsville, which is located approximately 40 miles away. UWMRC Board concurs.
- ✓ Location of the facility is in the Tooele County Hazardous Waste Corridor: This area was created by the Tooele County Commission to provide a remote area for the location of commercial waste management facilities. Residential development is prohibited in this corridor. For example, this further prevents the possibility of any population center being located near Grassy Mountain Facility in the future. UWMRC Board concurs.
- ✓ Non-potable groundwater: The quality of the groundwater at the facility is very poor (total dissolved solids concentration greater than 40,000 ppm) and is not suitable for human or animal consumption or for other agricultural uses without considerable treatment. UWMRC Board concurs.
- ✓ Aridity: The amount of precipitation for a typical year is only about six to nine inches. This limits the amount of erosion and leachate creation for a closed landfill cell. UWMRC Board concurs.
- ✓ Restricted access to the facility: Access to the facility is controlled. For example, the Grassy Mountain Facility is surrounded by a six-foot chain-link fence with warning signs and locking gate to discourage unauthorized access. UWMRC Board concurs.

Comment [VR96]: All of these points that justify no further perpetual care funds for hazardous waste facilities equally apply to rad facilities in chapter 3.

~~2.21 BEYOND FINANCIAL ASSURANCES, WHAT ELSE PROVIDES ASSURANCE THAT COMMERCIAL HAZARDOUS WASTE MANAGEMENT FACILITIES WILL BE PROPERLY CLOSED AND WILL PERFORM AS REQUIRED?~~

Comment [VR97]: By its nature, this question is out of scope. Board is required to review financial assurance – not things BEYOND financial assuance.

~~The comprehensive system for regulating the management of hazardous waste includes numerous features that limit the probability that closure, post-closure, and other costs would exceed those covered through financial assurance. These features include:~~

- ~~✓ General Facility Standards~~
- ~~✓ Preparedness and Prevention~~
- ~~✓ Contingency Plan and Emergency Procedures~~
- ~~✓ Manifest System, Recordkeeping, and Reporting~~
- ~~✓ Groundwater Protection~~
- ~~✓ Use and Management of Containers~~
- ~~✓ Tanks~~

- ~~Landfills~~
- ~~Land Disposal Restrictions~~

Comment [VR98]: These apply equally to rad facilities in chapter 3.

~~These requirements are briefly and necessarily incompletely summarized below:~~

~~General Facility Standards (Utah Administrative Code (R315-264-10 through R315-264-19)~~

- ~~Identification Number; Every facility owner or operator must obtain an EPA identification number.~~
- ~~General Waste Analysis; The requirements of UAC R315-264-13 must be satisfied.~~
- ~~Security; A facility owner or operator must prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of his facility.~~
- ~~General Inspection Requirements; Facility owners or operators must inspect their facilities for malfunctions and deterioration, operator errors, and discharges, which may cause or lead to release of hazardous waste constituents to the environment or pose a threat to human health.~~
- ~~Personnel Training; Facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with applicable requirements.~~
- ~~General Requirements for Ignitable, Reactive, or Incompatible Wastes; The owner or operator must take precautions to prevent accidental ignition or reaction of ignitable or reactive wastes.~~
- ~~Location Standards; Sites at which hazardous waste management facilities will be developed must satisfy siting requirements that address seismic considerations and avoid floodplains.~~
- ~~Construction Quality Assurance Program; A CQA program must be implemented for the construction of certain facility units to ensure that the constructed unit meets or exceeds all design criteria and specifications in the permit.~~

~~Preparedness and Prevention Utah Administrative Code (R315-264-30 through R315-264-37)~~

- ~~Design and Operation of Facility; Facilities must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden discharge of hazardous waste or hazardous waste constituents to air, soil, groundwater, or surface water which could threaten the environment or human health.~~
- ~~Required Equipment; All facilities must be equipped with the following:~~
  - ~~Internal communications or alarm system.~~

- ~~Device capable of summoning external emergency assistance from local law enforcement agencies, fire departments, or State or local emergency response teams.~~
- ~~Portable fire extinguishers, fire control equipment, including special extinguishing equipment.~~
- ~~Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems.~~

~~✓ Testing and Maintenance of Equipment; all facility communications or alarm systems, fire protection equipment, safety equipment, discharge control equipment, and decontamination equipment must be tested and maintained to assure its proper operation in time of emergency.~~

~~✓ Access to Communications or Alarm System; whenever hazardous waste is being poured, mixed, spread, or otherwise handled, all employees involved in the operation must have immediate access to an internal alarm or emergency communication device.~~

~~✓ Required Aisle Space; the facility owner or operator must maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, discharge control equipment, and decontamination equipment to any area of facility operation in an emergency.~~

~~✓ Arrangements with Local Authorities; the owner or operator must attempt to make arrangements with law enforcement agencies, fire departments, and emergency response teams to enable them to provide emergency services appropriate to potential hazards at the facility.~~

~~Contingency Plan and Emergency Procedures Utah Administrative Code (R315-264-50 through R315-264-56)~~

~~✓ Purpose and Implementation of Contingency Plan; Each owner or operator must have a contingency plan for his facility to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden discharge of hazardous waste or hazardous waste constituents to air, soil, groundwater, or surface water.~~

~~✓ Content of Contingency Plan; The plan must describe the actions facility personnel must take in response to fires, explosions or any unplanned sudden or non-sudden discharge of hazardous waste or hazardous waste constituents to air, soil, or surface water at the facility.~~

~~✓ Emergency Coordinator; At all times at least one employee with the responsibility for coordinating all emergency response measures must either present on the facility premises or on call.~~

~~✓ Emergency Procedures; Whenever there is an imminent or actual emergency situation, the facility's emergency coordinator or his designee must immediately take certain actions to contain hazardous substances and minimize the effects of the situation on workers and the environment.~~

~~Manifest System, Recordkeeping, and Reporting Utah Administrative Code (R315-264-70 through R315-264-77)~~

- ~~Use of Manifest System; A facility that receives hazardous waste must implement a manifest management system to ensure that all wastes received at the facility are documented.~~
- ~~Operating Record; The record keeping requirements of UAC R315-264-73 must be satisfied.~~
- ~~Manifest Discrepancies; The owner or operator must attempt to reconcile discrepancies between waste received and descriptions provided in manifests.~~
- ~~Availability, Retention, and Disposition of Records; Records of waste disposal locations and quantities must be maintained in compliance with UAC R315-264-73(b).~~
- ~~Biennial Report; Owners or operators of facilities that treat, store, or dispose of hazardous waste must prepare and submit a biennial report to the Director by March 1 of each even numbered year.~~
- ~~Unmanifested Waste Report; If a facility accepts for treatment, storage, or disposal any hazardous waste from an off-site source without an accompanying manifest, the owner or operator must prepare and submit a report to the Director within 15 days of the receipt of the waste.~~
- ~~Additional Reports; A facility owner operator must report discharges, fires, and explosions to the Director.~~

~~Groundwater Protection Utah Administrative Code (R315-264-90through R315-264-101)~~

- ~~Required Programs; Owners and operators of land disposal facilities must conduct a monitoring and response program described in UAC R315-264-91).~~
- ~~Groundwater Protection Standard; The owner or operator must comply with conditions specified in the facility permit to ensure that hazardous constituents detected in the groundwater from a regulated unit do not exceed applicable concentration limits in the uppermost aquifer underlying the waste management area beyond the point of compliance during the compliance period.~~
- ~~Hazardous Constituents; The Director has specified in the facility permit the hazardous constituents to which the groundwater protection standard applies.~~
- ~~Concentration Limits; The Director has specified in the facility permit concentration limits in the groundwater for hazardous constituents.~~
- ~~Point of Compliance; The Director has specified in the facility permit the point of compliance at which the groundwater protection standard applies and at which monitoring must be conducted.~~

- ~~Compliance Period; The Director has specified in the facility permit the compliance period during which the groundwater protection standard applies.~~
- ~~General Groundwater Monitoring Requirements; The owner or operator must comply with the requirements stated in UAC R315-264-97 for any groundwater monitoring program~~
- ~~Detection Monitoring Program; An owner or operator required to establish a detection monitoring program must, at a minimum, discharge the responsibilities stated in UAC R315-264-98.~~
- ~~Compliance Monitoring Program; An owner or operator required to establish a compliance monitoring program must, at a minimum, discharge the responsibilities stated in UAC R315-264-99.~~
- ~~Corrective Action Program; An owner or operator required to establish a corrective action program must, at a minimum, discharge the responsibilities started in UAC R315-264-100.~~
- ~~Corrective Action for Solid Waste Management Units; The owner or operator of a facility seeking a permit for the treatment, storage or disposal of hazardous waste must institute corrective action as necessary to protect human health and the environment for all releases of hazardous waste or constituents from any solid waste management unit at the facility, regardless of the time at which waste was placed in the unit.~~

~~Use and Management of Containers Utah Administrative Code(R315-264-170 through R315-264-179)~~

- ~~Condition of Containers; If a container holding hazardous waste is not in good condition, the owner or operator must transfer the hazardous waste from this container to a container that is in good condition or manage the waste in some other way.~~
- ~~Compatibility of Waste with Containers; The owner or operator must use a container made of or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired.~~
- ~~Management of Containers; A container holding hazardous waste must always be closed during storage (except when it is necessary to add or remove waste) and must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.~~
- ~~Inspections; At least weekly, the owner or operator must inspect areas where containers are stored, for leaks and container or containment system deterioration.~~
- ~~Containment; Container storage areas must have a containment system designed and operated in accordance with UAC R315-264-175.~~
- ~~Special Requirements for Ignitable or Reactive Waste; Containers holding ignitable or reactive waste must be located at least 50 feet from the facility's property line.~~
- ~~Special Requirements for Incompatible Wastes; Incompatible wastes must satisfy requirements stated in UAC R315-264-177.~~

- ~~Closure; At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues must be decontaminated or removed.~~
- ~~Air Emission Standards; The owner or operator must manage all hazardous waste placed in a container in accordance with the applicable requirements of UAC R315-264-179.~~

~~Tanks Utah Administrative Code (R315-264-190 through R315-264-200)~~

- ~~In general, the requirements as of UAC-264-190 through R315-264-200, must be satisfied.~~

~~Landfills Utah Administrative Code (R315-264-300 through R315-264-317)~~

- ~~Design and Operating Requirements; Any landfill that is not exempted must have a liner system for all portions of the landfill. The liner system must satisfy the requirements of UAC R315-264-301.~~
- ~~Monitoring and Inspection; During construction or installation, liners and cover systems (e.g., membranes, sheets, or coatings) must be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials) in accordance with UAC R315-264-303.~~
- ~~Surveying and Recordkeeping; The owner or operator of a landfill must maintain the items listed in UAC R315-264-309 in the operating record.~~
- ~~Closure and Post-Closure Care; At final closure of the landfill or upon closure of any cell, the owner or operator must cover the landfill or cell with a final cover designed and constructed to satisfy requirements of UAC R315-264-310.~~
- ~~Special Requirements for Ignitable or Reactive Waste; Ignitable or reactive waste must not be placed in a landfill, except under conditions stated in UAC R315-264-312.~~
- ~~Special Requirements for Incompatible Wastes; Incompatible wastes, or incompatible wastes and materials must not be placed in the same landfill cell, except as required by UAC R315-264-313.~~
- ~~Special Requirements for Liquid Waste; UAC R315-264-314, the placement of bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids, whether or not sorbents have been added, in any landfill is prohibited.~~
- ~~Special Requirements for Containers; Unless they are very small, such as an ampoule, containers must either be at least 90 percent full when placed in the landfill; or be crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill in accordance with UAC R315-264-315.~~
- ~~Disposal of Small Containers of Hazardous Waste in Overpacked Drums; Small containers of hazardous waste in overpacked drums may be placed in a landfill if the requirements stated in UAC R315-264-316 are met.~~

- ~~Special Requirements for Hazardous Wastes F020, F021, F022, F023, F026, and F027; Hazardous Wastes F020, F021, F022, F023, F026, and F027 must not be placed in a landfill except as provided by UAC R315-264-317~~

~~Land Disposal Restrictions Utah Administrative Code (R315-268)~~

- ~~In general the requirements regarding land disposal restrictions as found in UAC R315-268 must be satisfied. Wastes need to be treated to a specific level prior to land disposal.~~

~~Agency Inspections~~

- ~~Division Facility Inspections~~
- ~~EPA Off-site Rule Inspections~~
- ~~EPA Oversight Inspections~~

~~2.22~~2.13 *HOW CAN THE STATE HELP ENSURE AGAINST UNANTICIPATED COSTS OF LONG-TERM CARE AND MAINTENANCE?*

Ensuring against the unanticipated costs listed above could involve a range of possible actions. Each unanticipated cost might involve one or more actions such as:

- ✓ Increase financial assurance requirements
- ✓ Adequately enforce current ~~Impose more stringent and costly~~ siting, construction, operating, and closure requirements
- ~~Require a perpetual care fund~~

Comment [VR99]: Circular argument. Regardless of increase, unanticipated costs argue for further increases.

Comment [VR100]: Current requirements have not been demonstrated to be insufficient at protecting against unanticipated costs.

Comment [VR101]: While a perpetual care fund will provide monies to deal with unanticipated costs, the presence of such a fund by itself does not prevent unanticipated costs.

~~2.23~~2.14 *ARE SUFFICIENT FINANCIAL ASSURANCES PROVIDED FOR ADEQUATE FUNDING FOR COSTS OF UNPLANNED AND UNANTICIPATED EVENTS?*

In general, funds are available to cover the costs expected to close and provide post-closure care of commercial hazardous waste management facilities permitted in Utah. While f~~F~~unds are not provided to manage the costs of care at closed facilities after the permit has been terminated, the Division does not judge them necessary. UWMRC Board concurs.~~.~~

2.24 HOW DO THE FINANCIAL ASSURANCES REQUIRED FOR CLOSURE AND POST-CLOSURE CARE OF COMMERCIAL HAZARDOUS WASTE MANAGEMENT FACILITIES PERMITTED IN THE STATE OF UTAH COMPARE WITH THOSE REQUIRED IN OTHER STATES?

EPA Financial Assurance Requirements

The need for financial assurances for closure and post-closure care of hazardous waste management facilities was demonstrated historically by instances of abandonment or delayed closure, often occurring after the economic value of the facilities was diminished or nonexistent. The EPA recognized that post-closure care might be necessary for decades after the operating period, and that the facility owners or operators may lack funds for the required closure and/or care unless they provided for them during the operating period.

EPA first established financial responsibility standards for owners and operators of hazardous waste management facilities under the Resource Conservation and Recovery Act of 1976. The standards are contained in 40 CFR Parts 264 and 265 for facility permitting and interim status, respectively. EPA's original standards, proposed December 18, 1978 (43 FR 58995, 59006-7), provided (1) assurance that funds would be available when needed to properly close hazardous waste management facilities; (2) assurance that funds would be available when needed to monitor and maintain the facilities for a 20-year Post-Closure Period; and (3) liability coverage for injuries resulting from operation of the facilities. The initial closure and post-closure financial assurance required lump-sum deposits into trust funds in the amount of the closure and post-closure cost estimates multiplied by "present value factors" that accounted for growth of the fund during the operating life of the facility.

EPA revised its financial assurance rules on May 19, 1980 (45 FR 33260-33273) to (1) allow the closure trust fund to accumulate to its required value throughout the operating period (or for up to 20 years); (2) allow other financial assurance funding mechanisms besides the trust fund; and (3) extend the post-closure period from 20 years to 30 years. The stated purpose for extending the post-closure period to 30 years was to eliminate leachate monitoring requirements. Since it takes longer for contaminant migration to reach ground-water monitoring points than it would have taken to reach leachate-detection monitoring points, it is necessary to monitor for a longer period.

EPA provides flexibility in the 30-year post-closure period via case-by-case reviews (45 FR 33197). If an owner or operator can demonstrate that there is no need to monitor and maintain his closed facility for the entire 30-year period, the period can be shortened. On the other hand, representatives of the public can petition to have the monitoring period extended for cause.

EPA believes that certain organic chemicals persist longer than 30 years and that heavy metals remain toxic forever, requiring careful management to limit mobilization. However, EPA deemed it impossible for many small single facilities to finance perpetual care after their revenues cease. While EPA advocated some form of national insurance to ensure perpetual monitoring of facilities with detected or imminent contamination, its near-term solution was to

enable EPA's Regional Administrators to extend some or all of the post-closure care requirements for causes of detected or imminent groundwater contamination.

With respect to a possible perpetual care period, EPA appeared to seek a balance between perpetual monitoring and maintenance, where deemed necessary, and the financial burden imposed on the owner or operator of the individual facilities. EPA interpreted the RCRA statute to require measures to be taken, for as long as necessary, to ensure that land disposal facilities do not pose a threat to human health or the environment. However, they stopped short of imposing financial assurance requirements for the perpetual care period, citing the potential default of many facilities if faced with such a requirement.

As recently as 2001, an EPA Office of Inspector General (OIG) audit of RCRA financial assurance for closure and post-closure care found that there is insufficient assurance that funds will be available in all cases to adequately cover post-closure monitoring and maintenance (EPA 2001). The audit included nine of the ten EPA regions but excluded Region 8 (which includes Utah, Colorado, Wyoming, Montana, North Dakota and South Dakota). Although states may require more than 30 years of post-closure care, the audit found that (a) most state agencies had not developed a policy or process to determine whether Post-Closure care should be extended beyond 30 years and (b) there is no EPA guidance on determining the appropriate length of post-closure care. The OIG recommended that EPA develop appropriate post-closure care time frames.

The OIG report (EPA 2001) summarized an audit survey of post-closure care needs among privately-owned hazardous waste landfills in nine states (AL, CA, CT, MO, NY, OH, TX, VA, and WA). State officials indicated that 20 percent of the 178 hazardous waste facilities then in post-closure will need care beyond the 30-year period; 6 percent of them will not; and the remaining 74 percent of them have yet to be evaluated for possibly needing to extend the post-closure care period. The audit survey identified only three facilities for which the post-closure period was extended beyond 30 years: two in New York and one in Ohio. However, officials in five of the nine states surveyed (AL, CA, CT, MO, and NY indicated that 30 years was insufficiently long for the post-closure care period and those in two of the other states (OH and TX) have not yet evaluated the adequacy of the 30-year period. The officials also expressed concern that if they extend the post-closure period beyond 30 years without supporting federal criteria, they may become involved in legal battles with facility owners and operators.

The OIG audit survey found that the projected annual monitoring and maintenance costs for the last (30th year) of the post-closure period ranged from $400 to more than $1 million, averaging more than $96,000 per facility. The drop from this level to zero funding in the 31st year could adversely affect state programs and the environment. Further projecting the post-closure costs past the 30th year, based on equivalence to the costs in the 30th year (assuming no unexpected cleanup), the un-funded liability that could fall to the nine states surveyed totals $2.8 million by the year 2017 and $19 million by 2030.

The OIG audit also addressed financial assurance funding mechanisms and found that captive insurance companies do not provide an adequate level of assurance for closure and post-closure care. Although some risks were also found with other mechanisms, many cases were also found where the other financial assurance mechanisms work as intended.

The accuracy of closure and post-closure cost estimates was found often to be inadequate in the nine-state OIG survey. Underestimated costs, leading to insufficient financial assurance funding, are difficult to identify because reviewer judgments rely on different review criteria, reviewer experience, and differing levels of detail in the Closure and Post-Closure plans. An EPA Region IV study found that of 100 facilities in its eight states that submitted cost estimates, 89 had underestimated financial assurance costs by a total of $450 million. In one of the states, with 35 facility-submitted cost estimates, underestimated closure costs totaled $91 million and underestimated post-closure costs totaled $1.7 million.

EPA Region IV developed a software tool to improve state reviews of Subtitle C facility closure and post-closure cost estimates. Based on standard costing information such as published by the R.S. Means Company, the software expedites and standardizes the review process. Prior to its use, several very similar fuel blender facilities submitted closure cost estimates ranging from $100,000 to $5,000,000. Because the estimates were documented so inconsistently, it was difficult for individual states even to challenge the wide discrepancies for like facilities. Several states reported in the OIG survey that they used the software while four of the nine states surveyed were unaware that it existed.

In 2007, EPA placed renewed emphasis on the financial assurance programs with issuance of three program memoranda regarding the importance of financial assurance requirements and oversight. (EPA 2007 a, b, c)

In 2009, EPA published a noticed of availability of RCRA Closure and Post-Closure Care Cost Estimating Software. The revised software is an update of the 2001 software and provides EPA and state permit writers with a consistent, accurate and rapid method of evaluating cost estimates for closure and post-closure care of hazardous waste management facilities. The software is made available to state regulators through EPA's software license. (EPA 2009)

State of Utah

The Utah financial assurance requirements for Hazardous Waste Landfills that correspond to regulations are contained in UAC R315-264-140 through 151.

Utah does not require financial assurance if the facility is owned or operated by the State of Utah or the Federal government [UAC R315-264-140(c);]. Utah requires that a financial assurance mechanism be put in place for closure [UAC R315-264-143] and post closure [UAC R315-264-145] for hazardous waste facilities. Assurances of financial responsibility for completion of corrective actions at solid waste management units must be provided [UAC R315-264-550 through 553].

Owners and operators of surface impoundments, landfills, land treatment units, and waste pile units that received waste after July 26, 1982, or that certified closure, according to UAC R315-265-115, which incorporates by reference 40 CFR 265.115, after January 26, 1983, must have post-closure permits, unless they demonstrate closure by removal or decontamination as provided under UAC R315-270-1(c)(5) and (6), or obtain an enforceable document in lieu of a post-closure permit, as provided under UAC R315-270-1(c)(7). If a post-closure permit is required, the permit must address applicable UAC R315-264 groundwater monitoring,

unsaturated zone monitoring, corrective action, and post-closure care requirements of UAC R315. The denial of a permit for the active life of a hazardous waste management facility or unit does not affect the requirement to obtain a post-closure permit under UAC R315-270. Utah requires the same 30-year post-closure care period for hazardous waste disposal facilities [UAC R315-270-1 and UAC R315-264-110 through R315-264-120] but Utah explicitly requires monitoring of gases, water, and land during the period. Utah is more explicit than EPA in defining a stable site, for purposes of terminating post-closure care, as one with little or no settlement, gas production, or leachate generation. Also, the monitoring period may be as long as the Director deems necessary.

Utah's guidelines for closure and post-closure cost estimates follow UAC R315-142 and R315-264-143. The cost basis is also to include costs of obtaining, moving, and placing the cover material, final grading, moving and placing topsoil, fertilizing, seeding, and mulching, and removing any stored items, materials, buildings, equipment, or unnecessary items and materials [UAC R315-270-1(c)].

Utah's insurance requirements are identical to those of EPA and are found in UAC R315-264-140 through R315-264-151. Utah also requires that proof of insurance coverage be provided to the Division [UAC R315-270-14(b)(17)]. Utah's notification requirements are found in UAC R315-264-148.

Since July 1, 2014, commercial hazardous waste disposal or treatment facilities are assessed an annual flat fee (UDWMRC 2016a). The annual fee is set each fiscal year via DEQ's fee schedule process (URL: http://www.deq.utah.gov/FeesGrants/fees/docs/2015/05May/DEQFEEDOC16.pdf) and approved by the Legislature. The fee amount assessed for FY16 for hazardous waste facilities was $2,414,500. This fee is a primary source of funding to support running certain Division programs, along with investment income generated by the fund.

State of California

California financial assurance regulations are contained in Title 22 (Social Security) of the California Code of Regulations, Division 4.5, Chapter 14, Article 6. The CA regulations are numbered identically to EPA regulations, with the prefix §66 (§66264.101 corresponds to 40 CFR 264.101). The California regulatory requirements correspond to those of EPA regulations in 40 CFR 264.101, 40 CFR 264.117, 40 CFR 264.142, 40 CFR 264.143, 40 CFR 264.144, 40 CFR 264.145, 40 CFR 264.147, and 40 CFR 264.148.

California requires post-closure permits for hazardous waste facilities in the post-closure phase. The post-closure permit is renewed every 10 years. The renewal re-sets the 30-year post-closure care period for the facility. California has several facilities with post-closure permits (URS 2011).

State of Nevada

Nevada hazardous waste and associated financial assurance regulations are identical to those of EPA because they incorporate the EPA hazardous waste land disposal regulations (namely, 40

~~CFR 264.101, 40 CFR 264.117, 40 CFR 264.142, 40 CFR 264.143, 40 CFR 264.144, 40 CFR 264.145, 40 CFR 264.147, and 40 CFR 264.148) by reference. Nevada Administrative Code (NAC) Chapter 444.8632(1) incorporates 40 CFR Parts 260 to 270, inclusive, except as modified by NAC 444.86325, 444.8633, and 444.8634.~~

~~NAC 444.86325(2)(h) modifies 40 CFR parts 264.143(g), 264.143(h), 264.145(g), and 264.145(h) to delete the sentence: "If the facilities covered by the mechanism are in more than one Region, identical evidence of financial assurance must be submitted to and maintained with the Regional Administrators of all such Regions." NAC 444.8633 modifies references in 40 CFR to refer to state-specific rules and organization.~~

~~NAC 444.8634 defines other meanings to certain terms referred to in 40 CFR, including references for payment and deposit of certain fees.~~

~~State of Oklahoma~~

~~Oklahoma hazardous waste and associated financial assurance regulations are identical to those of EPA because they incorporate the EPA hazardous waste land disposal regulations (namely, 40 CFR 264.101, 40 CFR 264.117, 40 CFR 264.142, 40 CFR 264.143, 40 CFR 264.144, 40 CFR 264.145, 40 CFR 264.147, and 40 CFR 264.148) by reference. Oklahoma Administrative Code (OAC) Title 252, Chapter 205-3-2(f) incorporates all of the above-listed parts of 40 CFR Part 264.~~

~~State of Ohio~~

~~Ohio financial assurance regulations are contained in Ohio Administrative Code Chapters 3745-54 and 3745-55. The Ohio regulations are similar to EPA regulations, with the prefix OAC 3745-55-~~nn~~ (e.g., nn is 17 in OAC 3745-55-17 that corresponds to 40 CFR 264.117). The Ohio regulations generally correspond to EPA regulations in 40 CFR 264.117, 40 CFR 264.142, 40 CFR 264.143, 40 CFR 264.144, 40 CFR 264.145, 40 CFR 264.147, and 40 CFR 264.148.~~

~~One significant difference occurs in financial assurance for remedy pathway (corrective action). While OAC 3745-54-100 and OAC 3745-54-101 prescribe the requirements for remedy pathway, they do not require that financial assurance for remedy pathway be set aside beforehand in trusts or other accounts. Financial assurance is required upon selection of remedy pathway.~~

~~Ohio is currently evaluating the adequacy of the 30-year period that it presently requires for post-closure care. (URS 2011) Ohio has extended its post-closure care requirement beyond the 30-year length for one hazardous waste landfill, as of the 2001 EPA OIG survey.~~

~~State of Texas~~

~~Texas financial assurance regulations for commercial hazardous waste landfills are contained in Title 30, Texas Administrative Code, Chapters 37 and 335. The Texas regulations generally correspond to EPA regulations in 40 CFR 264.101, 40 CFR 264.117, 40 CFR 264.142, 40 CFR 264.143, 40 CFR 264.144, 40 CFR 264.145, and 40 CFR 264.147. One significant difference is~~

in the basis for the closure cost estimate, where Texas requires, in 30 TAC §335.178, that the closure cost estimate include removing, shipping, and handling all site wastes and costs for off-site disposal.

Texas is currently evaluating the adequacy of the 30-year period that it presently requires for post-closure care (URS 2011). However, Texas had not extended its post-closure care requirement beyond the 30-year length for any of its hazardous waste landfills as of the 2001 EPA OIG survey.

State of South Carolina

South Carolina financial assurance regulations for commercial hazardous waste landfills are contained in the South Carolina Code of Regulations (SCCR), Section 28-61-79. The South Carolina regulations generally correspond to EPA regulations in 40 CFR 264.101, 40 CFR 264.117, 40 CFR 264.142, 40 CFR 264.143, 40 CFR 264.144, 40 CFR 264.145, and 40 CFR 264.147. They explicitly call for financial assurance for corrective action [SCCR 28-61-79.264.101(b)], and allow for the closure cost estimate to include on-site disposal, as in the EPA regulation [SCCR 28-61-79.264.142].

Comparison of Utah Requirements with other States and EPA Requirements

Utah's requirement for financial assurance for corrective actions is equivalent to EPA's, which requires the financial assurance commitment to be contained in the operating permit with the closure financial assurance commitment. However, Utah adds qualifiers that the financial assurance for corrective action is only required in cases of known releases, and that it is not required for facilities operated by the federal or state (Utah) government. California, Nevada, Oklahoma, Texas, and South Carolina have similar requirements for corrective action financial assurance to those of EPA. However, Ohio does not include financial assurance for corrective actions in their rules for corrective actions.

The 30-year post-closure period specified by EPA is adopted by all of the six other states reviewed here for maintenance, monitoring, and reporting. The states are virtually identical to the EPA rule, except in specifying the appropriate state administrator or department instead of the EPA administrator for either shortening or extending the 30-year post-closure period depending on site conditions. Through its renewal process every 10 years for hazardous waste management facilities with post-closure permits, the State of California effectively extends the term of the post-closure period. Utah's rule for the post-closure care period is more specific than the others in specifying criteria for altering the length of the post-closure period. The criteria require stability in landfill settlement, gas production and leachate generation.

Cost estimating for closure of hazardous waste management facilities has become more uniform throughout the US, since issuance of the cost estimating codes "CostPro" by EPA (EPA 2009). Cost estimates in Utah and the other six states correspond to EPA's basis: that the closure be done by a third party, that it is based on the worst-case time or condition for the site, and that the cost estimates be updated annually for inflation, changing site conditions, and changed operating and closure plans. Texas departs from the EPA and other state positions in requiring off-site

disposal of all site wastes. Utah specifies more detail than most other states in requiring that the closure estimate include costs of cover material, grading, and topsoil stabilization.

The financial assurance mechanisms allowed by all seven states for site closure and for post-closure care are the same as those allowed by EPA. Similarly, the cost estimates for post-closure care, the liability insurance coverage, and the financial incapacity requirements of all seven states are also the same as those required by EPA.

Comment [VR102]: Out of scope. Comparison to other states is not required by statute.

2.25 DO ANY STATES HAVE FINANCIAL ASSURANCE FOR COSTS AND OTHER BURDENS THAT MIGHT DEVELOP OR EVOLVE AFTER THE PERMIT IS TERMINATED?

Although not the result of an exhaustive search in this evaluation, the Division has identified the following states that have protected themselves against financial and other burdens that might be realized following permit termination for any hazardous waste management facility:

State of Ohio

Envirosafe Services of Ohio operates a facility in Oregon, OH. The facility began operations in 1954 as a family-owned and -operated municipal and industrial solid waste landfill. The land area of the facility is 133 acres.

In 1988, the facility received a Federal RCRA permit, followed by issuance of a State permit in 1991. To comply with the financial assurance requirements, Envirosafe has established a trust fund for the closure and post-closure costs for the facility. In addition to the closure and post closure funding, the 1991 permit issued by the State of Ohio required Envirosafe to establish a perpetual care fund. This fund was designed to ensure funding for corrective measures for as long as waste remains on site. The ESIO trust fund combines all these and was fully funded to specified levels by 1995. The current estimated value of this trust fund is about $56 million.

State of New York

The owner of several hazardous waste landfills in western New York has voluntarily committed to a financial mechanism that effectively ensures the landfills will be protected against costs that might be incurred following permit termination. The CWM Model City hazardous waste management facility is located on the boundary between the towns of Lewiston and Porter in Niagara County. The facility uses fully permitted, state-of-the-art technologies to store, treat and dispose of a variety of liquid, solid and semisolid organic and inorganic hazardous waste and industrial non-hazardous waste.

The New York State Department of Environmental Conservation (DEC) has modified the operating permit of CWM Chemical Services, Inc. L.L.C. to incorporate an agreement that ensures that their Model City facility will always receive adequate long-term care without relying on state funds.

The possible presence of radioactive contaminants at this site may have had some influence in the decision to provide this additional financial protection. That is, it is unclear whether such

financial protections would have been provided, were that waste constituents limited strictly to hazardous constituents.

The agreement provides perpetual monitoring and maintenance of all landfills at the site and perpetual operation and maintenance of the remedial systems that address releases from past waste management practices. The company also agreed to a financial mechanism that provides funds for perpetual stewardship of the site even if CWM were no longer financially viable.

Under current regulations, 30 years of care beyond facility closure is the standard financial requirement. By accepting responsibility for the long-term management of the Model City facility, CWM has accepted a higher standard for stewardship that generally expected within the hazardous waste land disposal industry.

As early as 1989, DEC took steps to ensure long-term management of wastes disposed at the site by including provisions for perpetual care of any new landfill developed at the site. The recent agreement expands that concept by including perpetual care for the closed landfills and for the remedial systems which have already been installed.

State of Kansas

Title 8 of the Kansas Administrative Regulations, Article 31 (Kansas Hazardous Waste Management Standards and Regulations) provides that each active hazardous waste land disposal facility must pay a monthly perpetual care trust fund fee, based on the number of pounds of hazardous waste disposed of at the facility.

The perpetual care trust fund fee is $0.005 per pound of hazardous waste disposed in landfills, $0.00000455 per for pound of hazardous waste disposed by deep well injection, and $0.001 per for pound of hazardous waste disposed by other methods.

State of Mississippi

Although it appears that its provisions were repealed after December 31, 1996, the Mississippi Code of 1972 as amended (revised through the 2003 legislature), Section 17-17-53(4)(a) provided that thirty-five percent (35 percent) of all monies received by the State Tax Commission under provisions of the named section would be appropriated to and utilized by the Department of Environmental Quality for the perpetual care and maintenance account of commercial facilities that manage hazardous or nonhazardous solid waste.

The amount paid by the Permittee to the State Tax Commission was determined as follows:

- Ten Dollars ($10.00) per ton for hazardous waste generated and disposed of in the state by landfilling or any other means of land disposal and for hazardous waste generated and stored for one year or more in the state;
- Two Dollars ($2.00) per ton for hazardous waste generated and treated in the state and for hazardous waste generated and stored for less than one year in the state; and
- One Dollar ($1.00) per ton for hazardous waste generated and recovered in the state.

Comment [VR103]: Whether or not these are included by other states does not address if Utah is adequate (as required by statute). Incorporation by other state is subjective to conditions and permits in that state.

2.26 WHAT LEGAL OR REGULATORY REVISIONS SHOULD BE MADE TO PROVIDE FOR THE COSTS ASSOCIATED WITH PERPETUAL CARE?

The Utah Waste Management and Radiation Control Board (UWMRCB) has identified the following areas in which improvements might be made to address the issue of perpetual care at closed commercial hazardous waste disposal facilities:

- The UWMRCB recommends that a perpetual care fund be created and funded to provide for ongoing monitoring and maintenance of commercial hazardous waste land disposal facilities after termination of the post-closure permit.
- The UWMRCB recommends that the creation of any such fund should take into account the financial impact on current facilities.
- The UWMRCB recommends that additional funds not be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial hazardous waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells to current regulatory standards. All phases of landfill construction are reviewed, monitored, and approved by the Director. The design and construction of landfill cells ensure containment of wastes as a means to prevent additional superfund sites. Other factors include the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Corridor, which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities. (More details are provided in Section 2.20 under the heading "Should funds be required for costs that might be incurred for major events following post-closure permit termination?")

Comment [VR104]: Out of scope. Statute requires evaluation of adequacy of funds – NOT possible regulatory or legal revisions.

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3. LOW-LEVEL RADIOACTIVE WASTE TREATMENT AND DISPOSAL FACILITIES

The commercial ~~management~~ disposal of LLRW in Utah is regulated under provisions of the Utah Administrative Code, Title R313-25. Individual commercial LLRW management facilities must submit applications ~~for a~~ to license, ~~to~~ construct, ~~and~~ operate and eventually close such ~~a~~ facilities~~y~~.

The Director reviews ~~the~~ each license application ~~and~~ to ensure~~s~~ that the facility will satisfy its regulatory performance objectives and complt with applicable ~~all~~ technical and regulatory requirements~~issues are resolved in accordance with regulatory requirements and guidance~~. The purpose of the Director's review is to develop reasonable assurance that applicable regulatory requirements will be satisfied during all phases of facility life, including construction, operation, closure, and institutional control (100 years after facility closure). Given that applicable regulations are satisfied, confidence exists that the public health and the environment will be properly protected during facility operation and after its closure.~~.~~

Once all regulatory issues are resolved to ensure compliance with regulatory provisions, the Director prepares a draft license, notifies the public of its intention to issue a license, receives and responds to public comment, and issues the license. The license contains requirements ~~beyond those contained in regulations~~ to ensure that regulatory requirements ~~commitments the applicant made during the application review process~~ and assumed design conditions are achieved, in practice.

Up until completion of the institutional control period, t~~T~~he Director maintains regulatory surveillance during all phases of facility life to ensure compliance with regulatory requirements and all license conditions. The Director may ~~regularly~~ conduct~~s~~ compliance inspections of ~~all aspects of~~ facility operations covered by regulations and license conditions. Departures from required conditions and performance are addressed through a range of ~~enforcement~~ actions to ensure safe operation and that the environment and human health are ~~is~~ properly protected. Active regulatory oversight minimizes unexpected catastrophic events at the end of institutional control.

Regulatory requirements provide assurance that funds will be available to meet the costs of operating, decommissioning, maintaining, or monitoring the facility. The ~~Owner/~~Licensee is required to provide financial assurances for completion of closure and institutional control in the event that they are unwilling or unable to complete such.~~to protect against the possibility that it may not be able or willing to meet all such potential costs.~~

Utah Administrative Code R313 requires that the licensee must provide legally enforceable financial assurances (sureties) to cover ~~all~~ costs associated with facility closure and institutional control. These financial assurances ~~are intended to~~ cover anticipated costs through the facility operating life and a 100 year institutional control period.~~nominally for the 100 years that following closure.~~ These funds are available to the Director under stated conditions ~~and~~ to ensure that the State will not fund closure, maintenance, and institutional control costs from public sources. While not required in US Nuclear Regulatory Commission rules or for hazardous waste

Comment [VR105]: The level of scrutiny in Section 3 should match that in Section 2.

Comment [VR106]: By definition, compliance with "guidance" is not required.

Comment [VR107]: By definition.

Comment [VR108]: Frequency is set by the director, not this report.

Comment [VR109]: Director not authorized to conduct OSHA-related aspects of facility operations…

Comment [VR110]: Not all responses are enforcement in nature.

Comment [VR111]: Nothing "nominal" about it.

permittees (addressed in Chapter 2), ~~In addition to financial assurances provided by the licensees,~~ Utah has also established a Radioactive Waste Perpetual Care and Maintenance Fund (referred to in this report as the "Perpetual Care Fund") whose purpose is to provide for the care of closed disposal facilities following the institutional control period ~~and to protect against the possibility of shortfall during the institutional control period~~.

The Perpetual Care Fund has been funded to $13 million since the statute's creation. Annual c~~C~~ontributions to the Perpetual Care Fund have been made ~~annually~~ by ~~each~~ the licensee (Energy*Solutions*) in the amount of $400,000 per year of active facility operation. The balance of the fund has been pledged via surety vehicle (to ensure a total value of $13 million has been available since the statutes creation. The fund, including contributions and earnings but excluding the surety gap addition, totaled about $6.2~~18~~ million as of June 2016.

In this assessment, only those facilities currently licensed to manage LLRW are considered. ~~No consideration is given to the possibility that existing facilities might be expanded to provide additional services and additional disposal capacity.~~

In this section, the following are addressed:

- ✓ Facilities licensed by the State of Utah to treat and/or dispose of LLRW are identified and generally described.
- ✓ Facilities required to maintain financial assurances are identified and the nature of assurances they provide are briefly described.
- ✓ Representative closure and institutional control activities are described.
- ✓ Closure and institutional control financial assurances provided as required are identified and described.
- ✓ Ways in which closed commercial LLRW management facilities might fail are identified and the orders of magnitude of their costs, their probabilities, and their financial risks bracketed.
- ~~✓ Changes to current legal and regulatory requirements recommended.~~

Answers to several questions equivalent to those addressed in Chapter 2 are relevant and instructive. These questions and their answers follow in Section 3.1 below.

Legislation (Senate Bill 173) was enacted during the 2015 General Session of the Utah Legislature and signed into law March, 22, 2015, ~~that~~ allowing~~s~~ a radioactive waste disposal facility to use a *third-party bid* to estimate required surety amounts. The bid would be in effect for five years with financial surety updates for the intervening years calculated using an approved cost-of-living (inflation) factor. The Bill also ~~changes~~ clarifies the area that the Director can ask for financial surety to the area specifically identified in the Radioactive Materials License (rather than all other ~~the~~ property area that is under ownership/control by the licensee – but on which radioactive waste management is not authorized).

The Bill's passage also included a requirement that rules be promulgated by September 2015. However, t~~T~~he U.S. Nuclear Regulatory Commission (NRC) has indicated that implementation

Comment [VR112]: Shortfalls during the institutional control period are addressed via design and modeling conservatisms, regulatory enforcement during construction and operation, and institutional control period surety calculations.

Comment [VR113]: Since this is not part of the statutory charge, it would be inappropriate to include this, anyway.

Comment [VR114]: Out of scope. Is it adequate or not?

Comment [VR115]: The director has always been limited to the land area defined by the license. S.B. 173 was written to better clarify not redefine.

of Senate Bill 173 (S.B. 173) would make Utah "incompatible" with the federal financial assurance regulations for radioactive waste disposal facilities (as they exclude disturbed areas). The Division has delayed proposing rules to the Board that address the changes directed by Senate Bill 173, until the incompatibility has been resolved. While t~~T~~he Director is currently working to address the NRC's concerns with S.B. 173, further consideration herein is beyond scope until such revisions become statute. ~~Further amendments to the statute were proposed during the 2016 General Session of the Utah Legislature (S.B. 231), but were not passed. New legislation is planned for the 2017 General Session to ensure compatibility with the NRC.~~

Comment [VR116]: Speculative

3.1 WHAT FACILITIES HAS THE STATE OF UTAH LICENSED TO TREAT AND/OR DISPOSE OF LLRW?

The owners of any facility that ~~will~~ manage (that is, treat or dispose of) LLRW must ensure that funds are available to cover the costs associated with closing or maintaining the facility during the institutional control period ~~following closure~~ of that facility. These facility owners provide legally ~~-~~-enforceable financial assurances required under the Utah Administrative Code. Financial assurances must be sufficient to cover ~~all cost associated with~~ facility closure and institutional control.

~~The facilities licensed for LLRW management in Utah involve hazards that will persist after successful closure and stabilization. Such hazards are associated with LLRW that remain at the facility following closure and stabilization (because they are disposed of at and not removed from the site). Accordingly, these~~ F~~f~~acilities~~, as~~ shown in Table 3-1~~,~~ provide financial assurances to cover ~~not only~~ closure and ~~stabilization costs, but also costs expected during~~ institutional control activities.

Comment [VR117]: This same statement could also be made about hazardous waste (which does not decay), but was excluded in Chapter 2.

Table 3-1. Commercial radioactive waste management facilities licensed in Utah

Facility[15]	Licensed to:	Provides financial assurances for:
Energy*Solutions*; LLRW Facility	Dispose	Closure and Institutional Control
Energy*Solutions*; 11e.(2) Facility	Dispose	Closure and Institutional Control[16]
Energy*Solutions* Mixed Waste Facility	Treat[17], Store, and Dispose	Closure and Post-Closure

[15] All three facilities are located at Clive, Utah.

[16] Under provisions of the Nuclear Waste Policy Act of 1982, the US Department of Energy must by law provide long-term care of 11e.(2) facilities that have been closed and stabilized in compliance with US Nuclear Regulatory commission requirements. An additional condition of accepting such facilities is that funds sufficient to cover all long-term care costs must be transferred to the US DOE. One current facility will eventually be transferred to US DOE's care under these provisions: Energy*Solution's* 11e.(2) embankments at Clive, Utah. The Vitro embankment has already been transferred to US DOE.

[17] Permitted Facility in connection with Utah Hazardous Waste Permit UTD982598898.

3.2 WHAT IS THE "LIFE CYCLE" OF A COMMERCIAL LLRW MANAGEMENT FACILITY?

The life cycle of a LLRW facility consists of the phases or periods shown generally in Table 3-2.

Table 3-2. General phases of commercial LLRW facility

Phase or Period	Typical Duration (years)	Applicability
Licensing and Initial Development	2 to 5 years	Treatment, Storage, and Disposal Facilities
Operating	15 to 40 years	Treatment, Storage, and Disposal Facilities
Closure and Stabilization	1 to 5 years	Treatment, Storage, and Disposal Facilities
Institutional Control	Up to 100 years	Disposal Facilities
Following Institutional Control	Unlimited	Disposal Facilities

3.3 WHAT IS FACILITY "CLOSURE ~~AND STABILIZATION~~"?

When the decision is made that the facility will no longer actively operate, it undergoes ~~must go through~~ a formal procedure known as facility ~~to close~~closure. ~~, decontaminate, dismantle, decommission, and stabilize the facility and any components that remain.~~ The purpose of facility closure ~~and stabilization~~ is to isolate remaining radioactive wastes, to the extent achievable, from the environment or exposure to the general public. If waste is left in place, then institutional control financial assurance covers costs of expected post-closure care. Such is the case for facilities licensed to dispose of radioactive waste. ~~eliminate the need for ongoing active maintenance to the extent practicable so that only minor custodial care, surveillance, and monitoring are required following closure and stabilization.~~

~~If all such hazards cannot be eliminated, then financial assurances for institutional control will be required to cover costs associated with the residual hazards (that is, to cover costs of institutional control).~~

Facility closure ~~and stabilization~~ activities include:

- ✓ Disposing or shipment offsite of any waste received but not yet disposed of at the time closure commences
- ✓ Decontaminating of remaining support structures and operating equipment.
- ✓ Dismantling and disposing of support structures, support systems, and equipment as required ~~and appropriate~~.
- ~~✓ Disposing of any waste received but not yet disposed of at the time closure commences.~~

Comment [VR118]: Not cited in this manner in Chapter 2.

Comment [VR119]: Not equivalent to presentation in Chapter 2.

Comment [VR120]: See VR113

Comment [VR121]: You are presupposing a disposal facility here, where above you included other hazardous waste permitted facilities than just disposal.

Comment [VR122]: See VR28

Comment [VR123]: See VR29

- ✓ When required by the license, c~~C~~ontinuing the operational environmental monitoring program.
- ~~✓~~ Closing ~~and stabilizing all~~ disposal units according to the design and license requirements. ~~, once all waste has been disposed of.~~
- ~~✓~~

In general, f~~F~~acility closure ~~and stabilization~~ activities do not include ~~such activities as~~:

- ✓ Conducting environmental corrective actions.
- ✓ Repairing ~~Providing major repair or replacement of~~ facility components.

~~3.4 WHO PERFORMS A FACILITY CLOSURE AND STABILIZATION?~~

~~Under normal conditions, the Owner/Licensee will conduct facility closure and stabilization at its own expense. Closure activities must be pursued until the Director determines that the facility has been successfully closed and that all hazards have been eliminated (or appropriately addressed where residual hazards remain). In this case, the terms and conditions for exercising the financial assurances would not be fulfilled and no funds would be disbursed from the financial assurance for closure.~~

~~Under unusual conditions, the Owner/Licensee may be unable or unwilling to conduct the closure. Under these conditions, and in accordance with applicable terms of the mechanism used to provide the required financial assurance mechanism, the Director may conduct the closure using an independent third-party contractor. To cover the costs of such closure under these circumstances, the Director would use the financial assurance provided for closure. Thus, the State is protected from the financial liabilities that might otherwise be associated with facility closure.~~

~~3.5~~3.4 WHAT IS "INSTITUTIONAL CONTROL"?

Following facility closure, the access to the facility is controlled and the surrounding environment monitored. ~~responsibilities for controlling the site and for monitoring and maintaining the facility lie with the landowner or a custodial entity.~~ This period of time is referred to as the institutional control period. The duration of the institutional control period will be determined by the Director, but institutional controls may not be relied upon for more than 100 years following facility closure ~~under provisions of the Utah Administrative Code. The criteria for terminating the Institutional control period are not defined or stated in Utah statute or code.~~

Institutional control activities typically include ~~The landowner or custodial entity will conduct an institutional control program, including activities such as~~:

- ✓ Controlling physical access to the closed facility
- ✓ Continuing the ~~onducting an~~ environmental monitoring program ~~at the disposal site~~
- ✓ Performing periodic surveillance

Comment [VR124]: See VR24 and VR30.

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Comment [VR125]: Not equivalent to Chapter 2.

Comment [VR126]: See VR31

Comment [VR127]: Out of scope and not in Chapter 2.

- ✓ Providing minor custodial care and maintenance
- ✓ Maintaining records
- ~~✓ Reporting periodically to the Regulatory Agency~~
- ~~✓ Carrying out other equivalent activities as determined by the Director~~
- ~~✓ Administering funds to cover the costs for these activities~~

~~Custodial care, as used above, includes such activities as:~~

- ~~✓ Repairing fencing~~
- ~~✓ Repairing or replacing monitoring equipment~~
- ~~✓ Reestablishing or controlling vegetation on stabilized disposal unit areas~~
- ~~✓ Performing minor repair of disposal unit covers~~
- ~~✓ Providing general disposal site upkeep~~

~~Active maintenance is also allowed during the institutional control period and may include:~~

- ~~✓ Pumping and treating water from a disposal unit~~
- ~~✓ Replacing a disposal unit cover~~
- ~~✓ Taking other episodic or continuous measures~~

~~Institutional control activities typically do not include such activities as environmental restoration activities or corrective actions made necessary because of the failure of design features and components. Pumping and treating water found contaminated with radioactive constituents released from the closed and stabilized disposal site is an example of such remedial activities and corrective actions. Such remedial activities or corrective actions could potentially be paid with an appropriation by the Legislature from the Radioactive Waste Perpetual Care and Maintenance Account (Perpetual Care Fund) (refer to Questions 3.11 through 3.13), if necessary.~~

~~Termination of the Institutional Control period before the Perpetual Care Fund grows to a future value of $40 to $60 million might jeopardize the adequacy of the Institutional Control financial assurances under assumptions of this evaluation. Specifically, monies in a Perpetual Care Fund could be assumed to be invested and to grow at rates that exceed the rate at which costs escalate by 2 percent per year or the real return on investment may be less. Under these conditions, the real value of Perpetual Care Fund grows faster than the costs of the potential demands grow. By the time the value of the Perpetual Care Fund would have grown to $35 to $60 million, it is judged to have sufficient capacity to cover the estimated costs of unplanned or unexpected events for which other financial assurances are not available (refer to Questions 3-14, 3-19, and 3-23).~~

~~*3.6 WHO PROVIDES INSTITUTIONAL CONTROL AND WHO PAYS FOR IT?*~~

~~Under expected conditions, the landowner or a custodial entity will provide care and maintenance of the closed facility during the institutional control period. In the case of the~~

Comment [VR128]: See VR38

Comment [VR129]: See VR39 and VR40

Comment [VR130]: Report says that institutional control does "not include such activities as environmental restoration or corrective actions". The paragraph goes on to say that these activities are funded by the Perpetual Care Fund. However, DWMRC requires licensee put remedial activities into the regular surety. If so, it is inappropriate to also require it in the Perpetual Care Fund.

Comment [VR131]: Excluded from Chapter 2.

Energy*Solutions* facility at Clive, Utah, the facility Licensee (Energy*Solutions*) is the landowner. No custodial entity has been identified at this time and the State has not defined the process by which the custodial agency would be identified.

The costs of institutional control activities will be funded by financial assurances that the Licensee has provided for this purpose. The adequacy of these financial assurances are revised and submitted to the Director annually. In turn, the Director reviews and approves the proposed financial assurances once the proposed provisions are determined to satisfy applicable requirements.

Comment [VR132]: See VR41

3.7 WHO IS RESPONSIBLE FOR OVERSEEING THE CLOSED FACILITY AT THE END OF 100 YEARS OF INSTITUTIONAL CONTROL?

Under the current regulatory structure and license conditions for the currently licensed facilities, the responsibility for monitoring and maintenance continues with the licensee upon successful closure of the facility for the (100-year) institutional control period. Of course, laws and regulatory requirements might evolve over such a long period of time, not to mention the possibility that the licensee might cease to exist at any time.

The Hazardous Waste Regulation and Tax Policy Task Force of the Utah Legislature evaluated responsibility for the facility following closure and other issues during the interims of 2003 and 2004. State and federal regulations require transfer of a LLRW disposal site to either a state or federal government entity. In the case of Envirocare (now Energy*Solutions*), during the initial licensing process, the Director of the Utah Division of Radiation Control granted an exemption from the provisions of this rule based on meeting alternate criteria including placement of deed restrictions on the property.

During discussions of this issue, it was pointed out that it is unlikely that a licensee such as Energy*Solutions* would want to continue maintaining and monitoring a closed facility throughout the institutional control period. Consequently, it is reasonable to assume that at a future point, either the federal government or the State would assume responsibility for the site. As pointed out in this report and discussed by the Task Force, the federal government already has responsibility under the Uranium Mill Tailings Radiation Control Act to assume long-term stewardship of two embankments on the existing Energy*Solutions* site. These embankments are the 100-acre Vitro Tailings pile that has already been transferred to the Department of Energy (US DOE) for perpetual care and the operating uranium mill tailings disposal unit (11e.(2)) that will eventually be transferred to US DOE as well.

A potential option under consideration by the Task Force was the State of Utah should assume the responsibility for care of the site following the institutional control period. During the discussions of the Task Force, a motion was made at the September 14, 2004 meeting to defer any recommendation on site return

legislation. Since there were many issues under consideration at the time, the site ownership issue was not viewed as a priority for legislation.

In order for either of these scenarios to be realized, a new statutory provision would have to be passed and signed into law. If the Legislature were to decide that the State would assume site ownership, the statute could address the following issues:

- The State may assume ownership of a closed LLRW disposal facility for purposes of providing perpetual care at the end of 100 years after the date of the final closure of the facility unless the federal government has already taken ownership of the facility. The Legislature may appropriate monies from the Radioactive Waste Perpetual Care and Maintenance Account for the state to assume perpetual care responsibilities.
- The State may assume ownership of the facility for purposes of other than providing perpetual care. In this case, funds from the Radioactive Waste Perpetual Care and Maintenance Account may be appropriated by the Legislature to cover costs incurred by the State for closure or institutional control of the facility above any monies obtained by the Director as a result of actions relating to required financial assurance requirements.
- If the US DOE or another federal agency were willing to take ownership of the facility, the funds in the Radioactive Waste Perpetual Care and Maintenance Account established under §19-3-106.2 might be used to support relevant functions of the agency taking ownership of the facility

Comment [VR133]: Out of scope. Not presented in Chapter 2. Not required as part of review in Statute.

3.8 WHAT FORMS OF FINANCIAL ASSURANCES FOR CLOSURE AND INSTITUTIONAL CONTROL (FINANCIAL ASSURANCE MECHANISMS OR FINANCIAL SURETIES) ARE ALLOWED BY THE RULES?

An owner or operator may provide financial or surety arrangements that are generally acceptable to the Director, including:

- Surety bonds
- Cash deposits
- Certificates of deposit
- Deposits of government securities
- Irrevocable letters of credit
- Trust funds
- Combinations of the above or other types of arrangements, including commercial insurance, as may be approved by the Director.

Self-insurance, or an arrangement which essentially constitutes self-insurance, does not satisfy the surety requirement for private sector applicants under Utah Administrative Code.

The financial or surety arrangement must be written for a specified period of time. The surety arrangement must be automatically renewed unless the person who issues the surety notifies the Director; the beneficiary, the site owner; and the principal, the Licensee, not less than 90 days prior to the renewal date of its intention not to renew. In such a situation, the Licensee must

~~submit a replacement surety within 30 days after notification of cancellation. If the Licensee fails to provide a replacement surety acceptable to the Director, the beneficiary may collect on the original surety.~~

~~Proof of forfeiture is not necessary to collect the surety. Thus, in the event that the Licensee is unable to provide an acceptable replacement surety within the required time, the beneficiary may automatically collect the surety before it expires. The conditions described above must be clearly stated on surety instruments.~~

Comment [VR134]: See VR42

~~3.9~~3.5 *WHAT ARE THE ESTIMATED COSTS TO CLOSE A FACILITY AND PROVIDE INSTITUTIONAL CONTROL?*

The most recent Director's annuall-approved costs estimate~~d~~ for the closure and institutional control of commercial LLRW management facilities licensed by Utah are presented in Table 3-3. ~~These estimated costs are the most recent costs revised and updated by Owners/Licensees and reviewed by the Director. Following t~~The Director annually ~~'s independent~~ reviews and approves the financial assurance amoutns~~to ensure that applicable requirements were satisfied, the Director accepted them as an adequate basis for determining required financial assurances. Such costs are revised and independently reviewed by the Division annually and revisions made until applicable requirements are satisfied. Estimates of these costs were not further independently reviewed in the preparation of this report.~~

Comment [VR135]: Wording should be equivalent to Chapter 2.

Table 3-3. Summary of estimated facility closure and institutional control costs for commercial radioactive waste management facilities licensed by the State of Utah

Facility	Estimated Facility Closure Cost	Estimated Institutional Control Cost
Energy*Solutions*; LLRW Facility	$~~58.5~~49.7 million	$7.7~~6.2~~ million[18]
Energy*Solutions* Mixed Waste Facility	$12 million	$7.7 million~~Covered Under Post-Closure~~
Energy*Solutions*; 11e.(2) Facility	$11.8 million	US DOE Long-Term Stewardship Program[19]

These cost estimates must account for all activities and costs that will be required to close the facility and to care for it during the post-closure care period. The costs estimates must also be based on the assumption that an independent third party contractor performs the required work.

[18] Closure and Institutional Control Financial Assurances total $64,681,299 as of March 2015.

[19] Under provisions of the Nuclear Waste Policy Act of 1982, the US Department of Energy must by law provide long-term care of 11e.(2) facilities that have been closed and stabilized in compliance with US Nuclear Regulatory commission requirements. An additional condition of accepting such facilities is that funds sufficient to cover all long-term care costs must be transferred to the US DOE. One facility will eventually be transferred to US DOE's care under these provisions: Energy*Solution's* 11e.(2) embankment at Clive, Utah. The Vitro embankment has already been transferred to US DOE

~~The approach to estimating closure and institutional costs involves the following steps:~~

- ~~✓ Identify all necessary activities~~
- ~~✓ Estimate all required levels of effort, equipment, materials, supplies, and subcontractor support~~
- ~~✓ Determine unit costs for each cost item (labor, equipment, materials, and supplies)~~
- ~~✓ Calculate individual costs and aggregate~~
- ~~✓ Determine suitable contingency allowances~~
- ~~✓ Submit for Director review and revised to address their concerns~~
- ~~✓ Receive formal approval~~

Comment [VR136]: Not included in Chapter 2.

Estimated costs can be influenced by such factors as: ~~and their updates must account for such factors as:~~

Comment [VR137]: Same wording as Chapter 2.

- ✓ ~~Specifics of plans to~~C ~~c~~losure and ~~provide~~ institutional control plan specifications.
- ~~✓ Current site-specific conditions (such as geotechnical and hydraulic characteristics of soils, meteorological conditions, and characteristics of waste managed at the facility) available at or near the facility.~~
- ~~✓ Recent developments in technologies that could improve the conduct of any activity required during closure or institutional control.~~
- ~~✓~~ Changes in volume or ~~unit~~ costs of items or activities required to close or provide institutional control ~~(such as the price of fuel, reduced availability of materials, and changes in qualified labor supply).~~

Closure ~~and stabilization~~ costs must address ~~be estimated making allowances for~~ applicable requirements. For example, ~~:~~

- ✓ The ~~Owner/~~Licensee must design, operate and close the facility so that the need for further ~~ongoing active~~ maintenance is minimized. ~~eliminated to the extent practicable and so that only minor custodial care, surveillance, and monitoring are required following closure.~~

Comment [VR138]: See chapter 2.

- ✓ The cost estimate must assume that an independent third party will be hired to perform ~~all~~ closure activities and institutional control care. ~~and stabilization work.~~

Comment [VR139]: See VR49

- ~~✓ Pending resolution of potential inconsistencies in requirements between the NRC and those provided in S.B. 173, cost estimates for closure may be derived directly through a third-party bid in accordance with the requirements contained in S.B. 173.~~

Comment [VR140]: Speculative. Statute requires evaluation given current laws and requirements.

~~The closure financial assurance cost estimates provided in Table 3-3 reflect surety cost estimates that were approved by the Director in March 2015. Following the passage of senate bill (S. B. 173) in 2015, Energy*Solutions* submitted two proposed alternative cost estimates for closure of the Energy*Solutions* facility prepared on their behalf by two separate third-party engineering firms. In these proposed alternative cost estimates, the surety estimates were developed by combining the~~

~~sureties for LLRW, 11e.(2) and Mixed Waste facilities by assuming that all three facilities would close at the same time. It has not yet been determined whether the sureties can be combined given that the different disposal facilities at the Clive Complex are subject to different regulatory/legal requirements. If either or both of the proposed alternative closure cost estimates are approved, the total required surety amount for closing all three licensed disposal facilities could be reduced compared to the currently approved surety amounts that are shown in Table 3-3.~~

~~The initially proposed language in S.B. 173 also changed the area that the Director can require be covered by the financial surety to the area specifically licensed (area in Section 32). The two proposed alternative surety estimates are currently under review by the Director.~~

~~Subsequent to release of the initial proposed version of S.B. 173 for comment, the U.S. NRC indicated that the requirements contained in the new legislation regarding financial surety for LLRW licensees were not compatible with the NRC's financial surety requirements. Draft proposed revised financial assurance requirements for LLRW facilities in Utah were submitted to the NRC in February 2016 for review and comment (see Section 3.13).~~

Comment [VR141]: These do not reflect currently funded surety and perpetual care. This discussion is out of scope.

~~3.10~~3.6 *WHAT FINANCIAL ASSURANCES ARE CURRENTLY BEING PROVIDED FOR CLOSURE AND INSTITUTIONAL CONTROL?*

As of 2015, closure financial assurances listed in Table 3-4 for the costs of closing licensed commercial LLRW management facilities and maintaining institutional control.

Table 3-4. Financial assurances presently provided by Owners/Licensees in Utah

Facility	~~Closure Financial Assurance Mechanism~~	Closure Financial Assurance Provided	~~Institutional Control Financial Assurance Mechanism~~	Institutional Control Financial Assurance Provided
Energy*Solutions*; LLRW Facility	~~Surety Bond~~	$58.5 million[20]	~~Surety Bond~~	$6.2 million
Energy*Solutions* Mixed Waste Facility	~~Surety Bond and Standby Trust~~	$12 million	~~Not Applicable~~	Not Applicable
Energy*Solutions*; 11e.(2) Facility	~~Surety Bond~~	$11.8 million	~~US DOE Long-Term Stewardship Program[21]~~	$0.9 million

Comment [VR142]: See VR55 and VR56

[20] Closure and Institutional Control Financial Assurances total $64,681,299 as of March 2015.

~~[21] Under provisions of the Nuclear Waste Policy Act of 1982, the US Department of Energy must by law provide long-term care of 11e.(2) facilities that have been closed and stabilized in compliance with US Nuclear Regulatory commission requirements. An additional condition of accepting such facilities is that funds sufficient to cover all long-term care costs must be transferred to the US DOE. One facility will eventually be transferred to US DOE's~~

~~As required by Utah Administrative Code R313-25-31(3), these cost estimates and the resulting financial assurance arrangements are updated, critically reviewed, revised as necessary, and approved each year. Annually revised costs estimates account for changes in prevailing site conditions; the closure plan; institutional control plan; technologies available to accomplish closure and provide institutional control; and the effects of inflation.~~

Comment [VR143]: Not included in chapter 2.

~~3.11~~3.7 WHAT IS "PERPETUAL CARE AND MAINTENANCE"?

The term "perpetual care and maintenance" is not defined in the Utah Administrative Code or US Nuclear Regulatory Commission.

~~The concept of providing for the perpetual care and maintenance of a facility is well established and accepted where the obligation to care for a facility is expected to persist beyond the lives of the individuals and entities involved in developing and operating the facility. In the context of commercial LLRW management facilities, the costs of providing perpetual care and maintenance at a closed commercial LLRW management facility are paid through legislative appropriations from the Perpetual Care Fund.~~

~~In general terms, perpetual care and maintenance would typically include activities that might be necessary following cessation of institutional control activities, such as:~~

Comment [VR144]: Inappropriately different than tone in Chapter 2.

- ~~Maintaining appropriate levels of site security.~~
- ~~Providing repairs to components whose failure has compromised or could compromise the stability and safety of the closed facility.~~
- ~~Performing routine maintenance of site and support structures and systems (such as landscaping, painting, maintaining fences, and repairing minor damage to cover systems.~~
- ~~Complying with applicable regulatory or legal requirements.~~
- ~~Managing perpetual care and maintenance activities.~~
- ~~Administering any perpetual care and maintenance fund, were they available.~~

Comment [VR145]: See VR58 through VR64

~~3.12~~3.8 WHAT IS THE RADIOACTIVE WASTE PERPETUAL CARE AND MAINTENANCE FUND?

The Radioactive Waste Perpetual Care and Maintenance Account (Perpetual Care Fund) was created by the Utah Legislature and is stated in UCA §19-3-106.2. Its purpose is to provide funding for the care of closed disposal facilities following the institutional control period~~ and to protect against the possibility of funding shortfall during the institutional control period~~.

Comment [VR146]: This is the burden of DWMRC and the Director's annual review of the surety submittals.

~~care under these provisions Energy*Solution*'s 11e.(2) embankment at Clive, Utah. The Vitro embankment has already been transferred to US DOE.~~

The sources of revenue for the Perpetual Care Fund include annual fees paid by the owner or operator of any active commercial radioactive waste treatment or disposal facility and investment earning produced by the fund. The fee paid by each such owner or operator is $400,000 per year. Monies in the fund are invested by the Utah State Treasurer. The balance of the Perpetual Care Fund as of June 2016 was approximately $6.18 million, including accrued interest. Only the Legislature may authorize use of monies in the Perpetual Care Fund by appropriating funds for the stated purposes. The purposes and authorized uses of these funds under current law include the following.

- ✓ Perpetual care and maintenance of a commercial radioactive waste treatment or disposal facility, excluding sites within the facility used for the disposal of byproduct material (uranium mill tailings), beginning 100 years after the date of final closure of the facility (after the institutional control period).
- ✓ Maintenance, monitoring, or implementing corrective action at a commercial radioactive waste treatment or disposal facility, excluding sites within the facility used for the disposal of byproduct material, within the 100 years immediately following the date of final facility closure, provided that:
  - Owner or operator is unwilling or unable to carry out post-closure maintenance, monitoring, or corrective action; and
  - Financial surety arrangements made by the owner or operator (reviewed and approved annually by the Director), including any required under applicable law, are insufficient to cover the costs of post-closure maintenance, monitoring, or corrective action.

~~The Perpetual Care Fund does not explicitly allow funds to be used for corrective action following end of institutional control, although the explicitly stated purpose of providing for the care and maintenance of the facility might be construed to include taking any required corrective actions.~~

The statute (UCA §19-3-106.2) ~~also~~ provides that the "attorney general shall bring legal action against the owner or operator or take other steps to secure the recovery or reimbursement of the costs of maintenance, monitoring, or corrective action, including legal costs, incurred ...."

~~3.13~~3.9 *WHAT WILL BE THE COSTS OF MONITORING AND MAINTAINING THE CLOSED FACILITY FOLLOWING 100 YEARS OF INSTITUTIONAL CONTROL?*

Previous estimates of the annual costs of monitoring and maintaining the closed Energy*Solutions* LLRW facilities ranged between $80,000 and $83,000 per year (Energy*Solutions* 2006). The Director ~~independently~~ reviews the licensee's estimates of Institutional Control period costs ~~during the Institutional Control period~~. ~~These estimates adequately reflect the cost of continuing maintenance and monitoring following the end of Institutional Control period. Funds of about~~

Comment [VR147]: It is the burden of DWMRC inspectors to ensure that corrective actions are timely identified and corrected during operations.

Comment [VR148]: UAC R313-25-9(4)(d) requires that a facility be designed, constructed, and operated with a "reasonable assurance that there will not be a need for ongoing active maintenance of the disposal site following closure." As such, it is the burden of DWMRC inspectors to ensure operational compliance – so that no maintenance is required after institutional control.

Furthermore, UAC R313-25-15 requires complex plans be submitted and verified prior to facility Closure. Only after the Director has confirmed that there is a "reasonable assurance that the long-term performance objectives of Rule R313-25 will be met" is the license amended for closure. As such, it is the burden of DWMRC staff to ensure the site and license amendment information is adequate to prevent the need for ongoing maintenance after institutional control.

After closure, UAC R313-25-17(5) requires that the licensee has adequately demonstrated that the institutional requirements and performance objectives of UAC R313-25 will be met – before a Federal or State agency assumes responsibility for control of the closed site. As such, it is the burden of DWMRC staff to ensure that there is no need for ongoing maintenance after institutional control.

Therefore, the estimates for annual maintenance after institutional control should be $0.

Comment [VR149]: No they don't see VR141

~~$4.2 million invested at an assumed 2 percent per year real interest rate[22] would generate sufficient interest earning to cover these costs.~~

Revisions to Utah Administrative Code R313-15-403, as issued for comment by the UWMRCB on December 10, 2015, (UDWMRC 2016b) and approved by the Board on March 10, 2016, with an effective date of March 15, 2016, require, among other proposed changes, that, when terminating a license under restricted conditions, a licensee would need to have placed surety funds in a separate account and demonstrate the adequacy of the funds for institutional control activities (separate from those anticipated during perpetual care) based on an assumed 1 percent annual rate of return on investment. ~~Based on this rule revision, the Board recommends that the annual rate of return on the investment for the perpetual care account be revised to 1 percent as shown in Table 3-5a.~~

The U.S. NRC indicated that the proposed changes included in the initial S.B. 173 statute regarding financial surety for LLRW licensees were not compatible with the NRC's financial surety requirements (because they excluded consideration of disturbed lands). The Director submitted proposed draft revised financial surety requirements to the NRC for review in February 2016 (UDWMRC 2016c). The NRC provided a response in a letter dated March 9, 2016 identifying two suggested changes to the proposed legislation (S.B. 231) considered but not passed during the 2016 General Session (NRC 2016). New legislation is planned for the 2017 General Session to ensure compatibility with the NRC. While the Director is currently working to address the NRC's concerns with S.B. 173, further consideration herein is beyond scope until such revisions become statute.

~~3.14~~3.10 *WHAT WILL BE THE VALUE OF THE RADIOACTIVE WASTE PERPETUAL CARE AND MAINTENANCE FUND IN THE FUTURE?*

As noted above, the monies deposited into the Perpetual Care Fund are invested according to Utah State Treasurer rules. Investments must be made in secure financial instruments that have very small probability of failure or loss. Typically, such investments include US Treasury notes and bonds. Over the past century, these financial instruments have produced interest earnings of about 2 percent per year over and above prevailing inflation rates (RFF 2002, MSDW 1999)). ~~Since 2008 the actual return on investment has been less than 1 percent.~~ Investments in such financial instruments grow faster than inflation by about 2 percent per year.

Given the current value of the annual deposits to and earnings of the Perpetual Care Fund, and an assumed 2 percent real annual interest rate return, Figure 3-1 and Table 3-5 present projected future values of the fund. Knowing the number of years in the future when the facility closes and the time when the fund might be required, the value at the time of need can be determined. For example, if the facility terminates operations and is properly closed 20 years from now (shaded below) and the fund is required 100 years after facility closure (shaded below), its value is projected to be $93 million (shaded below), as shown in Table 3-5, ~~assuming no monies are~~

Comment [VR150]: Since there should be no maintenance costs after institutional control, this statement should apply only to the institutional control. If so, surety must only assume a 1% return on surety monies available for institutional control activities.

Comment [VR151]: This is for surety monies available for institutional control – at the time of license termination. It is out of scope and inappropriate to apply this requirement to periods after institutional control.

Comment [VR152]: See VR144.

Comment [VR153]: This statement also applies to monies invested by the Utah State Treasurer for the State Post-Retirement Benefits Trust fund – which shows an annual increase of over 6%.

Comment [VR154]: Bias statement. Since perpetual care will be used AFTER operation and 100 years of institutional control. It is highly inappropriate to assume a short term low return over such a long time period.

[22] ~~Real interest rate is the difference of the nominal (or current market) interest rate and the current inflation rate.~~

~~previously withdrawn from the fund and $31 million at an actual real return of 1 percent as shown in Table 3.5a~~.

Comment [VR155]: Monies can only be withdrawn from the fund for activities AFTER institutional control.

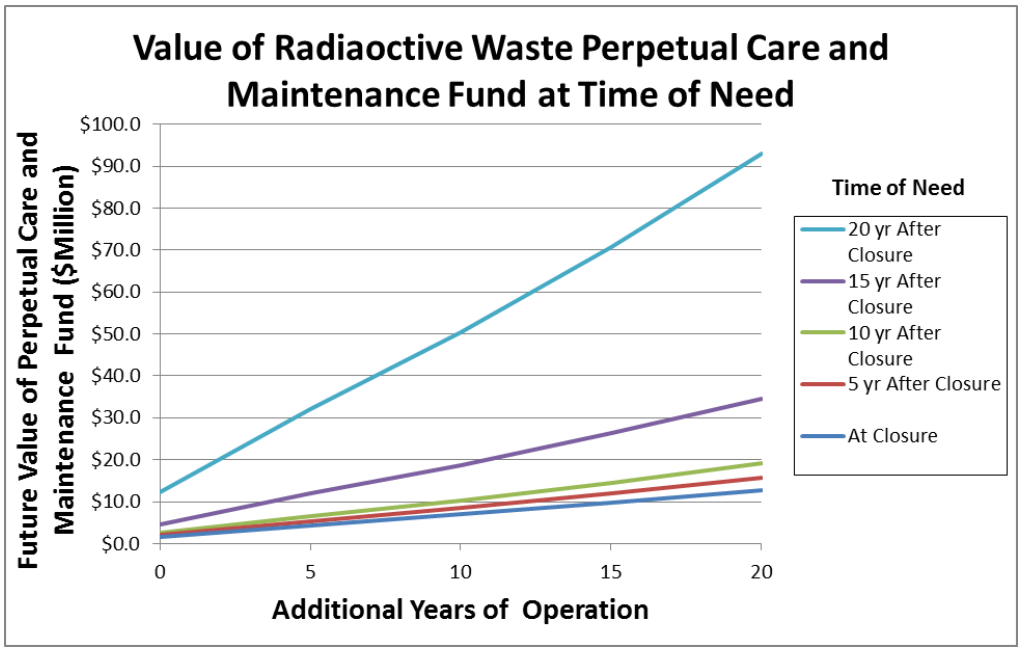

Figure 3-1. Projected Future Value of Radioactive Waste Perpetual Care and Maintenance Fund (2% average annual real return assumed)

Table 3-5. Projected Future Value of Radioactive Waste Perpetual Care and Maintenance Fund (2% average annual real return assumed)

	Time of Facility Closure (years from today)				
	0 yr	**5 yr**	**10 yr**	**15 yr**	**20 yr**
Collections Through Closure ($ million)	$1.7	$3.7	$5.7	$7.7	$9.7
Future Value ($ million)	$1.7	$4.4	$7.0	$9.8	$12.9
Time of Need (years after Closure)	Value at Time of Need ($ million)				
10 years	$2	$5	$8	$12	$16

Table 3-5. Projected Future Value of Radioactive Waste Perpetual Care and Maintenance Fund (2% average annual real return assumed)					
	Time of Facility Closure (years from today)				
20 years	$3	$7	$10	$15	$19
50 years	$5	$12	$19	$26	$35
100 years	$13	$32	$50	$71	$93
200 years	$89	$232	$365	$512	$675
300 years	$646	$1,681	$2,646	$3,711	$4,887
400 years	$4,683	$12,182	$19,169	$26,884	$35,402
500 years	$33,929	$88,251	$138,874	$194,766	$256,476

2045

~~Table 3-5a. Projected Future Value of Radioactive Waste Perpetual Care and Maintenance Fund (1% average annual real return assumed)~~					
	~~Time of Facility Closure (years from today)~~				
	~~0 yr~~	~~5 yr~~	~~10 yr~~	~~15 yr~~	~~20 yr~~
~~Collections Through Closure ($ million)~~	~~$1.7~~	~~$3.7~~	~~$5.7~~	~~$7.7~~	~~$9.7~~
~~Future Value ($ million)~~	~~$1.7~~	~~$4.3~~	~~$6.5~~	~~$8.9~~	~~$11.4~~
~~Time of Need (years after Closure)~~	~~Value at Time of Need ($ million)~~				
~~10 years~~	~~$2~~	~~$5~~	~~$7~~	~~$10~~	~~$13~~
~~20 years~~	~~$2~~	~~$5~~	~~$8~~	~~$11~~	~~$14~~
~~50 years~~	~~$3~~	~~$7~~	~~$11~~	~~$15~~	~~$19~~
~~100 years~~	~~$5~~	~~$12~~	~~$18~~	~~$24~~	~~$31~~
~~200 years~~	~~$12~~	~~$31~~	~~$48~~	~~$65~~	~~$83~~
~~300 years~~	~~$34~~	~~$84~~	~~$129~~	~~$176~~	~~$225~~
~~400 years~~	~~$91~~	~~$228~~	~~$349~~	~~$475~~	~~$609~~
~~500 years~~	~~$246~~	~~$616~~	~~$943~~	~~$1,286~~	~~$1,647~~

2046

In general, the value of the fund grows faster than costs inflate. As a general rule, the future value of the Perpetual Care Fund grows:

- ✓ When the facility continues to operate so that deposits continue to be made into the fund
- ✓ When the need for the fund is delayed
- ✓ If annual deposits to the fund increase

Comment [VR156]: Speculative. Not required by statute. Out of scope.

If the Perpetual Care Fund balance were $93 million and invested at 2 percent real interest rate, it would produce interest earnings of nearly $1.9 million per year without diminishing the balance itself. Under these conditions, annual care costs could total as much as about $1.9 million per year without diminishing the potential of the Perpetual Care Fund to cover annual care costs of a closed LLRW disposal facility.

3.15 WHAT MIGHT BE THE FUTURE VALUE OF THE PERPETUAL CARE FUND IF GREATER ANNUAL FEES WERE IMPOSED?

Comment [VR157]: Out of scope. This analysis is not required by statute.

If larger annual fees were required to be deposited into the Perpetual Care Fund, more monies would be available in the future, as shown in Table 3-6, assuming no monies were previously withdrawn from the fund, and assuming an average real interest rate of 2 percent per year. Table 3-6a shows the monies available if a 1 percent annual real return is assumed.

Table 3-6. Dependence of Perpetual Care Fund future value on annual fee (2% average annual real return assumed)

Annual Fee ($ per year)	Future Value[23] ($ million)
$400,000*	$93
$500,000	$112
$600,000	$130
$700,000	$149
$800,000	$168
$900,000	$186
$1,000,000	$205

[23] After 20 more years of deposits (disposal operations) and 100 years of institutional control at an assumed real interest rate of 2 percent per year.

Table 3-6a. Dependence of Perpetual Care Fund future value on annual fee (1% average annual real return assumed)	
Annual Fee ($ per year)	**Future Value[24] ($ million)**
$400,000*	$31
$500,000	$37
$600,000	$43
$700,000	$50
$800,000	$56
$900,000	$62
$1,000,000	$68

3.16 WHAT WOULD BE THE EFFECT OF FEWER YEARS OF FUTURE OPERATIONS OR NEED FOR FUNDS EARLIER THAN 100 YEARS AFTER FACILITY CLOSURE?

The financial assurances provided by the licensees for institutional control might be insufficient to cover all costs ultimately incurred following facility closure. This would be the case if the facility does not operate for an additional 20 years, as the Licensee currently projects. It could also occur if unplanned and unanticipated events were to occur earlier than the end of the 100 years of the institutional control period. Under either of these conditions, the Perpetual Care Fund might be inadequate to cover all costs. If, for example, the disposal facility were to operate for only another 10 years and the need for funds were to arise by 50 years after facility closure, the value of the Perpetual Care Fund would be only about $19 million, as shown in Table 3-5.

3.17 BEYOND FINANCIAL ASSURANCES, WHAT ELSE PROVIDES ASSURANCE THAT LICENSED COMMERCIAL LLRW MANAGEMENT FACILITIES WILL BE PROPERLY CLOSED AND WILL PERFORM AS REQUIRED

The comprehensive system for licensing and regulating commercial LLRW management facilities includes numerous requirements and features that limit the probability that closure and

Comment [VR158]: The Division is charged to ensure sufficient surety funds (which are separate from perpetual care) to account for this situation.

Comment [VR159]: These events are incorporated into the surety – not perpetual care fund.

Comment [VR160]: Presupposes that the annual costs projected for AFTER institutional control are accurate – which is disputed.

[24] After 20 more years of deposits (disposal operations) and 100 years of institutional control at an assumed real interest rate of 1 percent per year.

* Current annual fee requirement

institutional control costs would exceed those covered through financial assurance. These requirements and features are divided among:

- ✓ Performance objectives
- ✓ Waste characteristics requirements
- ✓ Siting requirements
- ✓ Design requirements
- ✓ Operating and closure requirements
- ✓ Environmental monitoring requirements

These requirements and features as summarized below:

Performance Objectives Utah Administrative Code (R313-25-19)

- ✓ Concentrations of radioactive material that may be released to the general environment in ground water, surface water, air, soil, plants or animals must not result in an annual dose exceeding an equivalent of 25 millirem (mrem) to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public.
- ✓ No greater than 4 mrem committed effective dose equivalent or total effective dose equivalent to any member of the public may come from groundwater.
- ✓ Reasonable efforts should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable (ALARA).
- ✓ Operations at the land disposal facility must be conducted in compliance with the standards for radiation protection set out in UAC R313-15, except for release of radioactivity in effluents from the land disposal facility, which are governed as stated immediately above.
- ✓ Every reasonable effort should be made to maintain radiation exposures ALARA.
- ✓ Design, operation, and closure of the land disposal facility must ensure protection of any individuals inadvertently intruding into the disposal site and occupying the site or contacting the waste after active institutional controls over the disposal site are removed.
- ✓ The disposal facility must be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate, to the extent practicable, the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care are required.

Waste Characteristics Requirements Utah Administrative Code (R313-15-1008(2)(a))

- ✓ Wastes must be packaged in conformance with the conditions of the license issued to the site operator to which the waste will be shipped. Where the conditions of the site license are more restrictive than the provisions of UAC R313-15, the site license conditions are controlling.

- ~~Wastes must not be packaged for disposal in cardboard or fiberboard boxes.~~
- ~~Liquid waste must be packaged in sufficient absorbent material to absorb twice the volume of the liquid.~~
- ~~Solid waste containing liquid must contain as little free-standing and non-corrosive liquid as is reasonably achievable, but in no case may the liquid exceed one percent of the volume.~~
- ~~Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.~~
- ~~Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.~~
- ~~Waste must not be pyrophoric. Pyrophoric materials contained in wastes must be treated, prepared, and packaged to be nonflammable.~~
- ~~Wastes in a gaseous form must be packaged at an absolute pressure that does not exceed 1.5 atmospheres at 68 degrees Fahrenheit. Total activity must not exceed 100 curies per container.~~
- ~~Wastes containing hazardous, biological, pathogenic, or infectious material must be treated to reduce to the maximum extent practical the potential hazard from the non-radiological materials.~~

~~Technical Analyses Utah Administrative Code (R313-25-9)~~

- ~~Under certain conditions, a site-specific performance assessment will be prepared.~~
- ~~Site-specific performance assessments must include:~~
  - ~~Analyses demonstrating that the general population will be protected from releases of radioactivity that consider the pathways of air, soil, ground water, surface water, plant uptake, and exhumation by burrowing animals.~~
  - ~~Analyses of the protection of inadvertent intruders.~~
  - ~~Analysis of the protection of individuals during operations that include assessments of expected exposures due to routine operations and likely accidents during handling, storage, and disposal of waste.~~
  - ~~Analyses of the long-term stability of the disposal site that address active natural processes including erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, surface drainage of the disposal site, and the effects of changing lake levels. *(Note: Although not explicitly listed in these requirements, analyses of long-term stability will necessarily address stability under seismic conditions.)*~~
- ~~Any facility that proposes to land dispose of more than one metric ton in total accumulation of concentrated depleted uranium (DU) after June 1, 2010, must~~

demonstrate by submitting a site-specific performance assessment that the performance standards specified in 10 CFR Part 61 and corresponding provisions of Utah rules will be met for the total quantities of concentrated DU and other wastes. Any such performance assessment must be revised as needed to reflect ongoing guidance and rulemaking from NRC. For purposes of this performance assessment, the assessment must include an evaluation of a 10,000 year- performance period. As part of the DU Performance Assessment, the licensee has also completed modeling simulations extending beyond the 10,000 year modeling period to predict the future timing and magnitude of peak doses for selected (long-lived) radionuclides.

Siting Requirements Utah Administrative Code (R313-25-24)

- ✓ The primary emphasis in disposal site suitability is given to isolating wastes and to disposal site features that ensure that the long-term performance objectives are met.
- ✓ The disposal site must be capable of being characterized, modeled, analyzed, and monitored.
- ✓ Within the region where the facility is to be located, a disposal site should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives of UAC R313-25-20 through R313-25-23.
- ✓ Areas must be avoided having known natural resources which, if exploited, would result in failure to meet the performance objectives of UAC R313-25-20 through R313-25-23.
- ✓ The disposal site must be generally well drained and free of areas of flooding or frequent ponding.
- ✓ Waste may not be disposed of in a 100-year flood plain, coastal high-hazard area or wetland, as defined in Executive Order 11988, "Floodplain Management Guidelines."
- ✓ Upstream drainage areas must be minimized to decrease the amount of runoff that could erode or inundate waste disposal units.
- ✓ The disposal site must provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, into the waste will not occur.
- ✓ The hydrogeologic unit used for disposal must not discharge ground water to the surface within the disposal site.
- ✓ Areas must be avoided where tectonic processes such as faulting, folding, seismic activity, vulcanism, or similar phenomena may occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of UAC R313-25-20 through R313-25-23 or may preclude defensible modeling and prediction of long-term impacts.

- ✓ Areas must be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with sufficient such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of UAC R313-25-20 through R313-25-23, or may preclude defensible modeling and prediction of long-term impacts.
- ✓ The disposal site must not be located where nearby facilities or activities could adversely impact the ability of the site to meet the performance objectives of UAC R313-25-20 through R313-25-23 or significantly mask the environmental monitoring program.

Design Requirements Utah Administrative Code (R313-25-25)

- ✓ Site design features must be directed toward long-term isolation and avoidance of the need for continuing active maintenance after site closure.
- ✓ The disposal site design and operation must be compatible with the disposal site closure and stabilization plan and lead to disposal site closure that provides reasonable assurance that the performance objectives of UAC R313-25-20 through R313-25-23 will be met.
- ✓ The disposal site must be designed to complement and improve, where appropriate, the ability of the disposal site's natural characteristics to assure that the performance objectives of UAC R313-25-20 through R313-25-23 will be met.
- ✓ Covers must be designed to minimize, to the extent practicable, water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.
- ✓ Surface features must direct surface water drainage away from disposal units at velocities and gradients that will not result in erosion that will require ongoing active maintenance in the future.
- ✓ The disposal site must be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal.

Operating and Closure Requirements Utah Administrative Code (R313-25-26)

- ✓ Disposal of only Class A LLRW is allowed in Utah.
- ✓ Wastes must be emplaced in a manner that maintains the package integrity during emplacement, minimizes the void spaces between packages, and allows the void spaces to be filled.
- ✓ Void spaces between waste packages must be filled with earth or other material to reduce future subsidence within the fill.
- ✓ Waste must be placed and covered in a manner that limits the radiation dose rate at the surface of the cover to levels that at a minimum will allow the Licensee to comply with all standards against radiation protection at the time the facility is closed and stabilized.

- ✓ The boundaries and locations of disposal units must be accurately located and mapped by means of a land survey.
- ✓ Near-surface disposal units must be marked in such a way that the boundaries of the units can be easily defined. Three permanent survey marker control points, referenced to United States Geological Survey or National Geodetic Survey control stations, must be established on the site to facilitate surveys.
- ✓ Horizontal and vertical controls must be provided by United States Geological Survey or National Geodetic Survey control stations as checked against United States Geological Survey or National Geodetic Survey record files.
- ✓ A buffer zone of land must be maintained between any buried waste and the disposal site boundary and beneath the disposed waste. The buffer zone must be of adequate dimensions to carry out environmental monitoring activities and take mitigative measures if needed.
- ✓ Closure and stabilization measures as set forth in the approved site closure plan must be carried out as the disposal units are filled and covered.
- ✓ Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures.
- ✓ Only wastes containing or contaminated with radioactive material may be disposed of at the disposal site.

Environmental Monitoring Requirements Utah Administrative Code (R313-25-27)

- ✓ When a license application is first submitted (emphasis added), the applicant must have conducted a preoperational monitoring program to provide basic environmental data on the disposal site characteristics. The applicant must obtain information about the ecology, meteorology, climate, hydrology, geology, geochemistry, and seismology of the disposal site. For those characteristics that are subject to seasonal variation, data must cover at least a 12-month period.
- ✓ During the land disposal facility site construction and operation, the Licensee must maintain an environmental monitoring program. Measurements and observations must be made and recorded to provide data to:
  - Evaluate the potential health and environmental impacts during both the construction and the operation of the facility
  - Enable the evaluation of long-term effects and need for mitigative measures
  - Provide early warning of releases of waste from the disposal site before they leave the site boundary

- After the disposal site is closed, the Licensee responsible for post-operational surveillance of the disposal site must maintain a monitoring system based on the operating history and the closure and stabilization of the disposal site. The post-operational monitoring system must also be capable of providing early warning of releases of waste from the disposal site before they leave the site boundary.
- The Licensee must have plans for taking corrective measures if the environmental monitoring program detects migration of waste which would indicate that the performance objectives may not be met.

In addition to these universally applicable requirements, the Director is authorized and empowered to impose license conditions that must also be met to protect facility workers, the general public, and the environment. The Director maintains surveillance, monitors activities related to the facility, and periodically performs inspections to determine compliance with regulatory requirements and license conditions.

The Owner/Licensee periodically prepares and submits environmental monitoring, operating, and other reports to the Director. The Director reviews and evaluates reports submitted by Owners/Licensees to assess whether the facility is being operated as required and as planned and whether changes should be made to provide greater assurance that the facility will perform as required and as planned.

The Owner/Licensee maintains records of all activities that indicate and document the performance of the commercial LLRW management facility. Each Owner/Licensee must also implement and maintain Quality Assurance and Quality Control programs to provide documentary evidence that required activities are performed properly.

All of these requirements and features help provide substantial assurance that LLRW disposed of in Utah will remain in a safe and secure condition that will not threaten or degrade public health or environmental media.

Comment [VR161]: Out of scope. This question is not included in statute.

3.18 HOW MIGHT CLOSURE, INSTITUTIONAL CONTROL, AND OTHER COSTS BE GREATER THAN THE FUNDING PROVIDED BY FINANCIAL ASSURANCES AND THE PERPETUAL CARE FUND?

The requirements for estimating closure and institutional control costs have been determined to minimize the potential that actual closure or institutional control costs will exceed the value of financial assurances provided (NRC 1981). Moreover, the Utah Legislature created the Perpetual Care Fund to cover costs incurred later than 100 years after facility closure[25], whether they are associated with monitoring, maintaining, repairing, conducting corrective actions, or other conditions.

Comment [VR162]: Subjective statement. Ignores Division and Director's responsibility to enforce requirements during operation and closure to ensure no ongoing maintenance is required after institutional control.

[25] Or during the first 100 years following closure under conditions limited by UCA 19-3-106.2(5)(b).

Notwithstanding the precautions taken to ensure safe operation, closure, and acceptable long-term maintenance, closure and institutional control cost estimates are merely projections of the costs of reasonably well-known but still uncertain future events, conditions, circumstances, and environment. To the extent that future conditions differ from those assumed and expected to exist, actual costs will likely vary from those estimated. Thus, actual costs could be either less than or greater than expected costs.

Uncertainties about the future might produce the following effects. These lists are limited only by human imagination and our collective judgment of what is "reasonable" to consider. Many of these effects are sufficiently ambiguous that no reasonable, warranted, or justifiable approach to dealing with them is possible.

Natural Conditions Worse Than Expected

- ✓ Climatic conditions change and produce excessive precipitation, run-on, or runoff
- ✓ Climatic conditions change and produce extreme aridity
- ✓ Earthquake ground motions are greater than projected
- ✓ Vegetation or burrowing animals intrude more aggressively than expected

Human Activities Not Anticipated

- ✓ Aircraft impacts the closed facility
- ✓ Waste constituents are dispersed by a terrorist attack or disgruntled employee
- ✓ Critical material, fuel, labor, or other prices are higher than projected
- ✓ Claims of health impacts attributable to the closed facility create new financial liabilities
- ✓ Laws and/or regulatory requirements change to create unanticipated financial liabilities
- ✓ Litigation delays or extends needed actions
- ✓ Incompetence, dereliction of duty, or ignorance within any entity involved with the licensed facility (Owner/Licensee, regulatory agency, financial institution, contractor, special interest groups, or members of the general public)

Facility Components Fail to Perform As Planned

- ✓ Water infiltration is greater than anticipated
- ✓ Water accumulates within disposal unit
- ✓ Water or wind erosion is greater than anticipated
- ✓ Excessive differential settlement damages the cover system
- ✓ Waste or constituents are exposed at the surface of the facility

Comment [VR163]: Incorrect conclusion.

Comment [VR164]: Not within the scope required by statute.

Comment [VR165]: NRC specifically indicates that modeling should not include dramatic climate change.

Comment [VR166]: Incorporated in design to ensure embankment stability is not compromised with an earthquake.

Comment [VR167]: Incorporated in design requirements.

- ~~Wastes interact with unanticipated deleterious effects~~
- ~~Construction flaws compromise facility performance~~

~~The probabilities of the outcomes listed above vary widely, as do their potential cost impacts. Both probabilities and financial (and other) impacts should be considered in identifying and evaluating any proposals to address them. For example, an event with a huge financial impact might appear to justify some effort. However, if its probability of occurrence is vanishingly small, the public interest might be better served instead by addressing events with smaller costs but a greater probability that it might occur. Without more detailed information about the possible events and outcomes listed above, any attempt to manage these risks would be based on simple speculation.~~

~~In recent evaluations of the impact of unplanned and unexpected events on costs of maintaining a closed LLRW disposal facility (Baird 2008), the State of South Carolina addressed the following events:~~

- ~~Decreased Precipitation~~
- ~~Adjacent Site Development~~
- ~~Trench Collapse~~
- ~~Burrowing Animals~~
- ~~Increased Precipitation~~
- ~~Worker Exposure~~
- ~~Negative Media Coverage~~
- ~~Regulatory Changes~~
- ~~Mine/Quarry Activity at Site~~
- ~~Spent Nuclear Fuel Rod~~
- ~~Health Claims~~
- ~~Invalid Geotechnical Model~~
- ~~Property Values Depressed~~
- ~~Extreme Weather~~

Comment [VR168]: Inconsistent with NRC direction. Out of scope required in statute. Overly speculative.

~~*3.19 HOW LARGE COULD THE INCREASES OF CLOSURE, INSTITUTIONAL CONTROL, AND OTHER COSTS BE?*~~

~~As noted above, many of the ways in which post-closure costs might be larger than expected can widely vary or have a significant level of uncertainty such that no effort to manage them is justified without further definition and information. In other cases that result in the facility failing to perform as required, reasonable estimates can be made of their costs and information developed in support of decision making. Even in these cases, however, substantial uncertainties exist about what might actually happen and what the resulting costs might be.~~

~~Notwithstanding the ambiguity and uncertainties associated with conditions that increase costs of monitoring and maintaining closed LLRW treatment and disposal facilities, an effort has been made to state the upper and lower bounds of the associated costs using a combination of realistic approximations and inference. These estimated costs are summarized in Table 3-7. A rigorous development of costs should be prepared as a basis for final decision making.~~

Table 3-7. Summary of inexact costs of unplanned and unanticipated future events

Potential Future Event	Inexact Cost[26] ($million)		
	Plausible Minimum	As Estimated	Plausible Maximum
Cover System Failures	$10	$20	$70
Excessive Water Enters Disposal Unit	$10	$30	$50
Surface Contamination Observed	$1	$3	$20
Wastes Interact with Unanticipated Deleterious Effects	$10	$30	$50
Aircraft Impacts the Closed Facility or Waste Constituents Are Dispersed by a Terrorist Attack	$5	$10	$30
Claims of Health Impacts Create New Financial Liabilities	$10	$40	$50
Laws/Regulations Create Unanticipated Financial Liabilities	Unknown	Unknown	Unknown
Litigation Delays or Extends Needed Actions	Unknown	Unknown	Unknown

Comment [VR169]: Already addressed in design factors of safety and surety estimates. Overly speculative. Beyond scope of statute. Incompatible with NRC direction.

These costs were estimated using industry accepted practices and relying upon the judgment of professionals with extensive experience in the radioactive waste management industry. Where possible activities were identified; quantities (for example areas, volumes, and labor requirements) were calculated; unit costs determined (relying on such sources as Means 2015); and costs calculated and aggregated. Plausible minimum costs were estimated as one-quarter to one-half of the calculated cost. Plausible maximum costs were estimated as 5 to 7 times the calculated cost.

Again, these cost estimates are based on very poorly defined characteristics and conditions. They are, therefore, highly uncertain and great caution should be exercised in making any decisions based on information presented in Table 3-7.

3.20 WHAT ARE THE PROBABILITIES OF OCCURRENCE OF THE INCREASES OF CLOSURE, INSTITUTIONAL CONTROL, AND OTHER COSTS?

Quantifying the probability of any individual cause of excess closure and institutional control costs is beyond the scope of this report. Still, it is possible, for the purpose of placing these events and their impacts in relative perspective, to state realistic and upper bounds of probabilities. These probability bounds were developed as the combined judgment of professionals technically informed and experienced in the radioactive waste management industry. A rigorous development of both costs and probabilities would provide a better basis for

Comment [VR170]: Correct statement. This section should be deleted.

[26] Rounded to the nearest $10 million or one figure of significance because of extreme uncertainty.

final decision-making. Such probabilities for unplanned and unanticipated future events are listed in Table 3-8.

Table 3-8. Order-of-magnitude probabilities for unplanned and unanticipated future events

Potential Future Event	Order-of-Magnitude Probability	
	Realistic	Overstated
Cover System Failures	Less than 10 in 1,000	200 in 1,000
Excessive Water Enters Disposal Unit	Less than 10 in 1,000	200 in 1,000
Surface Contamination Observed	Less than 10 in 1,000	200 in 1,000
Wastes Interact with Unanticipated Deleterious Effects	Less than 1 in 1,000	50 in 1,000
Aircraft Impacts the Closed Facility or Waste Constituents Are Dispersed by a Terrorist Attack	Less than 1 in 10,000	1 in 1,000
Claims of Health Impacts Create New Financial Liabilities	100 in 1,000	500 in 1,000
Laws/Regulations Create Unanticipated Financial Liabilities	100 in 1,000	500 in 1,000
Litigation Delays or Extends Needed Actions	500 in 1,000	1,000 in 1,000

Again, these order-of-magnitude probabilities are based on very poorly defined characteristics and conditions and are, therefore, highly uncertain. Great caution should be exercised in using the results presented in Table 3-8.

3.21 CONSIDERING BOTH THE PROBABILITY AND MAGNITUDE OF POSSIBLE COST INCREASES, WHICH POSSIBILITIES POSE THE GREATEST RISK FOR INCREASED COSTS?

Based on the descriptions of probability and the relative magnitude of possible cost increases stated above, the order of magnitude of expected costs or financial risks was scoped. A rigorous development of both costs and probabilities should be prepared as a basis for final decision making.

Financial risk is the product of the estimated cost and the probability that the cost would be incurred. The range of risks based on values presented in Table 3-7 and Table 3-8 are depicted in Table 3-9.

Table 3-9. Highly uncertain financial risks from unplanned and unanticipated future events

Potential Future Event	Financial Risk ($ million)			
	Minimum[27]	Realistic[28]	Overstated[29]	Maximum[30]
Cover System Failures	$0.1	$0.2	$4	$14
Excessive Water Enters Disposal Unit	$0.1	$0.3	$6	$10
Surface Contamination Observed	$0.01	$0	$1	$4
Wastes Interact with Unanticipated Deleterious Effects	$0.01	$0	$2	$3
Aircraft Impacts the Closed Facility or Waste Constituents Are Dispersed by a Terrorist Attack	$0	$0	$0	$0
Claims of Health Impacts Create New Financial Liabilities	$1	$4	$20	$25
Laws/Regulations Create Unanticipated Financial Liabilities	Unknown	Unknown	Unknown	Unknown
Litigation Delays or Extends Needed Actions	Unknown	Unknown	Unknown	Unknown
Total Financial Risk	**$1**	**$5**	**$32**	**$56**

Table 3-9 shows that, based on these highly uncertain analyses, the financial risk might likely range between $5 and $32 million. Based on these very uncertain estimated costs and probabilities, the total financial risk of unplanned or unanticipated events is unlikely to be less than about $1 million and unlikely to be more than about $60 million.

Comment [VR171]: See VR163

3.223.11 ARE SUFFICIENT FINANCIAL ASSURANCES PROVIDED TO PROTECT AGAINST INCREASED COSTS OF CLOSURE, INSTITUTIONAL CONTROL, AND UNPLANNED AND UNANTICIPATED EVENTS?

In general, the Division finds that sufficient funds are available to cover costs expected to close and provide institutional control of commercial LLRW management facilities licensed in Utah as shown in Table 3-7, Table 3-8, and Table 3-9. UWMRCB concurs. Funds are also available to

[27] Based on plausible minimum cost and realistic probabilities.

[28] Based on estimated cost and realistic probabilities.

[29] Based on estimated cost and overstated probabilities.

[30] Based on plausible maximum cost and overstated probabilities.

~~cover the costs of monitoring and maintaining closed commercial LLRW management facilities following the institutional control period.~~

Comment [VR172]: Not asked by section's question. Question addresses surety funds for closure and institutional control.

~~As noted above, a minimum fund balance of about $4.2 million, when invested at 2 percent per year real interest rate, will provide sufficient interest earnings to cover the costs of routine monitoring and maintenance. This amount would produce interest earnings of about $84,000 per year, without depleting the principal balance of the fund.~~

~~Table 3-5 shows the value of the Perpetual Care Fund after 20 more years of operations (and deposits to the fund) and 100 years of institutional control following facility closure (without withdrawals from the fund) to be about $93 million. Maintaining a minimum balance of $4 million to cover the costs of routine monitoring and maintenance would leave about $89 million available at that time to cover other costs. Finally, Table 3-9 reveals that the most likely financial risks (probability-weighted costs) of unplanned and unanticipated events, with substantial uncertainty, should range between $5 and $32 million following 100 years of institutional control. Moreover, under worst conditions, the financial risk should total no more than about $60 million following 100 years of institutional control and might be as small as $1 million. Thus, based on the very rough and inexact estimates of costs and probabilities presented in Table 3-7 through Table 3-9, it appears that sufficient monies would be available from the Perpetual Care Fund to cover the probable costs of expected events, as well as unplanned and unanticipated events.~~

~~If the value of the Perpetual Care Fund were $93 million and its funds were invested at 2 percent per year real interest rate, it would be capable of sustaining considerable maintenance and repair activities at the closed LLRW management facility. The Perpetual Care Fund would generate annual interest earnings of nearly $1.9 million per year, under stated conditions, without diminishing its principal balance.~~

Comment [VR173]: See VR165

~~The financial assurances provided by the licensees for institutional control might be insufficient to cover all costs ultimately incurred following facility closure. This would be the case if the facility does not operate for an additional 20 years, as the Licensee currently projects. It could also occur if unplanned and unanticipated events were to occur earlier than the end of the 100 years of the institutional control period. Under either of these conditions, the Perpetual Care Fund might be inadequate to cover all costs. If, for example, the disposal facility were to operate for only another 10 years and the need for funds were to arise by 50 years after facility closure, the value of the Perpetual Care Fund would be only about $19 million, as shown in Table 3-5.~~

Comment [VR174]: Not if the Director satisfies its obligation to accurately review, in detail, the annual surety projections for closure and institutional control activities.

~~*3.23 HOW DO THE FINANCIAL ASSURANCES REQUIRED FOR CLOSURE AND POST-CLOSURE CARE OF COMMERCIAL LLRW MANAGEMENT FACILITIES LICENSED IN THE STATE OF UTAH COMPARE WITH THOSE REQUIRED IN OTHER STATES?*~~

~~**State of Utah**~~

~~The State of Utah under UCA §19-3-106.2 defines the creation, funding, and use of the Perpetual Care Fund. The fund's overall purpose is to finance the perpetual care and maintenance of commercial LLRW disposal facilities following 100 years after final closure of the facility. The~~

~~statute requires commercial LLRW disposal or treatment facilities to pay an annual fee of $400,000 to be deposited into the Perpetual Care Fund.~~

~~The legislature may release monies from this fund to conduct perpetual care and maintenance of the facility beginning 100 years after final closure. Appropriations from the Perpetual Care Fund may also be made to maintain, monitor or implement corrective action at a commercial radioactive waste disposal facility prior to 100 years after its final closure if the owner/operator is unable or unwilling to carry out post-closure maintenance, monitoring, or corrective action or if the financial surety arrangements made by the owner/operator are insufficient to cover such costs. If either condition occurs, the State will initiate legal action against the facility owner or operator to recover or reimburse the costs paid by this fund.~~

~~Utah Administrative Code for financial assurances for the closure, stabilization, and institutional control of radioactive waste disposal facilities are addressed in UAC R313-25 "License Requirements for Land Disposal of Radioactive Waste" as well as in UAC R313-22-35. These financial assurance requirements are virtually identical to the NRC requirements stated in 10 CFR 61 and 10 CFR 30.35, respectively.~~

~~Utah Administrative Code R313-25-11 requires the Licensee to be financially qualified to conduct the operations for which they are requesting a license. A similar requirement in included in UAC R313-25-30 which requires the facility have sufficient funds to carry out facility construction and operations.~~

~~Financial assurance requirements for the closure and post-closure periods are addressed under UAC R313-25-31. These assurances are required to be in place prior to commencement of operations. The applicant must submit cost estimates that are used to determine the adequacy of proposed financial sureties. The cost estimates must take into consideration the costs for an independent contractor to perform the required decontamination, closure, and stabilization work, and are revised annually. Using these cost estimates the Director determines whether the proposed financial surety mechanisms are sufficient. Acceptable financial assurance arrangements include surety bonds, cash deposits, certificates of deposit, deposits of government securities, escrow accounts, irrevocable letter or lines of credit, trust funds, and other arrangements with the approval of the Director. Self-insurance or comparable arrangements are not acceptable for these purposes.~~

~~Financial assurances for the Institutional Control period are addressed in the Utah Administrative Code R313-25-32. This requires that a binding arrangement be established between the applicant and disposal site owner before the license is issued. The Director reviews this agreement annually to ensure that changes in technology, facility operations, and inflation are addressed. Any changes to this agreement must be submitted to the Director for review and approval.~~

~~The owner of the only commercial LLRW disposal facility in Utah is Energy*Solutions*, LLC, who is also the Licensee and applicant referred to in the regulations. Energy*Solutions*' predecessor organizations were exempted from the ownership requirements of UAC R313-25-29. This exemption allowed site ownership to remain with the facility operator, whereas the regulations, as written, require ownership to rest with a public agency. Thus, the regulatory requirements, as stated in UAC R313-25-32 provide the State no assurance since the resulting binding arrangement would be between Energy*Solutions* and itself.~~

State of Washington

The State of Washington initially passed the Radioactive Waste Act in 1983. Under RCW 43.200.080(2) the State assumed the responsibilities for the perpetual care agreement between the State and the federal government that was executed in 1965. As part of this agreement and the sublease between the State and the operator of the Hanford LLRW disposal site, the Washington Department of Ecology was directed to assess and collect fees to ensure acceptable site closure. RCW 43.200.080 created a Site Closure Account (Fund 125) and a Perpetual Surveillance and Maintenance Account (Fund 500) within the State Treasury. The purposes of these funds were to finance perpetual surveillance and maintenance and to ensure site closure under the lease with the federal government.

The Site Closure Account is funded through the collection of fees to defray the estimated costs of closure. This fee is called the "perpetual care and maintenance fee" and amounts to $1.75 per cubic foot of waste disposed of (WAC 173-44-040). These funds are used to reimburse the site operator, the State Licensing agency, or contracted agencies for costs (and reasonable profit, as appropriate) associated with the final closure and decommissioning of the Hanford LLRW disposal facility. Any funds remaining in the Site Closure Account after the final closure has been completed will be transferred to the Perpetual Surveillance and Maintenance Account.

The Perpetual Surveillance and Maintenance Account is funded through the collection of the same fees described in connection with the Site Closure Account. Funds in the Perpetual Surveillance and Maintenance Account are to be used exclusively to meet post-closure and maintenance costs or to otherwise satisfy surveillance and maintenance obligations.

Section 43.200.200 of the Radioactive Waste Act requires the Washington Department of Ecology periodically to review the potential for injury and property damaging resulting from the transportation and disposal of radioactive waste under state issued licenses. Financial assurance requirements maintained by licensees must be sufficient to protect the State from all claims, suits, legal fees, damages, or expenses resulting from these licensed activities. Acceptable financial assurances are identified. The appropriate level of financial assurances must consider the potential cost of decontamination, treatment, disposal, decommissioning and cleanup of facilities and equipment; federal cleanup and decommissioning requirements; and legal defense costs, if any (RCW 70.98.098).

Washington regulations pertaining to the licensing of commercial LLRW disposal facilities are found in WAC 246. The regulatory requirements pertaining to financial qualifications, financial assurances provided for site closure and stabilization, and financial assurances provided for institutional control correlate closely with the requirements of 10 CFR 61. A minor difference between the State of Washington and NRC regulations requires that surety have a specific time period and be automatically renewable.

State of South Carolina

The Atlantic Interstate LLRW Compact Implementation Act established South Carolina as a member of Atlantic LLRW Compact. This Act in Section 48-46 of the South Carolina Code defines the Decommissioning Trust Fund and the Extended Care Maintenance Fund.

The Decommissioning Trust Fund was established under a trust agreement between Chem-Nuclear Services, Inc., and the South Carolina Budget and Control Board, with the South Carolina State Treasurer as the trustee. This fund was created to ensure that adequate funding would be available for closure and decommissioning of the disposal site. The Decommissioning Trust Fund receives fees from the disposal of radioactive waste at the rate of $4.20 per cubic foot of waste disposed of.

The Extended Care Maintenance Fund is an escrow fund for perpetual care of the site. This fund provides custodial care, surveillance, and maintenance during the institutional control and post-closure observations periods. These activities are specified by the South Carolina Department of Health and may also include activities associated with site closure. Facility disposal fees include surcharges that are deposited into the Extended Care Maintenance Fund. The Extended Care Maintenance Fund receives fees from the disposal of radioactive waste at the rate of $2.80 per cubic foot of waste disposed of.

Similar to its meaning in 10 CFR 61, the term "maintenance" at the South Carolina LLRW disposal facility means active maintenance activities including pumping and treatment of groundwater and the repair and replacement of disposal unit covers. Consistent with NRC regulations contained in 10 CFR 61, South Carolina regulations define the term "active maintenance" similarly not including custodial activities such as repair of fencing, repair or replacement of monitoring equipment, re-vegetation, minor additions to soil cover, minor repair of disposal unit covers, and general disposal site upkeep such as mowing grass.

If the revenues generated by current disposal fees are less than the allowable site operator reimbursement for care and maintenance activities conducted, the operator is reimbursed from the Extended Care Maintenance Fund. This condition might prompt the facility to suspend operations until the volume of waste is sufficient to generate revenues for operations. If facility operations were suspended, monies from the Extended Care Maintenance Fund could be used to reimburse the site operator for qualifying expenses and allowable profits. During such suspensions, funds may also be used to support the activities of the South Carolina Budget and Control Board (the Board), the Public Service Commission, and the Compact Commission as necessary based on revised budgets. The Board must also ensure that the fund remains adequate to defray costs for future maintenance or other obligations.

Once all funds in the Decommissioning Trust Fund have been exhausted, the Extended Care Maintenance Fund will be used for custodial care, surveillance, monitoring, and maintenance for the post-closure and institutional control periods.

South Carolina regulations for radioactive waste land disposal facilities are part of the Radiological Health Regulation 61-63, Part 7. These regulations mirror the NRC regulations with one notable difference. The requirement for open-ended surety mechanism has been removed but mechanisms with a specific term require automatic renewal.

State of Texas

The Texas Health and Safety Code (THSC), Section 401.003(11) identifies the Perpetual Care Account, also referred to as the Radiation and Perpetual Care Account. Securities provided by LLRW disposal license holders are deposited in the Perpetual Care Account. Funds in the

~~Perpetual Care Account may be used to cover the costs of decontamination, decommissioning, stabilization, reclamation, surveillance, control, storage, and disposal of radioactive material reasonably required to protect the public health and safety and the environment and the costs of perpetual maintenance, surveillance, and corrective measures to remedy spills or contamination by radioactive materials. Funds in the Perpetual Care Account derive from securities (financial assurances) provided by license holders and the excess of fees collected by the Texas Commission on Environmental Quality (TCEQ, see THSC 401.303(g)). The TCEQ is required to seek reimbursement of security from the Radiation and Perpetual Care Account its uses to pay for actions permitted for the use of account funds.~~

~~The Texas regulations for licensing requirements for LLRW disposal are contained in Title 30 of the Texas Administrative Code, Part 1, Chapter 336, Subchapter H. Specific rules pertaining to liability and funding are addressed in R336.736. These rules are very similar to the corresponding NRC regulations with some exceptions but impose additional financial burdens on the license applicant.~~

~~Texas regulations require that the financial assurances for closure and stabilization be in place 60 days before the receipt of waste at the facility. Texas regulations require financial assurance not only for closure and stabilization of the facility, as required by 10 CFR 61, but also to provide liability coverage for sudden and non-sudden accidental occurrence involving bodily injury and property damage. Texas rules also require that cost estimates and financial assurances be reviewed and evaluated annually in meeting open to the public. No fees are presently authorized to fund the closure and stabilization of the disposal facility.~~

~~Institutional control funding is addressed under 30 TAC 336.737; this section differs significantly from the NRC regulations. Under this rule the Licensee is required to pay into a perpetual care account. The required value of this account is determined by the TCEQ Executive Director and must include the funding necessary to provide perpetual surveillance, monitoring, required maintenance, and fund administration costs. The total amount of this assurance must be in place 60 days prior to the receipt of waste. As with the closure financial assurances, the annual review must be conducted in an open meeting. No fees are presently authorized to fund the institutional control of the disposal facility or protect against any liabilities that might accrue to the State.~~

~~Financial assurances must also be provided to cover the costs of possible corrective actions. Such corrective actions could result from unplanned events that might pose a risk to public health, safety, and the environment that might occur after the decommissioning and closure of the disposal facilities. The amount of financial assurance must be no less than $20 million at the time the disposal facility is decommissioned. TCEQ must annually review that basis for determining the amount of financial assurances required for corrective action.~~

~~Authorized financial assurance mechanisms for closure, stabilization, and institutional control, are defined in 30 TAC 37, Subchapter T. These mechanisms include a fully funded trust, surety bonds, irrevocable standby letter of credit, external sinking fund, or insurance. A combination of these mechanisms may also be used.~~

State of New York

LLRW disposal in the State of New York is not being pursued. However, in the 1980's LLRW disposal was a possibility, for which commercial LLRW disposal facility licensing rules were promulgated. These regulations are contained in 6 NYCRR Subchapter C, "Radiation". The financial assurance requirements differ extensively from those required by 10 CFR 61. The requirements of New York's LLRW disposal requirements are summarized below only to provide insight on the directions other states have taken in requiring financial assurances.

Financial assurance for closure, post closure, and institutional control for land disposal facilities are addressed in 6 NYCRR, Part 383. The State financial assurance requirements corresponding to those contained in 10 CFR 61 are included in subpart 6 NYCRR 383-6. Under 6 NYCRR 383-6.4 a LLRW fund consisting of 3 separate trust funds must be established by the Licensee. These three funds are identified as:

- ✓ Closure, Post Closure, and Institutional Control Trust;
- ✓ Remedial Action/Third Party Compensations Trust (Operation, Closure, Post Closure periods); and
- ✓ Remedial Action/Third Party Compensation Trust (Institutional Control Period).

These trusts must be established 60 days before the receipt of waste. The fund trustees will determine the pay in amounts for each fund using the required costs, the number of years remaining before closure (not to exceed 30 years) and the number of payments required per year. These trust values and calculations must be reviewed annually.

The Closure, Post Closure, and Institutional Control Trust, is for reimbursement of costs that are in agreement with the approved closure, post closure or institutional control plan. 6 NYCRR 383-6.8 requires that cost estimates for closure are based on the decontamination and dismantlement of disposal facilities, closure of the facility so that only minor custodial care is necessary, implementation of the closure plan by a third party, and implementation of the plan when closure would be most expensive. The cost estimate must not include salvage of equipment or other disposal facility assets. Also included in the estimate for closure, post closure and institutional controls are considerations of the size, type and location of the facility, along with volume and nature of waste, any completed closure activates and the duration of health risks.

The Remedial Action/Third Party Compensations Trust (Operation, Closure, Post Closure Periods) is for remediating failures, and compensating third parties for injury or property damage that occur during the operations, closure, or post closure periods and that are caused by operation of the disposal facility. The Remedial Action/Third Party Compensation Trust (Institutional Control period) covers the same failures and liabilities but only those that occur during the institutional control period.

Under 6 NYCRR 383-6.9 the applicant is required to submit proposed levels of coverage for the costs of remediation for each time period, as well as third party compensation. These cost estimates must take into considerations the following;

- ✓ Analysis of facility location including natural characteristics, geology, hydrology.

- ~~Site demographics~~
- ~~Disposal technology used at the site~~
- ~~The type and concentration of radionuclides~~
- ~~Probability analysis~~
- ~~Major natural phenomenon~~
- ~~Inadvertent intrusion~~
- ~~Location specific and technology specific considerations~~
- ~~Performance assessments~~
- ~~Risk assessments~~
- ~~Dose assessment modeling~~
- ~~Expected radiation exposures~~
- ~~Potential (stochastic and non-stochastic) health effects~~

~~In addition to the established trust funds, alternative financial assurance mechanisms must be provided to address the difference between actual value of the trusts and the current cost estimates. These alternative mechanisms may include alternate trusts, surety bonds, letter of credit, liability insurance, written guarantee or a combination of these mechanisms.~~

~~State of Illinois~~

~~No commercial LLRW disposal facility is being developed in the State of Illinois. However, in the 1980's LLRW disposal was a possibility, for which commercial LLRW disposal facility licensing rules were promulgated. These regulations are contained in Title 32 of the Illinois Administrative code (IAC), Part 601. The financial assurance portions of Illinois regulation for licensing requirements for land disposal of radioactive waste 32 IAC Part 601 are the same as those contained 10 CFR 61. The requirements of Illinois' LLRW disposal requirements are summarized below only to provide insight on the directions other states have taken in requiring financial assurances.~~

~~The Illinois Low-Level Radioactive Waste Management Act defines policy for developing and operating a commercial LLRW disposal facility within the State of Illinois. This act created the Low-Level Radioactive Waste Facility Closure, Post-Closure Care, and Compensation Fund. This fund provided for decommissioning, closing, monitoring, inspecting, caring for, taking remedial actions, purchasing facility and third party liability insurance during the institutional control period, mitigating the impacts of suspended or interrupted disposal operations, compensating persons suffering damages or losses caused by a release from the proposed commercial LLRW disposal facility, and fulfilling obligations under a [host] community agreement.~~

The Low-Level Radioactive Waste Facility Closure, Post-Closure Care, and Compensation Fund was to be funded with waste fees imposed on all waste received for disposal. The waste fee was projected to grow to $3.00 per cubic foot of waste disposed of by 1985. Additional fees were charged owners of nuclear power plants. Twenty percent of fees collected were to be transferred to the Low-Level Radioactive Waste Facility Closure, Post-Closure Care, and Compensation Fund and used for purposed identified above.

State of Nevada

Since the Beatty LLRW disposal facility was closed in the 1980's, only surveillance and maintenance activities are presently conducted at this site. No revenues, except interest income, accrue to the Fund for Care of Sites for Disposal of Radioactive Wastes.

The Nevada Revised Statutes (NRS) 459.231 creates special revenue fund in the State treasury a Fund for Care of Sites for Disposal of Radioactive Wastes. The fund is administered by the Director of Health and Human Services. The Director may use annual income for the purpose for which the fund was created, although no purpose is mentioned (except as inferred from the name of the fund) in NRS 459.231 which created the fund.

Nevada regulations for the disposal of radioactive waste are contained in NAC 459.800 through 459.826. Nevada regulatory requirements for financial assurances are generally comparable to those of 10 CFR 61. Provisions of NAC 459 are essentially the same as those of 10 CFR 61, but consist of different language owing to the fact that these regulations have not been revised since 1984.

Commonwealth of Pennsylvania

No commercial LLRW disposal facility is expected to be developed in Pennsylvania. The requirements of Pennsylvania's LLRW disposal requirements are summarized below only to provide insight on the directions other states have taken in requiring financial assurances.

Requirements governing the disposal of LLRW in the Commonwealth of Pennsylvania are contained in Title 25 of the Pennsylvania Code, Chapter 236, with financial assurance and liability requirements stated in Section 236.601 through 236.607. Pennsylvania's financial assurance requirements address:

- ✓ Onsite cleanup during operations
- ✓ Liability for bodily injury and property damage during operations
- ✓ Site closure and decommissioning
- ✓ Long term care
- ✓ Liability for bodily injury and property damage following site closure

Comment [VR175]: See VR96

3.24 DO ANY STATES HAVE FINANCIAL ASSURANCE FOR COSTS THAT MIGHT DEVELOP OR EVOLVE AFTER FACILITY CLOSURE?

State of Texas

The State of Texas requires financial assurances for closure and institutional control of the facility. In addition, Texas rules require that financial assurances be provided to protect against the possibility that the commercial LLRW disposal facility might be found at some future time to have failed to perform as planned and required (30 TAC 336.738). As presently being implemented, the following costs are being considered in determining what financial assurances should be provided for these worst case corrective action costs:

- ✓ Determining the nature of the failure
- ✓ Designing a response to the failure
- ✓ Implementing the planned response including:
  - Excavating cover system over affects areas
  - Removing waste (contained in reinforced concrete canisters)
  - Transferring retrieved waste and contaminated materials to another commercial LLRW disposal facility for final disposal
  - Backfilling the hole from which waste was retrieved and cover system was excavated
  - Restoring surface conditions and reestablishing cover system
  - Monitoring the newly closed and stabilized disposal facility to ensure acceptable performance

One company has estimated the cost of this worst case corrective action scenario to total about $20 million for its proposed facility design.

Texas rules also provide that the Licensee of a commercial LLRW disposal facility must provide financial assurance for bodily injury and property damage to third parties caused by sudden and non-sudden accidental occurrences arising from operations of the disposal facility (30 TAC 336.736). One company proposing to develop a commercial LLRW disposal facility in the State of Texas has provided an insurance policy with coverage limits of $5 million per occurrence and $10 million in the aggregate to protect against claims of bodily injury and property damage.

State of Washington

As noted above, Washington rules require that the Licensee maintain financial assurances sufficient to protect the State from all claims, suits, legal fees, damages, or expenses resulting from these licensed activities.

Comment [VR176]: See VR97

3.25 WHAT LEGAL OR REGULATORY REVISIONS SHOULD BE MADE TO BETTER ASSURE AGAINST UNFUNDED COSTS?

The UWMRCB concludes that the existing financial assurances provided for closure and institutional control of the closed LLRW disposal facilities are adequate at current levels and with current, rules, controls and practices.

The UWMRCB recognizes the following:

- ✓ The Radioactive Waste Perpetual Care and Maintenance Account was established by the Legislature to finance the perpetual care and maintenance of commercial LLRW disposal facilities at the conclusion of the institutional care period and to protect against the possibility of funding shortfall during the institutional control period. Annual payments of $400,000 are required by state law to be paid into this fund.
- ✓ Based on information provided in this report, a minimum amount of $13 million has been established in order for the fund to meet the intended obligations for perpetual care and maintenance.
- ✓ Since 2008, Energy*Solutions* has set aside the balance of the targeted minimum amount of $13 million utilizing the surety required for financial assurance for closure and institutional care. However, if only a 1 percent return on investment is realized the minimum amount of $31million would be needed to meet the intended obligations for perpetual care and maintenance. As the annual payment of $400,000 is made to the perpetual care fund, an equivalent reduction is made to the overall obligation of the liability for closure, institutional care, and perpetual care.

Therefore, the UWMRCB recommends the following:

- ✓ The Legislature should consider the ambiguities created by the present exemptions from the land ownership requirements of Utah rules, as they relate to long-term responsibility for monitoring and maintaining the closed and stabilized facility.
- ✓ The Legislature should not divert funds from the Radioactive Waste Perpetual Care and Maintenance Account to other applications.

Comment [VR177]: See VR98

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

4.1 HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

The Division ~~UWMRCB~~ concludes that the amount of financial assurance required and provided for closure and post-closure care of commercial hazardous waste treatment, storage, or disposal facilities under Section 19-6-108 is judged to be adequate at current levels and with current rules, controls and practices. UWMRCB concurs.

Similarly, t~~T~~he ~~UWMRCB~~ Division concludes that the lack of perpetual care for periods after closure and post-closure of commercial hazardous waste treatment, storage, or disposal facilities is judged to be adequate with current rules, controls and practices. UWMRCB concurs. ~~recommends the following changes to address the issue of perpetual care at closed commercial hazardous waste land disposal facilities:~~

- ~~The UWMRCB recommends that a perpetual care fund be created and funded to provide for ongoing monitoring and maintenance of commercial hazardous waste land disposal facilities after termination of the post-closure permit;~~
- ~~The UWMRCB recommends that the fund be created in such a way so as to not place current facilities under an unreasonable financial burden; and~~
- ~~The UWMRCB recommends that no additional funds be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial hazardous waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells, the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Industries Corridor which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities.~~

Comment [VR178]: See Chapter 2.

4.2 RADIOACTIVE WASTE DISPOSAL FACILITIES

The ~~UWMRCB~~ Division concludes that the financial assurances provided and currently approved for closure and institutional control of the closed LLRW disposal facilities are adequate at current levels and with current, rules, controls and practices. UWMRCB concurs.

Furthermore, the Division concludes that the perpetual care for periods after closure and institutional control of LLRW disposal facilities are adequate at current levels and with current, rules, controls and practices. UWMRCB concurs.

~~The UWMRCB recognizes the following:~~

- ~~The Radioactive Waste Perpetual Care and Maintenance Account was established by the Legislature to finance the perpetual care and maintenance of commercial LLRW disposal facilities at the conclusion of the institutional care period and to protect against the~~

possibility of funding shortfall during the institutional control period. Annual payments of $400,000 are required by state law to be paid into this fund;

- Based on information provided in this report, a minimum amount of $13 million has been established in order for the fund to meet the intended obligations for perpetual care and maintenance; However, if only a 1 percent return on investment is realized the minimum amount of $31 million would be needed to meet the intended obligations for perpetual care and maintenance. and
- Since 2008, Energy*Solutions* has set aside the balance of the targeted minimum amount of $13 million utilizing the surety required for financial assurance for closure and institutional care. As the annual payment of $400,000 is made to the perpetual care fund, an equivalent reduction is made to the overall obligation of the liability for closure, institutional care, and perpetual care.

Therefore, the UWMRCB recommends the following:

- The Legislature should consider the ambiguities created by the present exemptions from the land ownership requirements of Utah rules, as they relate to long-term responsibility for monitoring and maintaining the closed and stabilized facility; and
- The Legislature should evaluate the existing funding approach for the Radioactive Waste Perpetual Care and Maintenance Account.

Based on a review of selected information that available after September 2011 related to licensed/unlicensed LLRW facilities in Utah, the following recommendations are also provided:

- For increased conservatism in long-range planning, Section 3.14 of this report includes an estimate of the future value for the Radioactive Waste Perpetual Care and Maintenance Fund assuming a minimum 1 percent per year real return on investment.
- It is recommended that the Director: (1) continue to work with the NRC and other stakeholders as appropriate to resolve any potential incompatibility issues between the State's proposed amendments to financial surety requirements for LLRW licensees in Utah and NRC's financial surety requirements; and (2) Further evaluate the economic impacts of the proposed final changes in financial surety requirements on financial assurance estimates for closure and post-closure of affected licensed LLRW facilities in Utah.

Comment [VR179]: See chapter 3 comments.

REFERENCES

Baird et al. 2008 — Baird, R.D. et al., "Cost Projections for Post-Closure Custodial Care of the Barnwell Radioactive Waste Disposal Facility," URS Corporation for South Carolina Budget and Control Board, URS-39400333-1, October 2008, http://www.energy.sc.gov/publications/Final%20%20Report%202008%2010.pdf.

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UAC R315 — Utah Administrative Code, Title R315, "Utah Hazardous Waste Management Rules."

UAC R313 — Utah Administrative Code, Title R313, "Utah Radiation Control Rules."

UDWMRC 2016a — Attachment to Email from Don Verbica, Utah Division of Waste Management and Radiation Control, to Jon Luellen, URS-Professional Solutions, LLC, dated January 11, 2016.

UDWMRC 2016b — Utah Division of Waste Management and Radiation Control, Letter dated January 13, 2016 to U.S. Nuclear Regulatory Commission, Re: Proposed Rule Changes to Adopt RATS ID 2011-1 UDWMRC 2016c Utah Division of Waste Management and Radiation Control, Letter dated February 25, 2016 to U.S. Nuclear Regulatory Commission (Regarding Draft Legislation [S.B. 173])

NRC 2016 U.S. Nuclear Regulatory Commission, Letter dated March 9, 2016 to Scott Anderson, Utah Division of Waste Management and Radiation Control, RE Comments on S.B. 231.

10 CFR 61 Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

NRC 2016 U.S. Nuclear Regulatory Commission, Letter dated March 9, 2016 to Scott Anderson, Utah Division of Waste Management and Radiation Control, RE Comments on S.B. 231.

10 CFR 61 Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

COMMENTS FROM

BOARD MEMBER

SHANE WHITNEY

Link to:
Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Committee Radioactive Waste Treatment, Storage, and Disposal Facilities"

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

4.1 HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

The UWMRCB concludes that the amount of financial assurance required and provided for closure and post-closure care of commercial hazardous waste treatment, storage, or disposal facilities under Section 19-6-108 is judged to be adequate at current levels and with current rules, controls and practices.

The UWMRCB recommends the following changes to address the issue of perpetual care at closed commercial hazardous waste land disposal facilities:

- ✓ The UWMRCB recommends that a perpetual care fund be created and funded to provide for ongoing monitoring and maintenance of commercial hazardous waste land disposal facilities after termination of the post-closure permit;
- ✓ The UWMRCB recommends that the fund be created in such a way so as to not place current facilities under an unreasonable financial burden; and
- ✓ The UWMRCB recommends that no additional funds be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial hazardous waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells, the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Industries Corridor which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities.

Comment [SW1]: I would be against any new fund to be created and funded by a commercial Hazardous waste disposal facility.

Comment [SW2]: How would a fund be created that would not be a financial burden to the facility?

Comment [SW3]: Is the No additional funds at this time meaning they will come later as the perpetual care Fund?

4.2 RADIOACTIVE WASTE DISPOSAL FACILITIES

The UWMRCB concludes that the financial assurances provided and currently approved for closure and institutional control of the closed LLRW disposal facilities are adequate at current levels and with current, rules, controls and practices.

The UWMRCB recognizes the following:

- ✓ The Radioactive Waste Perpetual Care and Maintenance Account was established by the Legislature to finance the perpetual care and maintenance of commercial LLRW disposal facilities at the conclusion of the institutional care period and to protect against the possibility of funding shortfall during the institutional control period. Annual payments of $400,000 are required by state law to be paid into this fund;
- ✓ Based on information provided in this report, a minimum amount of $13 million has been established in order for the fund to meet the intended obligations for perpetual care and maintenance; However, if only a 1 percent return on investment is realized the minimum amount of $31 million would be needed to meet the intended obligations for perpetual care and maintenance. and

- ✓ Since 2008, Energy*Solutions* has set aside the balance of the targeted minimum amount of $13 million utilizing the surety required for financial assurance for closure and institutional care. As the annual payment of $400,000 is made to the perpetual care fund, an equivalent reduction is made to the overall obligation of the liability for closure, institutional care, and perpetual care.

✓ Therefore, the UWMRCB recommends the following:

- ✓ The Legislature should consider the ambiguities created by the present exemptions from the land ownership requirements of Utah rules, as they relate to long-term responsibility for monitoring and maintaining the closed and stabilized facility; and
- ✓ The Legislature should evaluate the existing funding approach for the Radioactive Waste Perpetual Care and Maintenance Account.

Based on a review of selected information that available after September 2011 related to licensed/unlicensed LLRW facilities in Utah, the following recommendations are also provided:

- ✓ For increased conservatism in long-range planning, Section 3.14 of this report includes an estimate of the future value for the Radioactive Waste Perpetual Care and Maintenance Fund assuming a minimum 1 percent per year real return on investment.
- ✓ It is recommended that the Director: (1) continue to work with the NRC and other stakeholders as appropriate to resolve any potential incompatibility issues between the State's proposed amendments to financial surety requirements for LLRW licensees in Utah and NRC's financial surety requirements; and (2) Further evaluate the economic impacts of the proposed final changes in financial surety requirements on financial assurance estimates for closure and post-closure of affected licensed LLRW facilities in Utah.

Division's response to Board member's comments on the Draft Report
"Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
2,3	VR1	As a general comment, the language and approach between hazardous waste facilities and radioactive waste facilities seems dramatically different (even though many of their characteristics are the same). A uniform approach should be taken for all facilities.	The difference in language and approach is a reflection of two separate and distinct reports combined into one and is consistent with Legislative intent that HW and RAD facilities be evaluated differently. Retain current language.
10, 11	VR2	While I agree that this was prepared for the Division. Statute requires it to be prepared for the Board. As such, the board should have prepared the scope of work and had interactions with any contractor from the initial commissioning of this study.	Change to "prepared for the Director as the Executive Secretary to the Waste Management and Radiation Control Board".
299, 300			Suggested change is okay.
301-304	VR3	This is out of scope. Not required by UCA § 19-1-307.	This information is consistent with the directive of the Legislative Task Force in 2004 that became the genesis for this report. This information is critical in providing context and data necessary to comply with statute 19-1-307. The Division considers this information important for the Board and Legislature. Retain current language.
303	VR4	This is out of scope. Not required by UCA § 19-1-307.	This information is consistent with the directive of the Legislative Task Force in 2004 that became the genesis for this report. This information is critical in providing context and data necessary to comply with statute 19-1-307. The Division considers this information important for the Board and Legislature. Retain current language.
313-315		The Division ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements.	The Division recommends the suggested text be revised as follows: "The Division's active oversight of required facility design and construction specifications and operational requirements may minimize the perpetual care needs."
Table ES-1			
	VR5	This is out of scope. Not required by UCA § 19-1-307.	The type of financial mechanisms were of interest to the Legislative Task Force. Retain current language.
	VR6	This is out of scope. Not required by UCA § 19-1-307.	The type of financial mechanisms were of interest to the Legislative Task Force. Retain current language.
	VR7	A footnote as to why "Not Applicable" for last four permittees should be included in this table.	See footnote 3 on the bottom of Page xii. Add to footnote 3, "Therefore post-closure care is not applicable".
328-352	VR8	These were not identified by the Board nor are they being suggested by the Board. Statute directs that an evaluation be made if funds are aqequate. Further speculation is out of scope. Not required by UCA § 19-1-307.	Retain current language. The premise of this report is to provide Board recommendations to the Legislature. These recommendations are appropriate for the Board to make based on the current findings.
343-352	VR9	All of these same conditions equally apply to rad facilities at Clive and support a recommendation that no additional funds be required.	Retain current language. Additional language unnecessary, redundant and inappropriately transfers the role of the Board to the Division, in conflict with 19-1-307. The following narrative will be added "...non-potable groundwater (unless treated), the lack of precipitation, and the restricted access to the facilities. "
355-357	VR10	Independent of AEcom, I think it important to note the UDEQ already conducts an annual evaluation of the adequacy of the closure and post-closure funds	Retain current language.
358-361	VR11	If treated equivalent to Hazardous waste facilities in this report, this statement should be included (see the same statement on page xi.	The Division does not support the suggested change. Not relevant.
362-374			Retain current language. The purpose of this paragraph is to establish the future value of the Radioactive Waste Perpetual Care and Maintenance fund and to identify the assumed calculations from which the projected future value was derived. The suggested language is not relevant to this paragraph.
367-369	VR12	Inapplicable reference.	The correct rate of return will be added to the report.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
375-385			Suggested change; "The Board recommends that additional funds not be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial radioactive waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells to current regulatory standards. All phases of landfill construction are reviewed, monitored, and approved by the Director. The design and construction of landfill cells provide reasonable assurance that wastes are contained. Other factors include the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Industries Corridor, which prevents residential development in the area, the non-potable groundwater (unless treated), the lack of precipitation, and the restricted access to the facilities. "
	VR13	Copied from hazardous waste recommendation – as the arguments apply equally to rad facilities.	
387-395	VR14	As with hazardous waste facilities, unexpected events are incorporated into the design and operational quality control.	Retain current language. Required by 19-1-307. Additional language needed to reflect past and current market conditions.
Table ES-2	VR15	This is out of scope. Not required by UCA § 19-1-307.	Retain current language. See previous comments regarding scope.
Table ES-2	VR16	This is out of scope. Not required by UCA § 19-1-307.	Retain current language. Not explicitly excluded by scope of 19-1-307. In addition, this information is necessary to determine long-term site ownership under perpetual care. Retain footnote number 5.
403-410			Retain current language. Inappropriate transfer of responsibility. See previous comment regarding Division oversight.
411-421			The Division does not support the suggested change. Perpetual Care is required by statute. References to the NRC are not relevant.
422-426	VR17	Speculative and beyond scope required by UCA § 19-1-307	Retain current language. See previous comments regarding scope. Current narrative reflects past and present market performance and the need to re-evaluate the actual return on investment.
427			Suggested language OK.
431-432			The Division does not support the suggested change. Inappropriate transfer of roles.
433-435	VR18	Out of scope of the review required by 19-1-307.	Retain current language. This issue was explicitly raised by the legislative task force.
436-437	VR19	No equivalent recommendations are included for hazardous waste sites. Criterion cited for not needing these recommendations for hazardous waste sites apply equally to rad licensee.	Retain current language. Reference to hazardous waste sites are not relevant. This report does however recommend that perpetual care be required for hazardous waste facilities.
457-458			Replace suggested change with Utah citation R315-264-140 through 151.
472			The Division does not support the suggested change. It alters the intent of the statute.
474-476			The Division does not support the suggested change. It alters the intent of the statute.
479-482	VR20	Should be worded consistent with equivalent hazardous waste requirement.	Suggested language OK.
483-486			Suggested deletion OK.
487	VR21	Note that the statute requires a report of costs – not further speculation beyond that.	No suggested change.
502-505	VR22	Inappropriate for the Division's contractor to make this conclusion.	add "...Under the direction of the Executive Secretary of the WMRC Board." Delete "under the direction of the Utah Division of Waste Management and Radiation Control acting as a contractor to the Utah Department of Environmental Quality, for the UWMRCB. The Board has reviewed and concurs with the results, conclusions, and recommendations expressed in this report."
513-514	VR23	See same sentence in section 1.3 for rad facilities.	Suggested addition OK.
518-519			Change to "...and are statutorily required to be as stringent as those promulgated by the US Environmental Protection Agency, unless the agency demonstrates that more stringent rules are needed, in accordance with 19-6-106 and 19-3-104."
522-523			Suggested addition OK.
528-529			Suggested addition OK.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
530			Change to "...not required nor provided."
532			Suggested deletion OK.
533			Suggested deletion OK.
534-535			The Division does not support the suggested change because it is not factually correct. The funding for the post closure care of EnergySolutions mixed waste facility is separate from the Radioactive Perpetual Care and Maintenance Fund.
Footnote 6		Why not?	The statute directed an evaluation of commercial facilities only.
545			Suggested addition OK.
547-550			The Division does not support the suggested change. Not consistent with the statute.
553-554			Change to ."The rules that govern the management of radioactive waste at facilities within Utah are found in Title R313 of the Utah Administrative Code and are statutorily required to be equivalent with those promulgated by the US Nuclear Regulatory Commission, unless the agency makes a finding that a more stringent rule is necessary.
557-558			Change to "...(in the event that the permittee/licensee is unable or unwilling to complete such activities)".
561-562			The Division does not support this suggested change. Statement is incorrect. Financial assurance does not include perpetual care.
564-565	VR24	Not appropriate for the Division's contractor to presuppose.	Delete "As the Legislature has directed, the UWMRCB has reviewed this the Division's report and concurs with its results and findings . "
567-569			Suggested addition OK.
570	VR25	Out of scope. Statute requires the Board to review.	The Division does not support the suggested change. It is incumbent on the Board to make recommendations to the legislature based on its findings that changes may affect the adequacy of funds required for perpetual care and financial assurance.
572	VR26	This is out of scope. Not required by UCA § 19-1-307.	The Division does not support the suggested change. Not consistent with the legislative task force.
583-584			Suggested changes OK.
585-586			The Division does not support the suggested change. Construction and operating plans may help mitigate the consequences of catastrophic events, but cannot guarantee that if a catastrophic event happened that it would not effect the stability of the facility."
592			Suggested changes OK.
605-606	VR27	This same language should be included with rad. Perpetual care addresses "minor facility failures and maintenance …"	This language should be as follows: "No mechanism is presently required nor provided to cover costs associated with minimal maintenance and monitoring for reasonable risks that may occur during perpetual care, except for the EnergySolutions Mixed Waste Facility, which is covered by the Radioactive Waste Perpetual Care and Maintenance Fund. " This language does not need to be duplicated for RAD facilities because these costs are already covered under the Radioactive Waste Perpetual Care and Maintenance Fund.
621			Change to: "Conclusions and Recommendations." (Table of Content will need to be updated.)
628-632	VR28	This is not true. This wording does not accurately reflect the statute and rule.	The Division does not support the suggested changes. Use of these funds is at the discretion of the Director, not the permittee, and will be used for any/all costs associated with closure and post-closure. Line 630: New sentence added: "The facilities permitted for hazardous waste disposal in Utah involve hazards that will persist after successful closure and stabilization." "Such hazards are associated with hazardous waste that remain at the facility following closure and stabilization (because they are disposed of at and not removed from the site)."
635-636	VR29	If this is specifically "why", there should be a citation also included.	See Rule R315-260-10(c)(30)
638-639	VR30	This wording is more accurate than that objected to in VR19 and VR20.	Suggested changes OK.
645	VR31	See VR20	Change to: "Because waste remains in place after closure."

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
647-650	VR32	This is not true.	The Division does not support the suggested changes. Comment not accurate. The purpose of closure is to remove all hazardous waste from hazardous waste management units or, if waste is to remain in place, to properly close the land disposal unit.
651-652			The Division does support this suggested change. The rules require financial assurance for all post closure care costs.
655-656	VR33	You are presupposing a disposal facility here, where above you included other hazardous waste permitted facilities than just disposal.	Suggested changes OK.
657	VR34	Only if the structure and/or equipment weren't disposed of.	Suggested changes OK.
659	VR35	Subjective. Does not belong in this report.	Suggested changes OK.
660			Suggested changes OK.
662-663	VR36	See VR24.	The Division does not support the suggested deletions. Closure includes stabilization of disposal units. Suggested additions OK.
664			Suggested changes OK.
666			Change to: "Repairing or replacing facility components". In order to be consistent with Chapter 3.
667-680	VR37	Beyond scope. This is not required in 19-1-307.	The Division does not support the suggested deletion. Current language is factual and provides the basis to identify who performs closure and who is responsible for financial assurance.
682-685	VR38	Subjective. Not reflected in statute or rule.	The Division does not support the suggested deletion. Current language is an accurate statement of the purpose of post closure care. The exact duration of post closure care is determined by the Director.
687-688	VR39	In Utah? Or, across the U.S.?	The Division does not support the suggested deletions. Current language is accurate and consistent with rule.
689-690	VR40	If no time is set in statute and the duration of post-closure is set by the Director, it doesn't make sense to say the director may shorten or lengthen.	The Division does not support the suggested deletions. Current language is accurate and consistent with rule.
690-692	VR41	Please cite from where this statutory authority is given.	See R315-264-117.
693			Suggested changes OK.
694	VR42	Implied.	Suggested addition is okay. The Division does not support this suggested deletion, because reporting of environmental monitoring will be required by the permit.
696	VR43	See VR18.	The Division does not support the suggested addition. Financial assurance has to cover all custodial care and maintenance during the post closure care period.
698	VR44	Implied.	The Division does not support the suggested deletion. This report needs to accurately reflect the activities that will be conducted.
700	VR45	Implied.	The Division does not support the suggested deletion. This report needs to accurately reflect the activities that will be conducted.
701	VR46	Since surety assumes facility operates, this is out of place.	The Division does not support the suggested deletion. This report needs to accurately reflect the activities that will be conducted.
702-714	VR47	Not required in statue. Beyond the scope of this report.	The Division does not support the suggested deletion. Current language is factual and provides the basis to identify who performs post closure care and who is responsible for financial assurance.
715-732	VR48	A review and/or summation of the forms or their appropriateness is not require by statute. Beyond the scope of this report.	The Division does not support the suggested deletions. Understanding the nature of financial assurance mechanisms is critical to the evaluation of adequacy.
736			Change to: "The most recent cost estimates provided by the permitees for the closure…"
738-739			Suggested deletion OK.
739-740			The Division does not support the suggested changes. The current language is accurate.
Table 2-3.	VR49	Please footnote table 2-3 to explain to the reader why "not applicable"	Footnote can be added as suggested.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"			
Line #	**Commenter**	**Comment**	**DWMRC Response**
742			Add language from Chapter 3: "The approach to estimating closure and institutional costs involves the following steps: Identify all necessary activities; Estimate all required levels of effort, equipment, materials, supplies, and subcontractor support; Determine unit costs for each cost item (labor, equipment, materials, and supplies); Calculate individual costs and aggregate; Determine suitable contingency allowances; Submit for Director review and revised to address their concerns; Receive formal approval".
743	VR50	Not always true.	Suggested changes OK.
744			Suggested changes OK.
745-747			The Division does not support the suggested changes. The current language is accurate.
748-750	VR51	Do these site-specific conditions really change in a manner that needs to be reflected via surety change? Are you worried here about global climate change?	The Division does not support the suggested changes. The current language is accurate.
751-752	VR52	Ambiguous. Improve cost? Improve effectiveness? Improve how?	The Division does not support the suggested changes. The current language reflects possibilities that need to be considered.
753	VR53	Self-evident.	Suggested changes OK.
755-757			Suggested changes OK.
760-761	VR54	Not always true. Inappropriate here. Closure at the time of thermos-nuclear war or alien invasion may be "most expensive".	The Division does not support the suggested deletion. Required by Rule.
762	VR55	Third-party won't conduct the regulatory inspections, etc….	Suggested deletion OK.
764			Suggested changes OK.
769	VR56	Not true, by statute.	Suggested changes OK.
770-773			The Division does not support the suggested changes. Financial assurance must account for all required activities.
776-777	VR57	The Director's review is not limited to these components.	Change to "Having considered effects of any changes in closure plans, such as technological developments, and inflation…"
777	VR58	May? The director doesn't always approve.	Change to "...the Director may approve the …"
780-783	VR59	While not of equivalent risk, this statement applies to decreases, as well as increases.	Retain current language. Add "Permittee actions may also significantly affect the activities and/or costs projected for closure and post closure care. "
Table 2-4	VR60	Why?	See previous footnote regarding waste left in place.
Table 2-4	VR61	Out of scope of the report.	The Division does not support the suggested deletions. This is critical information and is necessary to determine adequacy of financial assurance.
Table 2-4	VR62	Out of scope of the report.	The Division does not support the suggested deletions. This is critical information and is necessary to determine adequacy of financial assurance.
792-797	VR63	Out of scope of the report.	The Division does not support the suggested deletions. This is critical information because it identifies who oversights the facility.
804-806			The Division does not support the suggested additions. The Division recommends the suggested text be revised as follows: "The Division's active oversight of required facility design and construction specifications and operational requirements may help minimize the perpetual care needs."
808-811			Suggestion addition is okay. The Division does not support the suggested deletion, narrative is accurate.
812	VR64	Facility must be designed and models estimate what happens if all security is lost at permit termination.	The Division does not support the suggested deletion. Narrative is accurate.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
813-814	VR65	The Division ensures that perpetual care needs are minimized through active oversight of required facility design and construction specifications and operational requirements. Required repairs reflect inspection failure in addition to permittee failure.	The Division does not support the suggested deletion. Narrative is accurate.
815-816	VR66	Not reflected anywhere in statute, requirement, or guidance.	The Division does not support the suggested deletion. Narrative is accurate.
817	VR67	This must be shown PRIOR to permit termination.	The Division does not support the suggested deletion. Narrative is accurate.
818-819	VR68	Permit will not be terminated if these activities are ongoing.	The Division does not support the suggested deletion. Narrative is accurate.
820	VR69	See VR61	The Division does not support the suggested deletion. Narrative is accurate.
821	VR70	See VR58.	The Division does not support the suggested deletion. Narrative is accurate.
822-841	VR71	Out of scope. Statute requires Board to assess if perpetual care funds are adequate, not if there is statutory justification for them.	The Division does not support the suggested deletion. Narrative is accurate.
842-867	VR72	Out of scope. Statute requires you to assess if adequate. If NO hazardous perpetual care fund exists, statute does not require you to project its future value.	The Division does not support the suggested deletion. The Statue states that an evaluation of perpetual care for hazardous waste facilities be conducted. This information supports a more complete evaluation of the adequacy of perpetual care.
868-869	VR73	Only according to the assumptions included in the projections. This is inappropriately declarative.	Agree to delete "In general, the value of the fund grows faster than costs inflate." The Division does not support the remainder of suggested deletions. Narrative provides information on how the Fund might grow.
870-872	VR74	See VR65.	The Division does not support the suggested deletion. Narrative is accurate.
872			Suggested language to Insert: "Based on review of the available information in preparing this report update, a return on investment of less than 2 percent may not be sufficient to realize the minimum amount needed to meet the intended obligations for perpetual care and maintenance".
873-880 Table 2-6 & Table 2-6a	VR75	Speculative, beyond scope of statute. You are required to assess is current hazardous was perpetual care fund is adequate. If NOT in existence, the answer is simple (Yes, No).	The Division does not support the suggested deletion. This information supports a more complete evaluation of the adequacy of perpetual care.
881-908	VR76	Out of scope. This is not a question posed by Statute for this review.	The Division does not support the suggested deletions. Evaluating the affect of funding perpetual care on current operations.
910-911	VR77	Statutory requirements do not include consideration of "unplanned and unanticipated events."	The section has been amended. The Division recommends the suggested text be revised as follows :"…and reasonable risks."
915-917	VR78	Is this adequate or not?	The Division does not support the suggested deletions. The statement is factual.
918-922	VR79	Out of scope. Statute requires judgement if perpetual care fund is adequate or not. If not present, judgment is Yes/No – not speculative on the possible performance of a hypothetical fund.	The Division does not support the suggested deletion. This information supports a more complete evaluation of the adequacy of perpetual care.
923-927	VR80	See VR72	The Division does not support the suggested deletion. This information supports a more complete evaluation of the adequacy of perpetual care.
928-931	VR81	See VR72	The Division does not support the suggested deletion. This information supports a more complete evaluation of the adequacy of perpetual care.
932			The Division does not support the suggested deletion. The statement is theoretical.
938-939	VR82	This is an operational issue related to the adequacy of inspection, not closure / post-closure.	The Division does not support the suggested deletion. This statement is accurate.
940	VR83	See VR75. This further relates to the adequacy of the operational environmental monitoring program.	The statement is accurate.
942-943	VR84	Not accurate.	The Division does not support the suggested deletions. These examples could affect the cost estimate.
943-944	VR85	Cover must be constructed, as permitted	The Division does not support the suggested deletions. These examples could affect the cost estimate.
944	VR86	See VR75	The Division does not support the suggested deletions. These examples could affect the cost estimate.
945-946	VR87	Funds would continue to accrue interest if left unspent.	The Division does not support the suggested deletions. These examples could affect the cost estimate.
947-948	VR88	Required to be incorporated in permitted facility design and models.	The Division does not support the suggested deletions. This statement is accurate.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
949-951	VR89	This conclusion is out of scope. Is the current perpetual care fund balance sufficient for hazardous waste disposal sites?	Suggested deletion OK. This paragraph will be moved to the proper section, 2.15 (Line 872).
955-961	VR90	Untrue. Cells are required to be designed to minimize uncertainty and the need for active major maintenance, differential settlement, and groundwater corrective actions.	The Division does not support the suggested changes. This language is required by statute.
Table 2-7	VR91	Speculative and inaccurate, given the rigorous design, operation, and closure requirements and modeling required by permit.	The Division does not support the suggested deletions. This information is based on the contractor's expertise and professional judgment.
963-984	VR92	This is a rad facility (not hazardous waste – as discussed in Chapter 2). This is also a Class B and C facility (with radiological hazards exceeding 100 year). This facility was also designed and operated before the current rigorous modeling and design requirements were promulgated. It is NOT comparable to any Utah hazardous waste facilities. Nor is it comparable to Utah's radiological facilities discussed in Chapter 3.	The Division does not support the suggested deletions. This information provides examples of reasonable risks at landfill facilities.
985-987	VR93	This is the question required to be evaluated by statute.	The Division does not support the suggested changes. The current language accurately reflects the statutory requirements.
988-989	VR94	How can AEcom force what action a regulator will take in the future?	The Division does not support the suggested changes. The current language reflects a commitment to future regulatory oversight.
990-992	VR95	This is the answer to the question asked in Statute.	The Division does not support the suggested changes. Inappropriately transfers the role of the Board to the Division, in conflict with 19-1-307.
993-1028	VR96	All of these points that justify no further perpetual care funds for hazardous waste facilities equally apply to rad facilities in chapter 3.	Suggested changes on line 993 are OK. Suggested addition of "UWMRC Board concurs" is not supported. This is a Board report to the Legislature. The statute requires perpetual care for RAD sites. This section only identifies mitigating factors for the amount of perpetual care needed for HW sites.
1029-1032	VR97	By its nature, this question is out of scope. Board is required to review financial assurance – not things BEYOND financial assuance.	The Division does not support the suggested deletion. This information is critical in providing information regarding adequacy.
1044-1232	VR98	These apply equally to rad facilities in chapter 3.	The Division does not support the suggested changes. The statute already requires perpetual care for RAD facilities. Regulatory citations support determination of adequacy.
1238	VR99	Circular argument. Regardless of increase, unanticipated costs argue for further increases.	For clarification the following change: "An increase in financial assurance." Adding more funds to financial assurance for unanticipated costs for long term care and maintenance.
1239	VR100	Current requirements have not been demonstrated to be insufficient at protecting against unanticipated costs.	The Division does not support the suggested changes. The statement was to clarify the potential of decreased need for increased costs.
1241	VR101	While a perpetual care fund will provide monies to deal with unanticipated costs, the presence of such a fund by itself does not prevent unanticipated costs.	The Division does not support the suggested change. There is no perpetual care fund for HW facilities. A fund would help pay for unanticipated cost of long term maintenance.
1246-1248			The Division does not support the suggested changes. The report recommends perpetual care for long term care and maintenance of hazardous waste disposal facilities.
1249-1491	VR102	Out of scope. Comparison to other states is not required by statute.	The Division does not support the suggested deletions. A comparison with other states was important to the Legislature's Hazardous Waste Regulation and Tax Policy Task Force. Additionally, the information was determined by the previous Boards to be critical and informative to the evaluation of the adequacy of financial assurance.
1492-1558	VR103	Whether or not these are included by other states does not address if Utah is adequate (as required by statute). Incorporation by other state is subjective to conditions and permits in that state.	The Division does not support the suggested deletions. A comparison with other states was important to the Legislature's Hazardous Waste Regulation and Tax Policy Task Force. Additionally, the information was determined by the previous Boards to be critical and informative to the evaluation of the adequacy of financial assurance.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"			
Line #	**Commenter**	**Comment**	**DWMRC Response**
1559-1582	VR104	Out of scope. Statute requires evaluation of adequacy of funds – NOT possible regulatory or legal revisions.	The Division does not support the suggested deletions. Change section title to: "Conclusions and Recommendations."
1589-1590	VR105	The level of scrutiny in Section 3 should match that in Section 2.	Comment noted.
1591-1592			The Division does not support the suggested changes. The scope of the statute is broader than disposal. The current language conforms with the scope of the statute. Commercial radioactive waste treatment or disposal facilities are subject to more than just R313-25, for purposes of obtaining a radioactive materials license.
1593-1594			Suggested changes OK.
1595-1597			Suggested changes OK.
1597	VR106	By definition, compliance with "guidance" is not required.	Agree to delete "…and guidance." Add: "The Director relies on appropriate guidance in making determinations."
1602			Suggested changes OK.
1605-1608			Recommend the sentence be revised as "The license contains requirements beyond those contained in regulations to ensure that the assumed design conditions are achieved."
1609	VR107	By definition.	The Division does not support the suggested changes. Current language as written already covers institutional control periods.
1611	VR108	Frequency is set by the director, not this report.	The Division does not support the suggested changes. This statement as written is accurate.
1611-1612	VR109	Director not authorized to conduct OSHA-related aspects of facility operations…	The Division does not support the suggested deletion. Add "…'applicable' regulations…"
1613	VR110	Not all responses are enforcement in nature.	Recommend rewording sentence "…range of actions, including enforcement,…."
1614			Suggested change OK.
1615-1616			The Division does not support the suggested addition. Construction and operating plans may help mitigate the consequences of catastrophic events, but cannot guarantee that if a catastrophic event happened that it would not effect the stability of the facility."
1618-1621			Suggested changes OK.
1623			The Division does not support the suggested deletion. The rules require surety to cover "all" costs associated with closure and institutional control.
1624			The Division does not support the suggested deletion. The statement is accurate.
1625-1626	VR111	Nothing "nominal" about it.	Suggested changes OK.
1628-1630			Suggested changes OK.
1632-1633	VR112	Shortfalls during the institutional control period are addressed via design and modeling conservatisms, regulatory enforcement during construction and operation, and institutional control period surety calculations.	The Division does not support the suggested deletions. This state is accurate based on statute (19-3-106.2).
1634-1639			Change to: "Annual contributions to the Perpetual Care Fund have been made by the licensee (EnergySolutions) in the amount of $400,000 per year of active facility operation. The balance of the fund has been pledged via surety mechanism to ensure a current value of $13 million is made available. The fund, including contributions and earnings but excluding the surety gap addition, which is approximately $6.8 million, totaled about $6.2 million as of June 2016."
1640-1642	VR113	Since this is not part of the statutory charge, it would be inappropriate to include this, anyway.	The Division does not support the suggested deletion. This information is a true statement as it provides information to the adequacy.
1654	VR114	Out of scope. Is it adequate or not?	The Division does not support the suggested deletion. Change to "Conclusions and Recommendations".
1655			The Division does not support the suggested insertion. The statutory language is different for the two different types of facilities.
1658			Suggested changes OK.

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Line #	Commenter	Comment	DWMRC Response
1661	VR115	The director has always been limited to the land area defined by the license. S.B. 173 was written to better clarify not redefine.	Suggested changes OK.
1663			Suggested change OK.
1664			The Division does not support the suggested changes. Facility currently has a radioactive material area on this property.
1665-1666			The Division does not support the suggested changes. The Division discussed with the Legislative Rules Review Committee and it was understood that rules would not need to be developed until the statute was amended to make it compatible with the NRC requirements.
1668			Change to …"as Senate Bill 173 excludes disturbed areas."
1669-1670			Change to: "The Director has delayed proposing rules until new legislation is passed that eliminates the current incompatibility with the NRC."
1671-1674	VR116	Speculative	The Division does not support the suggested changes. Change last sentence to "The Director is hopeful that new legislation will be passed in the 2017 General Session to ensure compatibility with the NRC."
1677-1680			Suggested changes OK.
1681			The Division does not support the suggested deletions. The rules require surety to cover "all" costs associated with closure and institutional control.
1683-1686	VR117	This same statement could also be made about hazardous waste (which does not decay), but was excluded in Chapter 2.	The Division does not support the suggested changes. Same information will be added to Chapter 2.
1686-1688			The Division does not support the suggested changes. Sentence as worded is accurate.
1692	VR118	Not cited in this manner in Chapter 2.	The Division does not support the suggested changes. This is a Radiation Rule specific requirement (R313-25-31), not applicable to Chapter 2.
1693-1695	VR119	Not equivalent to presentation in Chapter 2.	Change to: "When the decision is made that the facility will no longer actively operate, it undergoes a formal procedure known as facility closure to decontaminate, dismantle, decommission, and stabilize the facility and any components that remain." The hazardous waste rules and radioactive waste rules are not the same in regards to closure and stabilization.
1695-1701	VR120	See VR113	Change to: "The purpose of facility closure and stabilization is to isolate remaining radioactive wastes from the environment and exposure to the general public. When waste is left in place, surety is required to cover the costs expected for the institutional control period. Such is the case for facilities licensed to dispose of radioactive waste."
1702-1704			Suggested deletion OK.
1705			The Division does not support the suggested deletion. This is a Radiation Rule specific requirement (R313-25-31).
1706-1707	VR121	You are presupposing a disposal facility here, where above you included other hazardous waste permitted facilities than just disposal.	Suggested change OK.
1708	VR122	See VR28	The Division does not support the suggested insertion. Closure needs to consider all required support structures and operating equipment.
1709-1710	VR123	See VR29	Suggested changes OK.
1711			Suggested changes OK.
1712			Suggested changes OK.
1714-1715	VR124	See VR24 and VR30.	Change to: "Closing and stabilizing all disposal units according to the design and license requirements once all waste has been disposed of."
1717			Change to "In general, Facility closure and stabilization do not include such activities as:"
1719	VR125	Not equivalent to Chapter 2.	Change to: "Repairing or replacement of facility components." Same language added to Chapter 2.
1720-1733	VR126	See VR31	The Division does not support the suggested deletion. Current language is factual and provides the basis to identify who performs closure and who is responsible for financial assurance.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
1735-1737			The Division does not support the suggested changes. The statement as written is accurate.
1740-1741	VR127	Out of scope and not in Chapter 2.	Suggested changes OK.
1742-1743			The Division does not support the suggested changes. The statement as written is accurate.
1745			Change to: "Continuing the environmental monitoring program at the disposal site."
1747			Suggested addition OK.
1749	VR128	See VR38	The Division does not support the suggested deletions. This activities need to be included, reporting to the regulatory agency is important.
1750-1751	VR129	See VR39 and VR40	The Division does not support the suggested deletions. Reference to VR39 and VR40 are not germane.
1752-1758			The Division does not support the suggested deletions. This information provides examples of activities that occur during institutional control period.
1758-1761	VR130	Report says that institutional control does "not include such activities as environmental restoration or corrective actions". The paragraph goes on to say that these activities are funded by the Perpetual Care Fund. However, DWMRC requires licensee put remedial activities into the regular surety. If so, it is inappropriate to also require it in the Perpetual Care Fund.	The Division does not support the suggested deletions. This information provides examples of activities that occur during institutional control period.
1762-1768			Suggested deletions OK.
1769-1777	VR131	Excluded from Chapter 2.	The Division does not support the suggested deletions. There currently is no perpetual care for hazardous waste.
1778-1789	VR132	See VR41	The Division does not support the suggested deletion. Current language is factual and provides the basis to identify who performs the institutional control period and who is responsible for financial assurance.
1790-1837	VR133	Out of scope. Not presented in Chapter 2. Not required as part of review in Statute.	The Division does not support the suggested deletions. Current language is factual and provides the basis for who is responsible for overseeing the closed facility at the end of 100 years.
1838-1864	VR134	See VR42	The Division does not support the suggested deletions. Understanding the nature of financial assurance mechanisms is critical to the evaluation of adequacy.
1867-1875	VR135	Wording should be equivalent to Chapter 2.	Change to: "The most recent cost estimates provided by the licensee for the cost of closure and institutional control of commercial LLRW management facilities licensed by Utah are presented in Table 3-3. The Director annually reviews and approves the proposed financial assurance once the proposed provisions are determined to satisfy applicable requirements." (This language is now equivalent to Chapter 2).
Table 3-3			The Division does not support the suggested changes. Information as provided is accurate.
1879-1887	VR136	Not included in Chapter 2.	The Division does not support the suggested changes. This language will be added to Chapter 2.
1888-1889	VR137	Same wording as Chapter 2.	Suggested change OK.
1890			Suggested change OK.
1891-1893			The Division does not support the suggested changes. Consistent with Chapter 2.
1894-1895			The Division does not support the suggested changes. The current language reflects possibilities that need to be considered.
1896-1898			The Division does not support the suggested changes. The current language is accurate.
1899-1900			The Division does not support the suggested change of deletion of "and stabilization". The rest of the suggested changes OK.
1901-1903	VR138	See chapter 2.	Suggested changes OK.
1904-1905	VR139	See VR49	Suggested changes OK.
1906-1908	VR140	Speculative. Statute requires evaluation given current laws and requirements.	Suggested deletions OK.
1909-1927	VR141	These do not reflect currently funded surety and perpetual care. This discussion is out of scope.	The Division does not support the suggested deletions. This information provides updated information on current status.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
Table 3-4	VR142	See VR55 and VR56	The Division does not support the suggested deletions. This is critical information and is necessary to determine adequacy of financial assurance.
Footnote 21			The Division does not support the suggested deletions. This is critical information and is necessary to determine adequacy of financial assurance.
1934-1938	VR143	Not included in chapter 2.	The Division does not support the suggested deletions. Radiation rules and hazardous waste rules are not equivalent.
1940-1941			The Division does not support the suggested additions. Not consistent with statute.
1942-1949	VR144	Inappropriately different than tone in Chapter 2.	The Division does not support the suggested changes. There is currently no statutory requirement for perpetual care of hazardous waste disposal facilities.
1950-1957	VR145	See VR58 through VR64	The Division does not support the suggested deletions. Helps determine adequacy.
1962-1963	VR146	This is the burden of DWMRC and the Director's annual review of the surety submittals.	The Division does not support the suggested deletions. This is required by the Radiation Control Act 19-3-106.2.
1982-1983			The Division does not support the suggested additions. The Director does not approve financial surety arrangements.
1986-1989	VR147	It is the burden of DWMRC inspectors to ensure that corrective actions are timely identified and corrected during operations.	Suggested deletions OK.
1990			The Division does not support the suggested deletion. The word "also" clarifies that the portion quoted from 19-3-106.2 is only a portion of the full citation.
1996-1997	VR148	UAC R313-25-9(4)(d) requires that a facility be designed, constructed, and operated with a "reasonable assurance that there will not be a need for ongoing active maintenance of the disposal site following closure." As such, it is the burden of DWMRC inspectors to ensure operational compliance – so that no maintenance is required after institutional control. Furthermore, UAC R313-25-15 requires complex plans be submitted and verified prior to facility Closure. Only after the Director has confirmed that there is a "reasonable assurance that the long-term performance objectives of Rule R313-25 will be met" is the license amended for closure. As such, it is the burden of DWMRC staff to ensure the site and license amendment information is adequate to prevent the need for ongoing maintenance after institutional control. After closure, UAC R313-25-17(5) requires that the licensee has adequately demonstrated that the institutional requirements and performance objectives of UAC R313-25 will be met – before a Federal or State agency assumes responsibility for control of the closed site. As such, it is the burden of DWMRC staff to ensure that there is no need for ongoing maintenance after institutional control. Therefore, the estimates for annual maintenance after institutional control should be $0.	There will be on-going costs beyond the 100 year period to ensure the public does not have access to the site.
1998-1999			Suggested changes OK.
1999-2000	VR149	No they don't see VR141	The Division does not support the suggested language. This is an estimate of on-going costs.
2000-2002	VR150	Since there should be no maintenance costs after institutional control, this statement should apply only to the institutional control. If so, surety must only assume a 1% return on surety monies available for institutional control activities.	The Division does not support the suggested deletions. Information is needed for on-going maintenance costs.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
2003-2009	VR151	This is for surety monies available for institutional control – at the time of license termination. It is out of scope and inappropriate to apply this requirement to periods after institutional control.	Suggested changes OK.
2009-2011	VR152	See VR144.	Change to: "Table 3-5a identifies what the rate of return on the investment for the Perpetual care account would be, assuming a 1% average annual real return on investment." This provides a more conservative approach to limit possible risk of public having to provide funds for perpetual care.
2012-2021			Delete Lines 2012-2021, already addressed in previous language.
2026-2027	VR153	This statement also applies to monies invested by the Utah State Treasurer for the State Post-Retirement Benefits Trust fund – which shows an annual increase of over 6%.	The PTIF that manages the Perpetual Care Account has for the last fourteen years generated a negative 0.4% real return on investment.
2030	VR154	Bias statement. Since perpetual care will be used AFTER operation and 100 years of institutional control. It is highly inappropriate to assume a short term low return over such a long time period.	The Division does not support the suggested deletion. This is just an update of current information.
2030-2031			Delete "Investments in such financial instruments grow faster than inflation by about 2 percent per year."
2034			Insert "Table 3.5a presents projected future values of the fund assuming a 1% real annual interest rate return."
2038-2040	VR155	Monies can only be withdrawn from the fund for activities AFTER institutional control.	The Division does not support the suggested changes. Statement is accurate as written. (See 19-3-106.2(5))
Footnote 22			The Division does not support the suggested deletions. Accurate information.
2045 Table 3-5a			The Division does not support the suggested deletions. Demonstrates what the fund would be at 1%, which is more in line with current market conditions.
2051	VR156	Speculative. Not required by statute. Out of scope.	The Division does not support the suggested deletions. Used to determine adequacy.
2057-2064	VR157	Out of scope. This analysis is not required by statute.	The Division does not support the suggested deletions. This is critical information and is necessary to determine adequacy of financial assurance.
2065-2067	VR158	The Division is charged to ensure sufficient surety funds (which are separate from perpetual care) to account for this situation.	The Division does not support the suggested deletion. This is a statutory requirement 19-3-106.2(5).
2068-2070			The Division does not support the suggested deletions. Currently there is no provision for the facility to fund the remaining amount needed for perpetual care if the facility voluntarily closes before the fund reaches $13 million.
2070-2072	VR159	These events are incorporated into the surety – not perpetual care fund.	The Division does not support the suggested deletions. Change to: "It could also occur if unplanned and unanticipated events were to occur earlier than the end of the 100 years of the institutional control period if there were insufficient funds to complete the institutional control period."
2072-2075	VR160	Presupposes that the annual costs projected for AFTER institutional control are accurate – which is disputed.	The Division does not support the suggested deletions. The information shows what would be in the fund, assuming a 2% real return of investment.
2076-2278	VR161	Out of scope. This question is not included in statute.	The Division does not support the suggested deletions. Used to determine adequacy.
2287-2288	VR162	Subjective statement. Ignores Division and Director's responsibility to enforce requirements during operation and closure to ensure no ongoing maintenance is required after institutional control.	The Division does not support the suggested deletions. Used to determine adequacy.
2293	VR163	Incorrect conclusion.	The Division does not support the suggested deletions. Used to determine adequacy.
2279-2294	VR164	Not within the scope required by statute.	The Division does not support the suggested deletions. Used to determine adequacy.
2295-2301	VR165	NRC specifically indicates that modeling should not include dramatic climate change.	The Division does not support the suggested deletions. Used to determine adequacy.
2302	VR166	Incorporated in design to ensure embankment stability is not compromised with an earthquake.	The Division does not support the suggested deletions. Used to determine adequacy.
2303	VR167	Incorporated in design requirements.	The Division does not support the suggested deletions. Used to determine adequacy.

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"

Line #	Commenter	Comment	DWMRC Response
2295-2346	VR168	Inconsistent with NRC direction. Out of scope required in statute. Overly speculative.	The Division does not support the suggested deletions. Used to determine adequacy.
2347-2359			The Division does not support the suggested deletions. Used to determine adequacy.
Table 3-7	VR169	Already addressed in design factors of safety and surety estimates. Overly speculative. Beyond scope of statute. Incompatible with NRC direction.	The Division does not support the suggested deletions. Used to determine adequacy.
2361-2370			The Division does not support the suggested deletions. Used to determine adequacy.
2371-2381 & Table 3-8	VR170	Correct statement. This section should be deleted.	The Division does not support the suggested deletions. Used to determine adequacy.
2383-2385			The Division does not support the suggested deletions. Used to determine adequacy.
2386-2399 & Table 3-9	VR171	See VR163	The Division does not support the suggested deletions. Used to determine adequacy.
2404			The Division does not support the suggested addition. The statement is accurate as written.
2406			The Division does not support the suggested changes. This is a Board report.
2406-2408	VR172	Not asked by section's question. Question addresses surety funds for closure and institutional control.	Suggested deletion OK.
2409-2412			The Division does not support the suggested deletions. Used to determine adequacy.
2413-2430	VR173	See VR165	The Division does not support the suggested deletions. Used to determine adequacy.
2431-2438	VR174	Not if the Director satisfies its obligation to accurately review, in detail, the annual surety projections for closure and institutional control activities.	The Division does not support the suggested deletions. Used to determine adequacy.
2439-2715	VR175	See VR96	The Division does not support the suggested deletions. Used to determine adequacy.
2716-2748	VR176	See VR97	The Division does not support the suggested deletions. Used to determine adequacy.
2749-2775	VR177	See VR98	The Division does not support the suggested deletions. Used to determine adequacy.
2776			Insert "Based on a review of selected information that available after September 2011 related to licensed/unlicensed LLRW facilities in Utah, the following recommendations are also provided: For increased conservatism in long-range planning, Section 3.14 of this report includes an estimate of the future value for the Radioactive Waste Perpetual Care and Maintenance Fund assuming a minimum 1 percent per year real return on investment."
2780			The Division does not support the suggested changes. This is a Board report.
2783			The Division does not support the suggested changes. This is a Board report.
2784-2801	VR178	See Chapter 2.	The Division does not support the suggested deletions. These are the Board recommendations.
2803-2808			The Division does not support the suggested changes. This is a Board report.
2810-2836	VR179	See chapter 3 comments.	The Division does not support the suggested changes. This is the conclusion of the report.
2837-2842	VR179 (cont.)		Suggested deletion OK.
Appendix A Appendix B Appendix C			The Division does not support the suggested changes. This information is consistent with the directive of the Legislative Task Force in 2004 that became the genesis for this report. This information is critical in providing context and data necessary to comply with statute 19-1-307. The Division considers this information important for the Board and Legislature. Retain current language.
Section 4.1 check mark 1	SW1	I would be against any new fund to be created and funded by a commercial Hazardous waste disposal facility	Noted

Division's response to Board member's comments on the Draft Report "Evaluation of Closure, Post-Closure Care and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities"			
Line #	**Commenter**	**Comment**	**DWMRC Response**
Section 4.1 check mark 2	SW2	How would a fund be created that would not be a financial burden to the facility?	Perpetual care for hazardous waste disposal facilities would require a statutory change. The Division will implement legislative directive.
Section 4.1 check mark 3	SW3	Is the No additional funds at this time meaning they will come later as the perpetual care Fund?	If the legislature creates a requirement for perpetual care for hazardous waste disposal facilities, additional funds to provide that care will be necessary.

UTAH WASTE MANAGEMENT AND RADIATION CONTROL BOARD
FINANCIAL ASSURANCE – FIVE-YEAR EVALUATION
STATUTORY REQUIREMENTS (UCA § 19-1-307)

COMMERCIAL HAZARDOUS WASTE TREATMENT, STORAGE, or DISPOSAL FACILITY

Five-year evaluation of:

ADEQUACY OF FINANCIAL ASSURANCE REQUIRED FOR

- Closure
- Postclosure Care

ADEQUACY OF FINANCIAL ASSURANCE OR FUNDS REQUIRED FOR

- Perpetual Care and Maintenance (following closure and postclosure period)
  - If found necessary following the evaluation below

EVALUATION TO DETERMINE

Whether the amount of financial assurance is adequate for:

- Closure
- Postclosure Care
- Perpetual Care and Maintenance (following closure and postclosure period)
  - If necessary to protect human health and the environment

Costs above the minimal maintenance and monitoring for reasonable risks that may occur during

- Closure
- Postclosure
- Perpetual Care and Maintenance

Including:

- Groundwater corrective action;
- Differential settlement failure; or
- Major maintenance of a cell or cells

COMMERCIAL RADIOACTIVE WASTE TREATMENT or DISPOSAL FACILITY

Five-year evaluation of:

ADEQUACY OF FINANCIAL ASSURANCE REQUIRED FOR

- Closure
- Postclosure Care (Institutional Control)

ADEQUACY OF RADIOACTIVE WASTE PERPETUAL CARE AND MAINTENANCE ACCOUNT

EVALUATION TO DETERMINE

Whether the amount of financial assurance is adequate for:

- Closure
- Postclosure Care (Institutional Control)

Whether the restricted account is adequate for:

- Perpetual care and maintenance

Costs above the minimal maintenance and monitoring for reasonable risks that may occur during

- Closure
- Postclosure (Institutional Control)
- Perpetual Care and Maintenance

Including:

- Groundwater corrective action;
- Differential settlement failure; or
- Major maintenance of a cell or cells

Costs under §19-3-106.2(5)(b)[1] of using the restricted account during the 100 years following final closure for:

- Maintenance;
- Monitoring; or
- Corrective Action

[1] §19-3-106.2

(5)(b) maintenance or monitoring of, or implementing corrective action at, a commercial radioactive waste treatment or disposal facility, excluding sites within the facility used for the disposal of byproduct material, before the end of 100 years after the date of final closure of the facility, if:

(i) the owner or operator is unwilling or unable to carry out postclosure maintenance, monitoring, or corrective action; and

(ii) the financial surety arrangements made by the owner or operator, including any required under applicable law, are insufficient to cover the costs of postclosure maintenance, monitoring, or corrective action

UTAH WASTE MANAGEMENT AND RADIATION CONTROL BOARD
CLOSURE, POST-CLOSURE AND PERPETUAL CARE EVALUATION

2006, 2011, and 2016 REPORTS COMPARISON

COMMERCIAL HAZARDOUS WASTE TREATMENT, STORAGE, OR DISPOSAL FACILITY		
CONCLUSIONS		
2006	**2011**	**2016**
The amount of financial assurance required and provided for closure and post-closure care of commercial hazardous waste treatment, storage, or disposal facilities under Section 19-6-108 is judged to be adequate at current levels and with current rules, controls and practices.	The USHWCB concludes that the amount of financial assurance required and provided for closure and post-closure care of commercial hazardous waste treatment, storage, or disposal facilities under Section 19-6-108 is judged to be adequate at current levels and with current rules, controls and practices.	The UWMRCB concludes that the amount of financial assurance required and provided for closure and post-closure care of commercial hazardous waste treatment, storage, or disposal facilities under Section 19-6-108 is judged to be adequate at current levels and with current rules, controls and practices.
RECOMMENDATIONS		
2006	**2011**	**2016**
The USHWCB recommends that a perpetual care fund be created and funded to provide for ongoing monitoring and maintenance of commercial hazardous waste land disposal facilities after termination of the post-closure permit.	The USHWCB recommends that a perpetual care fund be created and funded to provide for ongoing monitoring and maintenance of commercial hazardous waste land disposal facilities after termination of the post-closure permit.	The UWMRCB recommends that a perpetual care fund be created and funded to provide for ongoing monitoring and maintenance of commercial hazardous waste land disposal facilities after termination of the post-closure permit.
The USHWCB recommends that the fund be created in such a way so as to not place current facilities under an unreasonable financial burden.	The USHWCB recommends that the fund be created in such a way so as to not place current facilities under an unreasonable financial burden.	The UWMRCB recommends that the fund be created in such a way so as to not place current facilities under an unreasonable financial burden.
The USHWCB recommends that no additional funds be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial hazardous waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells, the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Corridor which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities.	The USHWCB recommends that no additional funds be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial hazardous waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells, the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Corridor which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities.	The UWMRCB recommends that no additional funds be required at this time to cover potential catastrophic failure of the landfill cells, ground water corrective action or major maintenance at commercial hazardous waste land disposal facilities. This determination is based on the engineering controls employed to build the landfill cells, the remote location of current facilities, the lack of a nearby population center, the location of the facilities in the Tooele County Hazardous Waste Industries Corridor which prevents residential development in the area, the non-potable groundwater, the lack of precipitation, and the restricted access to the facilities.

UTAH WASTE MANAGEMENT AND RADIATION CONTROL BOARD
CLOSURE, POST-CLOSURE AND PERPETUAL CARE EVALUATION

2006, 2011, and 2016 REPORTS COMPARISON

COMMERCIAL RADIOACTIVE WASTE TREATMENT OR DISPOSAL FACILITY		
CONCLUSIONS		
2006	**2011**	**2016**
The financial assurances provided for closure and institutional control of the closed LLRW disposal facilities are adequate at current levels and with current, rules, controls and practices.	The URCB concludes that the financial assurances provided for closure and institutional control of the closed LLRW disposal facilities are adequate at current levels and with current, rules, controls and practices.	The UWMRCB concludes that the financial assurances provided and currently approved for closure and institutional control of the closed LLRW disposal facilities are adequate at current levels and with current, rules, controls and practices.
It is the intent of URCB that payments into the Radioactive Waste Perpetual Care and Maintenance Fund be accelerated to better protect against the possibility that EnergySolutions might not remain in operations for 20 additional years, as assumed in Chapter 3 of this report.	The Radioactive Waste Perpetual Care and Maintenance Fund was established by the Legislature to finance the perpetual care and maintenance of commercial LLRW disposal facilities at the conclusion of the institutional care period and to protect against the possibility of funding shortfall during the institutional control period. Annual payments of $400,000 are required by state law to be paid into this fund.	The Radioactive Waste Perpetual Care and Maintenance Account was established by the Legislature to finance the perpetual care and maintenance of commercial LLRW disposal facilities at the conclusion of the institutional care period and to protect against the possibility of funding shortfall during the institutional control period. Annual payments of $400,000 are required by state law to be paid into this fund.
	Based on information provided in this report, a minimum amount of $13 million has been established in order for the fund to meet the intended obligations for perpetual care and maintenance.	Based on information provided in this report, a minimum amount of $13 million has been established in order for the fund to meet the intended obligations for perpetual care and maintenance; However, if only a 1 percent return on investment is realized the minimum amount of $31 million would be needed to meet the intended obligations for perpetual care and maintenance.
	Since 2008, EnergySolutions has set aside the balance of the targeted minimum amount of $13 million utilizing the surety required for financial assurance for closure and institutional care. As the annual payment of $400,000 is made to the perpetual care fund, an equivalent reduction is made to the required annual adjustment to the surety reserved for closure/institutional care. Consequently, the previous URCB recommendations regarding accelerated payments into the perpetual care fund and the amount of the payment into the perpetual care fund based on remaining disposal capacity are unnecessary.	Since 2008, EnergySolutions has set aside the balance of the targeted minimum amount of $13 million utilizing the surety required for financial assurance for closure and institutional care. As the annual payment of $400,000 is made to the perpetual care fund, an equivalent reduction is made to the overall obligation of the liability for closure, institutional care, and perpetual care.

COMMERCIAL RADIOACTIVE WASTE TREATMENT OR DISPOSAL FACILITY		
RECOMMENDATIONS		
2006	**2011**	**2016**
The annual contribution to the Radioactive Waste Perpetual Care and Maintenance Fund should be based on the amount of the disposal capacity depleted each year. Also, an immediate one-time contribution should be required to the Radioactive Waste Perpetual Care and Maintenance Fund to bring the fund to an adequate level. At closure of the facility, the value of the Radioactive Waste Perpetual Care and Maintenance Fund, in constant 2006 dollars, should be no less than $13 million. If the facility closes before 2026, the currently required annual payment will be insufficient to meet the $13 million target.	The Legislature should consider the ambiguities created by the present exemptions from the land ownership requirements of Utah rules, as they relate to long-term responsibility for monitoring and maintaining the closed and stabilized facility.	The Legislature should consider the ambiguities created by the present exemptions from the land ownership requirements of Utah rules, as they relate to long-term responsibility for monitoring and maintaining the closed and stabilized facility.
The Legislature should specifically address the ambiguities created by the present exemptions from the land ownership requirements of Utah rules, as they relate to long-term responsibility for monitoring and maintaining the closed and stabilized facility.	The Legislature should not divert funds from the Perpetual Care Fund to other applications.	The Legislature should evaluate the existing funding approach for the Radioactive Waste Perpetual Care and Maintenance Account.
The Legislature should resist any pressure to divert funds from the Perpetual Care Fund to other applications.		For increased conservatism in long-range planning, Section 3.14 of this report recommends an estimate of the future value for the Radioactive Waste Perpetual Care and Maintenance Fund assuming a minimum 1 percent per year real return on investment.