# PUBLIC PARTICIPATION SUMMARY

for the

Energy*Solutions*' Class A West Embankment

License Amendment Request

Tooele County, Utah

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Abbreviations and Acronyms

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|---|---|
| 11e.(2) | Section 11e.(2) of the Atomic Energy Act of 1954, as amended |
| AASHTO | American Association of State Highway & Transportation Officials |
| ALARA | As Low As Reasonably Achievable |
| ANSI | American National Standards Institute |
| ARML | AASHTO Materials Reference Laboratory |
| ASME | ASME International, formerly American Society of Mechanical Engineers |
| bgs | Below ground surface |
| BLM | U.S. Department of the Interior, Bureau of Land Management |
| BWF | Bulk Waste Facility |
| CAC | Class A Combined Facility |
| CAES | Computer Aided Earthmoving System |
| CAN | Class A North Facility |
| CFR | Code of Federal Regulations |
| cm/sec | centimeters per second |
| cm/yr | centimeters per year |
| CQA/QC | Construction Quality Assurance/Quality Control |
| CRSO | Corporate Radiation Safety Officer |
| CSLM | Controlled Low Strength Material |
| CWF | Containerized Waste Facility |
| cy | Cubic yards |
| D&D | Decontamination and Decommissioning |
| DOE | U.S. Department of Energy |
| Division | Utah Division of Radiation Control |
| DU | Depleted Uranium |
| EZD | Evaporative Zone Depth |
| ft/ft | feet per foot |
| GSA | Generator Site Access |
| GWQDP | Groundwater Quality Discharge Permit |
| HEAL Utah | Healthy Environment Alliance of Utah |
| HIC | High integrity container |
| LARW | Low-activity Radioactive Waste |
| LEU | Low-enriched Uranium |

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|---|---|
| LRA | License Renewal Application |
| LLRW | Low-Level Radioactive Waste |
| NQA-1 | Quality Assurance Requirements for Nuclear Facility Applications published jointly by ASME and ANSI |
| NRC | U.S. Nuclear Regulatory Commission |
| NW | Northwest |
| OSHA | U.S. Occupational Safety and Health Administration |
| PE | Professional Engineer |
| PMP | Probable Maximum Precipitation |
| QA | Quality Assurance |
| QAP | Quality Assurance Program |
| QC | Quality Control |
| RML | Radioactive Materials License |
| RWP | Radiation Work Permit |
| SEC | U.S. Securities and Exchange Commission |
| SER | Safety Evaluation Report |
| sf | square feet |
| SME | Subject Matter Expert |
| $UO_2$ | Uranium dioxide |
| $U_3O_8$ | Triuranium octoxide; yellowcake |
| URCB | Utah Radiation Control Board |
| URCR | Utah Radiation Control Rule |
| URS | URS Corporation |

***Introduction***

The purpose of this document is to summarize public comments received by the Utah Division of Radiation Control (the Division) regarding Energy*Solutions*' request to amend its Radioactive Material License governing disposal of low-level radioactive waste (LLRW) at its facility located at Clive, Utah, and to provide responses to those comments.

Three sets of written comments were received from the public during the comment period that ended on July 26, 2012. One of the sets of comments duplicated another set (both submitted by HEAL Utah). No oral comments were received at the Public Hearing held July 26, 2012 in Tooele, Utah. These comments were considered in revising the requirements of the facility's Radioactive Material License, No. UT 2300249.

Each comment topic received is restated below in italics. The Division's response and disposition follow each comment; denoted with the words "Division Response" in bold text. Images of the complete comment documents are included as Appendices A, B, and C.

Revisions made to Energy*Solutions*' Radioactive Material License (RML), No. UT 2300249, which was issued for public comment on June 12, 2012, are shown in Appendix D and discussed in the conclusion to this document.

***Background***

The following general information provides context for some of the specific comment responses.

***(1) Financial Assurance***

The amount of financial assurances required is approved annually by the UDRC after review of updated cost estimates submitted by the Licensee. The financial assurances are intended to cover the costs of closure and post-closure care of the facilities. The Division reviews the Licensee's surety report annually to assess the adequacy of the surety provided and to determine what surety adjustments should be provided for protecting against financial insolvency. The annual review considers whether adjustments are needed to reflect inflation, increases in the amount of disturbed land, changes in engineering plans, addition of new facilities, closure and stabilization that have already been accomplished, and other conditions that might affect closure costs. For example, A new item was added to the 2011 Surety in the amount of $578,285 to construct a drainage swale, 6700 feet in length, to prevent water collecting in the clay borrow areas of Section 5, immediately south of the disposal facilities.

The 2011 Annual surety has been reviewed and approved by the DRC. The 2012 surety report will be submitted December, 2012.

The following points are pertinent to comments received during the public comment period:

- Development of the Class A West cell will require changes to the closure plan and therefore increases in the surety. License Condition 73 requires EnergySolutions to address those changes and any resulting changes in the surety in its annual Surety Report due in December 2012. It is anticipated that the Division will complete its review of the report by approximately June, 2013. Any increase in surety required by the Division must be provided within 60 days of that approval.
- To address the interim period before the Surety for Class A West is reviewed and increased, EnergySolutions has provided interim Surety sufficient to relocate any waste disposed of that is

not within areas that could be closed in the currently-approved configuration for the Class A or Class A North cells. See Appendix G. If premature closure is required, this waste would be moved to the Class A or Class A North cell, using this portion of the surety. The cells would then close as provided in the currently-approved and fully-funded closure plan.

- This interim Surety funding is also sufficient to meet concerns about timing of the study required under new License Condition 41 which requires a new evaluation of the clays that will be used to build the cap. The characteristics of the clays take on increased importance given the length of the runs in the new larger cell. However, if the study demonstrates that additional processing will be required to process the clays, the existing and interim Surety would cover moving the new waste and implementing the currently-approved Class A and Class A North cells if Surety for that additional processing was not provided and the Licensee became financially insolvent.

- In its May 15, 2011 Class A West application, section 10.2 Funding Assurances EnergySolutions states: "Upon DRC approval of the Class A West embankment and associated financial surety calculations, and prior to placing waste in portions of the class west embankment that exceed horizontally or vertically beyond the current approved Class A and Class A North designs, EnergySolutions will amend the letters of credit necessary to ensure funding for closure and post-closure monitoring of the class A west Embankment." Feb, 23, 2012 (Rev.04). This commitment is incorporated into the permit under License Condition 73.

- License Condition 73 requires EnergySolutions to maintain in the surety an allowance for the cost of re-engineering the facility, including recontouring of embankment slopes if premature closure is necessary. Recontouring may be necessary if there is not enough waste in the cell to close as provided in the Class A West closure plan.

Perpetual Care is another aspect of financial assurance. The annual amount EnergySolutions is required to pay into the Perpetual Care Fund is set by state law (UCA 19-3-106.2) and that amount does not change unless the statute is amended. However, there is also additional financial assurance for perpetual care associated with the five-year reviews the Radiation Control Board undertakes under Utah Code Ann. § 19-1-307(2). By statute, this amount is reviewed and reported to the Legislative Management Committee every five years, not in association with license amendment(s). Perpetual care is now fully funded based on the amount approved by the Radiation Control Board when it approved the September 2011 report, "Evaluation of Closure, Post-closure, and Perpetual Care and Maintenance for Commercial Hazardous Waste and Commercial Radioactive Waste Treatment, Storage, and Disposal Facilities."

The final License includes a new condition related to surety that is pertinent to comments received during the public comment period:

> 76. The Licensee shall at all times maintain a Surety for perpetual care, using an instrument that satisfies the requirements of UAC R313-22 and R313-25. The Surety shall be in the amount last approved by the Radiation Control Board, as provided in Utah Code Ann. 19-1-307(2), as adequate to fund perpetual care, less the amount contributed to the Radioactive Waste Perpetual Care and Maintenance Account created under Utah Code Ann. 19-3-106.2 (but not including any part of that Account resulting from returns on investment).

### *(2) License Amendment and the Huntsman Agreement*

On March 15, 2007, Governor John Huntsman for the State of Utah and CEO Steve Creamer for EnergySolutions entered into an agreement (Appendix E) that committed EnergySolutions to limit its disposal to "the currently-licensed low-level radioactive waste cell volumes," including the volume of waste that the agreement anticipated as a result of converting EnergySolutions' 11e.(2) cell into a Class A

waste cell. The Division and EnergySolutions have agreed that this total approved volume is 10,357,412 million cubic yards (Class A = 3,778,896 million $yd^3$; Class A North = 1,722,509 million $yd^3$; Class A South = 3,501,915 million $yd^3$; Mixed Waste = 1,354,092 million $yd^3$ for a total of 10,357,412 million $yd^3$). EnergySolutions had originally anticipated that this disposal would occur in three already-licensed low-level radioactive waste cells (Class A, Class A North and Mixed Waste cells) and in the 11e.(2) cell that it expected to convert to a Class A cell. The Licensee has now chosen instead to develop this allowable capacity in two cells, the existing Mixed Waste Cell, and a new combined Class A and Class A North cell (now proposed as the Class A West cell). The Mixed Waste and Class A West cells will have a combined capacity of 10,078,189 cubic yards. This leaves a capacity of 279,223 cubic yards that EnergySolutions can still develop under the Huntsman Agreement.

Additional amendments to EnergySolutions' License to conform to the Huntsman agreement are not necessary because this License covers all areas where Class A waste can be disposed. The only other area that is licensed to take radioactive waste is the 11e.(2) cell. Class A waste cannot be disposed of in that cell, and only Class A waste is subject to the Huntsman Agreement. Because there is no other area that may accept Class A waste, there is no possibility that the Agreement will be violated under currently-applicable licenses. Additional requirements would be redundant and unnecessary.

A modification to License Condition 9.E of the revised RML UT 2300249 will be made to address a correction in the calculations:

> "The Licensee may dispose of a volume of Class A Low-Level Radioactive Waste (LLRW) and Naturally Occurring and Accelerator Produced Radioactive Materials (NARM) in the Class A West disposal cell described in License Condition 40 not exceeding ~~8,742,097~~ 8,724,097 cubic yards, and in the Mixed Waste Landfill Cell not exceeding ~~1,353,004~~ 1,354,092 cubic yards. Together, the total aggregate volume of waste disposed of in the Class A West disposal cell and the Mixed Waste Landfill Cell shall not exceed 10.08 million cubic yards. Class A waste LLRW is defined in Utah Radiation Control Rule R313-15-1009 and NARM at R313-12-3."

### *(3) Waste Settlement*

The design criteria, their basis, conditions evaluated, and projected performance for the Class A West embankment is the same as the currently approved Class A and Class A North embankments. These factors are applicable to the Class A West embankment because liner, waste placement, and cover specifications are the same for each embankment. Site preparation and construction requirements for the Class A West embankment are provided in the LLRW and 11e.(2) CQA/QC Manual (Rev. 26d). Basically, the specifications regarding the Class A West embankment are identical to those of the currently approved Class A and Class A North embankments, with only a minor technical revision regarding settlement monitoring requirement in the LLRW and 11e.(2) CQA/QC Manual. Specifically, the criteria for observed settlement was revised from the current distortion criteria of 0.02 ft/ft, to a more restrictive settlement monitoring observed distortions between any two adjacent points of 0.007 ft/ft or less. This is further discussed in DRC's response HEAL -08 below. Construction methods involving the liner, waste placement, and cover construction for the Class A West embankment will be unchanged from current approved practices as provided in the LLRW and 11e.(2) CQA/QC Manual.

## 1. ***Comments from HEAL Utah, Matt Pacenza, Policy Director***

***Note:*** Comments submitted by Mr. Matt Pacenza are provided verbatim in Appendix A and are duplicated below in italics, with the Division's responses (normal text) following line headers in bold and underscored.

### *Comment HEAL-01:*

*Introductory and Background Information*

*The below comments are regarding an initial decision by the Director of the Utah Division of Radiation Control to amend the EnergySolutions (Licensee) Low---Level Radioactive Waste Disposal License (RML UT 2300249) and Ground Water Quality Discharge Permit (No. UGW450005).*

*Before we get to the substance of our comments, we think it essential to frame this decision and our response to it in a longer history of EnergySolutions' efforts to expand and shift capacity at the Clive site. It is critical that the Division of Radiation Control, along with DEQ officials and the Herbert Administration, make this particular decision within that broader policy context.*

*Let us start in 2006, when EnergySolutions sought permission from the DRC to create a "Supercell," merging the Class A and Class North embankments and increasing its LLRW capacity at Clive from 8.8 million cubic yards to 13.1 million cubic yards.*

*At the time, HEAL and others argued that such an expansion should trigger the provision of a 1990 law requiring that significant license changes be approved by the Legislature and the Governor. EnergySolutions disagreed with that interpretation, but, just in case, in February 2007, it successfully lobbied the State Legislature to pass a law removing the governor, Legislature and Tooele County Commission from the chain of required approvals for a significant capacity increase.*

*That led Gov. Jon Huntsman to threaten to exercise his veto power via the Northwest Interstate Compact on Low-Level Radioactive Waste Management to prevent the company from creating the Supercell. The Huntsman Administration and the company then entered into negotiations that then led, of course, to what has become known as the "Huntsman Agreement," a negotiated accord between the state of Utah and EnergySolutions[1].*

*Obviously, as state regulators you are familiar with the agreement, so we do not intend to repeat all of its provisions here. The critical piece, however, was a trade:*

*EnergySolutions agreed to give up its Supercell proposal in exchange for being allowed to convert approximately 3.6 million cubic yards of its already-permitted 11e.(2) disposal cell into capacity for low-level radioactive waste.*

*The agreement was signed in March 2007. Over the subsequent four years, the company and state regulators sought pathways to implement the conversion of 11e.(2) into low-level radioactive waste disposal and apparently encountered various legal and technical challenges.*

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[1]http://www.utah.gov/governor/news_media/article.html?article=225

*In the meantime, however, the company made clear it was willing to jettison the Huntsman Agreement – as soon as it had grounds to do so.*

*Please see "EnergySolutions flips on deal not to expand waste site," a story from February 2010.[2] After the company won an initial court decision that determined that its Clive site wasn't under the jurisdiction of the Northwest Compact, it immediately announced that the Huntsman Agreement was "obsolete."*

> *"When the district court ruled that the Northwest Compact lacked jurisdiction over the Clive [Tooele County] facility," company president Val Christensen said in an e--mail to The Tribune this week, "the standstill agreement with Gov. Huntsman became unnecessary."*

*Company officials were clearly eager several years ago to abandon the Huntsman Agreement. We would thus conclude – and will make this case below – that the state should adopt an extremely cautious approach to drafting license language that leaves as little "wiggle room" as possible, in the effort to avoid opening up potential future loopholes that could lead to greater site expansion.*

*We also point out that same Tribune article from Feb. 2010 makes clear that Gov. Gary Herbert supports the Huntsman Agreement and its volume caps.*

*We now move to May 2011, when EnergySolutions applied to the state for permission to create a new Class A West cell. Like the Supercell, it merges the existing Class A and Class North embankments, although this version is somewhat smaller. The company returned to the merged cell proposal, it said, because it and the state could not satisfactorily resolve outstanding legal and engineering hurdles that stood in the way of the Class A South/11e(2) conversion.*

*Effectively, the proposal before the state and the public now is a reversal of the trade at the heart of the Huntsman Agreement: Instead of giving up the Supercell proposal in exchange for the Class A South conversion, the company now proposes to give up the Class A South conversion in exchange for creating a slightly smaller Supercell.*

**Division Response HEAL-01:** See Background, part 2, License Amendment and the Huntsman Agreement. There has been no reversal of the trade at the heart of the Huntsman Agreement. The heart of that Agreement was a limit on type and total volume of low level radioactive waste. All limits are supported by this amendment as described in the Background, Part 2.

## REFERENCES

Huntsman, J.M., and Creamer, R. S., 2007. Agreement between the Governor of the State of Utah and Energy*Solutions*, LLC, dated March 15, 2007.

URS 2012, Utah Division of Radiation Control, Safety Evaluation Report. Energy*Solutions* LLRW Disposal Facility Class A West Amendment Request. June 2012.

[2] http://www.sltrib.com/News/ci_14329478

***Comment HEAL-02:***

*Please keep the above history in mind as we move to our substantive comments on the current Class A West Amendment.*

1. *We applaud the Division for the following amendment to RML UT 2300249:*

   *The Licensee may dispose of a volume of Class A Low-Level Radioactive Waste (LLRW) and Naturally Occurring and Accelerator Produced Radioactive Materials (NARM) in both the Class A West and Class A North disposal cell described in License Condition 40, and in the Mixed Waste Landfill Cell not exceeding a total of 10.1 million cubic yards. Class A waste is defined in Utah Radiation Control Rule R313-15-1008 and NARM at R313-12-3.*

   *The* ***not exceeding a total of 10.1 million cubic yards*** *language is welcome, because it codifies in the license for the first time (we believe) a volume cap for that portion of the Clive site. We do not yet know if the licensee has agreed to this language, but if they have, and it stands, it is a step in the right direction of limiting efforts to continually expand the Clive site.*

- **Division Response HEAL-02:** The Division acknowledges the comment. The actual total is slightly less at 10.08 million cubic yards. This is below the 2007 Agreement by 279,223 cubic yards, as described in background, part 2.

***Comment HEAL-03:***

2. *However, we urge the DRC to further amend the license to include the following: a total cap on LLRW volume for the entire Clive site, including the unused portion of the Class A South/11e.(2) cell.*

   *This additional language is essential if the DRC intends to preserve the total volume caps in the Huntsman Agreement, as Gov. Herbert and regulators have previously indicated they wish to. We believe that EnergySolutions, without violating this license, could come back to the Division in a few years and say they've now figured out a way to safely engineer Class A South and so would like to propose to re-open that 3.5 million cubic yard proposal. That would grant the company a significant expansion in total capacity - which obviously the Huntsman Agreement was seeking to prevent.*

   **Division Response HEAL-03:** See Background, Part 2 and Division Response to HEAL-01.

***Comment HEAL-04:***

*We believe EnergySolutions will be able to argue that the newly RML UT 2300249 supersedes the Huntsman Agreement. It explicitly and directly contradicts the Agreement. It, for example, grants the licensee permission to merge the Class A and Class North embankments – which the Agreement was designed to prevent.*

**Division Response HEAL-04:** The Division does not agree that EnergySolutions will be able to argue that the new License supersedes the Huntsman Agreement. The Agreement prohibited disposal of a total waste volume greater than an agreed-upon amount: the volume within the "waste cell volumes" licensed as of May 1, 2006, plus the volume of the anticipated "Converted Class A Cell." Although the Huntsman Agreement did not

anticipate shifting that volume to different cells, it did not prohibit such a shift if the total volume remains under the ceiling specified in the Agreement. The total volume for Class A Waste under this License Amendment remains under the ceiling specified in the Agreement.

See also Background, Part 2.

***Comment HEAL-05:***

*Is it unrealistic or perhaps paranoid to think that EnergySolutions will seek to further expand its LLRW capacity Clive beyond the 10.1 million cubic yards it is permitted in the Class A West and Mixed Waste disposal cells? To identify additional space elsewhere at Clive – such as Class A South – where it will be able to dispose of additional waste, and continue to bring material to Utah for decades to come?*

**Division Response HEAL-05:** This is not an issue that can be addressed in this License; EnergySolutions will not be able to develop additional capacity as the facility is currently licensed, and there is no License Conditions that DRC can put in place that will prevent EnergySolutions, if it so chooses, from contemplating and even requesting changes to the Huntsman Agreement with the current Administration.

See also Background, Part 2 and Division Responses HEAL -01, HEAL -03 and HEAL-04.

***Comment HEAL-06:***

*As mentioned above, the licensee as recently as 2010 sought to jettison the volume caps in the Huntsman Agreement as soon as it had a pretext for doing so. Clearly, EnergySolutions has seen the agreement as a document it would seek to abandon as soon as it could, rather than one that it was bound to in good faith. To our knowledge, EnergySolutions has not publicly indicated they believe they are currently bound to the terms of the original agreement.*

*The company faces tremendous financial pressure to demonstrate to investors that its long-term revenue prospects are solid. Undoubtedly, regulators have noted the recent wave of bad news for EnergySolutions: It dismissed its CEO and CFO. Its stock plummeted, losing more than half its value Standard & Poor's and other key rating agencies down-graded the company's debt to BB- and BB+, aka "speculative grade" or junk bond levels. The company announced it was looking to sell its U.K. and European business, which, according to a recent Associated Press story ("Company charged with dismantling Zion nuclear plant struggling financially") represents at least 60 percent of its total revenue. At the same time, the company has previously made clear that disposal at Clive is among its most profitable work, as it long ago paid the upfront costs for building and engineering the facility. Its newer proposed revenue streams – such as decommissioning shuttered nuclear reactors – have turned out to lose money.*

*Given those economic realities, it would be a surprise if the company were to not seek to expand the potential disposal volume at Clive – to reassure investors that its most profitable revenue stream will continue for many years.*

**Division Response HEAL-06:** The Division acknowledges the comment. See Division Response to HEAL-05.

**REFERENCES**

Energy*Solutions*, LLC. 2011. Annual Surety Submittal, Radioactive Materials License UT2300249: Response to Request for Information.

UDRC 2012. Energy*Solutions* 2011 Annual LLRW Surety Submittal, 2011 Engineering Module 13, Radioactive Materials License Number UT2300249: Conditional Approval.

***Comment HEAL-07:***

*In addition, those financial difficulties – and what experts have suggested is at least a possibility that EnergySolutions may face bankruptcy or liquidation – must be fully factored into this license amendment. It would be prudent for the Division to consider what impact the new Class A West proposal has upon the line of credit and perpetual care fund designed to ensure that the State of Utah will have sufficient resources to safely maintain the Clive facility in case the company no longer can. In other words, will anything about the super cell proposal either a) increase near-term closure costs if the company goes bankrupt, or b) increase costs associated with perpetual care of the site? For instance: Will tying two cells together into a super cell increase costs for fill material if EnergySolutions goes bankrupt before filling the new supercell? Will differential settlement be more likely in a supercell, and create additional financial risks in the long-term? In order to protect Utah's health and environment, and the Utah taxpayer, we believe it is necessary to estimate the impact of the proposed super cell on short-term closure and long term perpetual care costs prior to making a final licensing decision on the proposed super cell.*

**Division Response HEAL-07:** *See* Background, Part 1, regarding the adequacy of the surety, and Part 3, regarding waste settlement. Perpetual care is, by statute, addressed every five years. *See* 19-1-307(2).

The Division evaluated the Licensee's 2011 approved surety report with respect to each of the issues raised in Comments HEAL-06 and HEAL-07 and has determined that they have been appropriately addressed in that document.

In addition, refer to Division Response to HEAL-08.

***Comment HEAL-08:***

*We do believe that merging two different cells into a larger "supercell" presents some unique technical challenges, including: How can the clay liners for the existing cells be adequately "stitched" together, given that the clay liners underlying the existing cells are of different vintages and have been subject to different weights and pressures as the cells have settled? And, importantly, when the supercell is filled, will differential settlement across the various portions of the supercell cause the cover to crack or eventually create ponding or accelerated erosion?*

**Division Response HEAL-08 follows:**

**Liner Connections and Liner Differential Settlement**: The Division has considered potential issues created by allowing construction of the Class A West liner system in the area between the Class A and Class A North embankments (Energy*Solutions*, LLC. 2012). These issues include the possibility that the different placement times and different extents of previous settlement in these three areas might compromise the integrity of the existing and proposed modified liner and cover systems.

The design of the liner system between the Class A and Class A North embankments requires that new portions of the liner be keyed into existing portions. This will result in a "joint" similar to those used in the construction of the original liner system which has a permeability similar to that of a continuously placed section of liner (*see* Appendix F). Once new portions are keyed into existing portions, waste placement will occur. As waste accumulates above the liner, both existing portions (that have only slightly settled) and new portions (that have not settled at all) of the foundation soils will settle together without any distinctively adverse pattern of differential settlement. Hence the Division's conclusion is that the integrity of the Class A West liner system will not be jeopardized or compromised.

Moreover, the method proposed by ES for connecting newly-constructed sections of clay liner to existing clay liners in the CAN and CA embankments includes using an overlapping, "stair-stepped" connection approach. *See* Appendix F. The procedures for constructing such connections between new clay liner sections and existing clay liners are included under the 'Specification', and the 'Quality Control' and 'Quality Assurance' columns of *Work Element – Clay Liner Placement* in the LLRW and 11e.(2) CQA/QC Manual (Energy*Solutions* 2011). The "keying-in" specification requires that sections of clay liner constructed at times more than 30 days apart from each other be keyed-in to each other at vertical steps no greater than nine inches and at least twice as wide as they are high. For the 2-ft-thick clay liner thickness, the width of clay liner connection overlap will be a minimum of 4 feet. Any deficiencies noted in the keying-in to the existing liners must be noted on an "Embankment Construction Lift Approval Form". These procedures are consistent with current recommended practices in the waste disposal industry (e.g., see Sharma and Lewis 1994, Section 8.3.4.2), which include making such a stair-stepped connection and achieving a 4- to 5-foot overlap for such clay liner connections. This procedure requires some reworking of the edge of the existing clay liners and is designed to lead to a continuous bond between the clay liner segments. Phased construction and lateral tie-ins of clay liner sections in this manner is a typical practice at other waste disposal facilities.

A series of analyses were performed to evaluate differential settlement magnitudes across different portions of the proposed CAW embankment (Energy*Solutions*, LLC 2012). Specifics regarding the differential settlement analyses completed for the CAW embankment are discussed in Section 4.4.1 of Attachment 5 to the CAW Embankment License Amendment Request (LAR) (AMEC 2011). Based on the results of the analyses described above, AMEC concluded that: (1) settlement of the foundations soils will be 12 to 16 inches; (2) the foundations settlements are expected to be complete well before final cover is placed (within a 1-year period after final waste placement); (3) monitoring data obtained from the interim cover layer over emplaced wastes is expected to primarily reflect embankment (i.e., waste) settlements and not foundation settlements; and (4) the maximum settlement in the foundation soil will be 24 inches. Based on the analysis, AMEC concluded that with primary and secondary foundation settlement incorporated into the

cover design criteria, the magnitude and timing of foundation settlements, will not adversely impact drainage of the final CAW embankment cover. The Division concurs with the analyses and the associated technical conclusions.

**Cover Differential Settlement:** As discussed above, AMEC conducted a series of analyses to evaluate differential settlement magnitudes across different portions of an embankment. Critical cross sections considered in the analyses included sections across and spanning different waste forms, including: (1) bulk compressible wastes placed adjacent to CLSM pyramids; (2) compressible debris and incompressible debris placed in adjacent soil lifts; and (3) Containerized Waste Facility pyramids placed adjacent to other waste forms/types (AMEC 2005; 2011). Details regarding the differential settlement analyses are discussed in Section 4.4.1 of Attachment 5 to the CAW Embankment License Amendment Request (LAR) (AMEC 2011). The Division finds use of these cross sections for assessing potential magnitudes of differential settlement of the proposed CAW embankment to be acceptable. Results of analyses of differential settlement for the proposed CAW Embankment (see Section 3.0 and Table 3.4 of the CAW Embankment LAR) indicate that the projected maximum distortion amounts in the Liner of the proposed CAW Embankment are 0.001 ft/ft and 0.007 ft/ft, under normal and abnormal conditions, respectively; and projected maximum distortion amount in the Radon Barrier layer in the cover of the proposed CAW embankment under abnormal conditions is less than 0.01, which occurs for the case of bulk waste. The 2011 AMEC study concluded that most of the settlement would occur during operations in the waste placement phase, prior to the final cover placement.

Settlement monument monitoring data obtained by Energy*Solutions* to date for existing embankments, combined with evaluation of settlement vs. embankment height trend data indicate (AMEC 2011) that the magnitude of distortion expected to occur in CAW embankment is less than 0.007 ft/ft . This value is lower than the currently-prescribed allowable clay layer distortion criterion of 0.02 ft/ft, a value that was selected based on published literature data prior to 2005.

Energy*Solutions* is currently conducting additional laboratory testing to confirm the cracking characteristics of the specific soils that will be used for constructing the clay layer in the cover. (See License Condition 41.) The testing will determine minimum (threshold) distortion values required for initiation of cracking of the compacted clay layer. Pending results of this additional laboratory testing, a Specification in *Work Element – Temporary Cover Placement and Monitoring* in the LLRW and 11e.(2) CQA/QC Manual requires that the temporary soil cover placed over waste be monitored for a minimum of 1 year after placement until data from all monitoring locations indicate observed distortions between any two adjacent points of 0.007 ft/ft or less.

The LLRW and 11e.(2) CQA/QC Manual also requires that Energy*Solutions* submit a written report to the Division at least 7 days prior to removing pre-final cover settlement monuments in preparation for final cover construction. Final cover construction cannot begin until an acceptable level of consolidation and settlement has occurred. The results of the additional laboratory testing of clay layer distortion and cracking will be reviewed in relation to these current requirements to determine whether the currently specified maximum allowable distortion threshold (0.007 ft/ft) remains appropriate for the specific soils to be used for clay layer construction. Settlement and differential settlement magnitudes will be monitored (Energy*Solutions* 2012) to ascertain whether the design cover distortion criteria developed and used for evaluating long-term stability of the

embankment with respect to settlement has been achieved. The final cover system will be constructed only after settlement has been shown, after placement of the interim cover system, to be within prescribed acceptable limits.

The testing of clay properties is advisable because the Class A West cell has longer runs that may stress the clays in ways different than previously analyzed. The tests will be completed prior to approval of the Surety, as that process is described in Background, Part 1 of this Response, and the approved Surety will address any necessary changes. In the interim period, the Surety will be sufficient for the reasons specified in Background, Part 1 of this Response.

**REFERENCES**

AMEC Earth & Environmental, Inc. 2005. Geotechnical Study:" Increase in Height and Footprint," May 27, 2005.

AMEC Earth & Environmental, Inc. 2011. Report: "Geotechnical Update Report – Energy*Solutions* Clive Facility Class A West Embankment," February 15, 2011.

Energy*Solutions*, LLC. 2012. Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No. UGW450005, Amendment and Modification Request – Class A West Embankment: Response to Round 3 Interrogatory URCR R313-25-7(3)-04, with attachments. Letter from Tim Orton, Energy*Solutions*, to Mr. Rusty Lundberg, Utah Division of Radiation Control, dated March 20, 2012.

EnergySolutions, LLC 2012. LLRW and 11e.(2) Construction Quality Assurance/Quality Control (CQA/QC) Manual" Revision 26d), May 7, 2012.

Sharma and Lewis, 1994. Waste Containment Systems, Waste Stabilization, and Landfills: Design and Evaluation, John Wiley & Sons, Sep 8, 1994.

***Comment HEAL-09:***

*The report indicates that two important documents have not yet been submitted for final state approval: a report explaining the cover design as well as a report examining clay performance. We believe these reports must be submitted and reviewed as part of the overall licensing procedure and that it would be inappropriate for the state to approve the current license amendment in the absence of those two reports.*

**Division Response HEAL-09:** The DRC has accepted the cover design submitted with the License Amendment Application for the Class A West embankment. Unless another cover design is approved, this cover will be implemented. It will also be fully funded under the Surety, as described in Background, Part 1.

However, the licensee is interested in looking at another cover design option, which will be submitted by the end of the year. The DRC is allowing the licensee to investigate these other design options since cover construction of Class A West is a year or so into the future. This also applies to the Clay distortion study; therefore, the DRC and the licensee have time to obtain better information regarding the properties of site specific clays.

When the information is submitted, on or before December 21, 2012, the Division will review Energy*Solutions*' proposed cover design, together with associated analyses and

calculations, to include infiltration model simulations that will be submitted in support of that design. In addition, the clay study will better define the allowable distortion based on properties of site specific clays used in cover construction. Currently, there is a settlement value for which the Licensee will determine the maximum allowable distortion value on site specific clays. Depending on the outcome, this value may be different than the current value approved by the Director.

**REFERENCES**

EnergySolutions, LLC 2011. Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No. UGW450005. Amendment and Modification Request – Class A West Embankment; Retraction of the Class A South/1 le.(2) Embankment Design Change Request, dated May 2, 2011.

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NUREG/CR-4620. Nelson, J.D., S.R. Abt, R.L. Volpe, D. van Zyl, N.E. Hinkle, and W.P. Staub. 1986. *Methodologies for Evaluating Long-Term Stabilization Designs of Uranium Mill Tailings Impoundments*, ORNL/TM-1006, prepared for U.S. Nuclear Regulatory Commission, June 1986.

Temple, D.M., Robinson, K.M., Ahring, R.M., and Davis, A.G. 1987. *Stability Design of Grass-Lined Channels*. U.S. Department of Agriculture, Agricultural Handbook No. 667, U.S. Government Printing Office, Washington, D.C., 167 pp.

URS 2012. Safety Evaluation Report. Energy*Solutions* LlRW Disposal Facility Class A West Amendment Request. June 2012.

US Nuclear Regulatory Commission (NRC), Office of Nuclear Material Safety and Safeguards. 2002. NUREG-1623, *Design of Erosion Protection for Long-term Stabilization*, Final Report. September 2002.

***Comment HEAL-10:***

*We appreciate the Division taking the time to carefully consider these comments. We would like to repeat our most important point for emphasis: the Huntsman Agreement was incredibly important for codifying a trade: the company gave up the Supercell and got back the Class A South conversion. And, now, EnergySolutions proposes to flip that trade: It will give up Class A South in exchange for Class A West. Here's the fundamental problem: Only half that deal is in writing. The company gets Class A West – but there is as yet no language that ensures that the former Class A South Cell will never be developed.*

*The division must require the licensee to commit to an overall volume cap and to agree to not seek to convert Class A South or any other possible cell at Clive in the future. If the State does not take this critically important step, we fear this current license could have the unfortunate impact of nullifying the most important component of the landmark Huntsman Agreement—namely, a cap on total waste at the site of 10.1 million cubic yards.*

**Division Response HEAL-10:** Refer to Division Responses HEAL-01through HEAL-04.

***Note:*** An additional comment submitted by Mr. Christopher Thomas is provided verbatim in Appendix B and is duplicated below in italics.

***Comment HEAL-11 (From Christopher Thomas, Executive Director):***

*a. Incorrect reference*

*There is a proposed amendment that reads:*

*The Licensee may dispose of a volume of Class A Low-Level Radioactive Waste (LLRW) and Naturally Occurring and Accelerator Produced Radioactive Materials (NARM) in both the Class A West and Class A North disposal cell described in License Condition 40, and in the Mixed Waste Landfill Cell not exceeding a total of 10.1 million cubic yards. Class A waste is defined in Utah Radiation Control Rule R313-15-1008 and NARM at R313-12-3.*

*We believe the reference to Utah Radiation Control Rule R313-15-1008 is incorrect; we believe it should be Utah Radiation Control Rule R313-15-1009, "Classification and Characteristics of Low-Level Radioactive Waste," which include waste classification tables.*

**Division Response HEAL-11:** The Division agrees with the comment and regrets the typographical error. The typographical error was corrected.

2. Comments from Charles Judd, Cedar Mountain Environmental, Inc. (July 26, 2012)

***NOTE:*** The paragraphs quoted from Mr. Judd's comments are provided verbatim in Appendix C and duplicated below in italics. Each comment is numbered according to the numbering systems used in his comments. Judd's comments are provided below in italics, with the Division's responses following line headers in bold and underscored.

***Comment Judd-01:***

***Judd Detailed Comments, Page 1***

1. *THE FINANCIAL STABILITY OF THE COMPANY IS DETERIORATING QUICKLY. IT IS POSSIBLE THAT THE STATE OF UTAH WILL SOON BE RESPONSIBLE TO CLOSE THE CELLS. THERE ARE NOT ENOUGH RESOURCES TO CLOSE THE NEW CELL SO THE STATE WILL BE RESPONSIBLE TO PAY THE EXTRA COSTS OF THIS NEW "SUPERCELL".*

*The financial stability of the company is of great concern. Stock prices have dropped over 90 percent and the debt of the company is huge. To top it off, there was no review done of the financial surety of the site if the new supercell were approved. The DRC must do a financial review of the amendment before it is approved. The surety is the main way the State of Utah is protected from the failure of the company. The State of Utah is at huge risk at this time. There are many issues surrounding the surety that are unknowns. First, the design of the facility is not even known. No one has shown how the new facility would be closed if the company goes bankrupt. It would be a huge cost to fill the cell up to the limits needed to provide proper drainage. There is not enough cover materials identified to complete the cells at the site. Their amount of money set aside to pay for rock is way low. The settlement issues create a time concern for closure that has*

*not been addressed. It is clear that the protection of the State of Utah has not been considered in the proposal. This financial review needs to be done before this proposal is sent out to public comment.*

*The SER was based on a management team that has now drastically changed. The company has gone through several major changes in the past 5 years. These changes are probably based on the financial situation at the company since the stock price has dropped from over 27 dollars to under 2 dollars. The new management needs to be evaluated to determine if they are willing to maintain proper controls at the company even though the financial situation at the company is very concerning. The citizens of Utah should not be expected to pay tens of millions of dollars to close a new supercell after executives of the company have been paid millions in benefits. A complete surety review is needed and a review of the company's financial stability and management should be required before a new supercell is considered. It is clear that a second public comment period is needed when the financial surety review is completed.*

**Division Response Judd-01:**

Financial stability of any company holding a radioactive materials license from the State of Utah concerns the UDRC. Existing regulations require the establishment of surety accounts wherein the licensee places funds, or other appropriate financial instruments, for use in the event of financial insolvency. The UDRC reviews and updates the surety annually, incorporating learning and guidance from the industry, including such widely accepted cost estimation sources such as RS Means. The UDRC has confidence that the current surety contains sufficient funding for closure and remediation of the currently approved facilities and activities. Changes to those facilities and activities as a result of the current action will trigger a revision of surety as described in Background, Part 1 of this Response.

With respect to the specific comment that the design of the proposed CAW embankment is not known, that is not true. There is a design for these embankments that DRC has reviewed and the Director has approved. As described in Division Response HEAL-09 above, EnergySolutions is proposing a modification to that design. That proposed modification is not relevant to this licensing; it has not been submitted to DRC for DRC's review and the Director's approval. If it is submitted and if DRC's review indicates that the revised design appears to meet relevant design criteria, a draft license amendment for the revised design will be provided for public notice and comment. Until that time, it is not appropriate to speculate about the proposal.

The Division reviews the Licensee's surety report annually to assess its adequacy and to determine the amount of the sureties. Annual surety adjustments include a cost item for re-engineering of the facility, including possible regrading/recontouring of embankment slopes should that become necessary. Under the hypothetical scenario wherein the Licensee is assumed to become financially incapable of continuing operations at the CAW embankment, a revised grading plan would be re-engineered to provide a final embankment surface that would promote and maintain long-term positive drainage over the performance life of the embankment, accounting for potential differential and total settlement, and a revised final cover would be designed. Further, the surety amount is adjusted annually to reflect inflation, increases in the amount of disturbed land, changes in engineering plans, addition of new facilities, closure and stabilization that have already been accomplished, and other conditions affecting closure costs.

Should ES become unable to fulfill its financial responsibilities before CAW surety monies are in place, the Division would fall back from the CAW cell design, revert to the Class A and Class A North designs, and close both cells (A and A north) accordingly.

If an alternative CAW cover design receives approval, the UDRC will review the impact of those plans on the surety, and require an appropriate adjustment to the surety account prior to allowing Energy*Solutions* to execute those plans,. This review also will determine an appropriate amount of surety to cover the costs of possible re-engineering and closure of the facility prematurely in the event of loss of financial resources on the part of the Licensee to continue operations at the facility. Consistent with findings of this review, the Division will require that the necessary sureties be provided.

During its most recent surety review, completed and approved for 2011, the Division specifically examined the Licensee's estimated costs for processing rock needed for the final cover. The Division required documentation supporting the Licensee's estimate. A detailed review of the work and the supporting documentation support a finding that the existing funding is adequate to fund the anticipated processing costs.

The Division will review the surety cost for all design changes during its next surety review (scheduled to begin in December 2012). Therefore, the Division has added a license condition (condition 43) that requires design cost estimates be provided in the upcoming 2012 surety submission. First placement of final cover over a portion of the proposed CAW embankment footprint is not expected to occur for at least another two years. The Division is aware that the Licensee is considering a design change, and included this License Condition to ensure that this matter will be resolved before that time. If the Director does not approve a change to the cover, the currently-approved cover will be implemented.

See also Background, Part 1 of this Response.

**REFERENCES**

EnergySolutions, LLC. 2011. Annual Surety Submittal, Radioactive Materials License UT2300249: Response to Request for Information.

UDRC 2012. EnergySolutions 2011 Annual LLRW Surety Submittal, 2011 Engineering Module 13, Radioactive Materials License Number UT2300249: Conditional Approval.

***Comment Judd-02:***

2. *APPROVAL SHOULD NOT BE GIVEN WHEN MAJOR DESIGN ISSUES ARE UNKNOWN. UTAH MAY END UP WITH MILLIONS OF CUBIC YARDS OF WASTE TO COVER AND NO WAY TO COVER THE WASTE.*

   *There are two major issues that have not been resolved to the State's satisfaction, one concerning the clay to be used for cell construction and one concerning the rock for cell construction. Instead of solving these issues before public comment, the SER was sent out and DRC is moving forward without knowing if the new design will work. This is not acceptable. The commenters do not have access to significant issues such as what is the cover design. The cover design is one of the major issues in waste facility control since it is the major item to contain the waste for thousands of years. Without proper clay and proper rock there is no way the waste can be*

*contained. A conditional approval is not an acceptable procedure in this situation. ES could go out of business and leave the State of Utah and its citizens with millions of cubic yards of waste that are uncovered and no proper design to cover the waste. ES should wait until they have completed major design items on the cell before they seek approval. It is clear that a second public comment is needed when the design is completed.*

**Division Response Judd-02:** Refer to Division Responses HEAL-08, HEAL-09 and Judd-01. The commenter has not provided any information about alleged deficiencies, so it is not possible for the Division to further respond.

***Comment Judd-03:***

***Judd Detailed Comments, Page 2***

3. *THE NEW "SUPERCELL" ALSO GIVES ES APPROVAL TO LEAVE WASTE UNCOVERED FOR UP TO 30 YEARS. ES CONTINUES TO GET PAID TO ACCEPT WASTE BUT IS NOT PROPERLY COVERING IT, WHICH IS THE MOST IMPORTANT PART OF CELL CONSTRUCTION. IF ES GOES OUT OF BUSINESS THEN THERE IS MILLIONS OF CUBIC YARDS OF WASTE THAT UTAH WILL BE RESPONSIBLE TO COVER.*

   *ES continues to delay the covering of waste material. This request only lengthens the time the waste is uncovered. Originally, ES was to cover waste with a final cover within 5 years. They then committed to cover it in 10 years. Now this amendment will change it so that ES can leave waste open for up to 30 years. This is not acceptable for several reasons. First of all, it leaves the State of Utah at greater risk because there is more waste open that will need to be handled if ES goes out of business (which is more likely every year). Second the waste is open to many elements for too long; open to wind, rain, freeze thaw and other elements. This too brings more risk to the people in Utah. It is convenient for ES to leave waste open for decades, but just creates more risk for everyone else. It is possible that ES does not have the money to pay for the closure now so they are just trying to leave it open for decades and then have someone else be responsible to cover the waste.*

**Division Response Judd-03:** The Division disagrees with this comment. The proposed License Amendment does not change the time for final cover; it remains at 17 years following first waste placement. The timeline for cover construction is dictated by the approved LLRW and 11e.(2) CQA/QC Manual.

The commenter is also incorrect in stating that the time a cell can be open has changed with this License Amendment. The open cell time limitation mandated in Part I.E.6 of the Ground Water Quality Discharge Permit (No. UGW450005). That portion of the Permit is not being modified at this time. It is also important to understand that all deposited waste is required to be covered with a temporary cover (1 foot minimum thickness) within 90 days of any survey that determines that specified waste fill grades (design top of waste elevations) are reached and no later than 15 years after waste placement on each lift area.

A separate interim temporary cover is also required to comply with the "uncovered radioactive waste" limit described in License Condition 11. See the LLRW and 11e.(2) CQA/QC Manual. In addition, License Condition 53 B, requires commercial fixative

product (i.e., polymer), magnesium chloride, or non-contact water may be applied, in accordance with the manufacturer's instructions, to the surface of the Class A West cell on a biweekly basis (once every two weeks) between the first day of May and the last day of September.

The Division reviews the Licensee's surety report annually to assess its adequacy and to determine the amount of the sureties. The surety includes a cost item for re-engineering of the facility, including possible regrading/recontouring of embankment slopes, should that become necessary. Further, the surety amount is adjusted annually to reflect inflation, increases in the amount of disturbed land, changes in engineering plans, addition of new facilities, closure and stabilization that have already been accomplished, and other conditions affecting closure costs. The Division oversees Permittee compliance with the LLRW and 11e.(2) CQA/QC Manual and Permit by the implementation of its inspection programs. The Division inspectors conduct their inspections and oversight activities regularly to examine the extent to which the regulatory requirements are satisfied. If a violation is observed, a determination is made regarding an appropriate enforcement action to correct the violation.

As described in Background, Part 2 of this Response, the UDRC will review the impact of this License Amendment on the surety requirements during the review of the 2012 Surety Report, and will require any appropriate adjustment to the surety account. The currently approved 2011 surety report required an appropriate amount of surety to cover the costs of closing the facility prematurely in the event of loss of financial resources to continue operations at the facility, as will the 2012 Surety. Consistent with findings of this review, the Division will require that necessary sureties be provided

Please refer to the approved 2011 Surety Report for discussion of individual financial surety-related items.

***Comment Judd-04:***

4. *NO REVIEW HAS BEEN DONE OF EARLY CELL CLOSURE FOR THIS NEW "SUPERCELL". IF THE AMENDMENT WERE APPROVED, THEN UTAH COULD BE RESPONSIBLE FOR EARLY CELL CLOSURE WHICH WOULD COST OVER $35 MILLION EXTRA.*

*Once construction of the new supercell starts, there is no approved way to close the cell early if the company goes out of business. The only approved option would be to close the entire cell. This means that the State of Utah may need to bring in over 3,000,000 cubic yards of fill material to complete the cell. Fill material is costing over $12 per cubic yard. This means that the State of Utah is accepting an additional $35 million in cost. This money is not covered under the surety. ES does not have access to this amount of material right now and neither does the State of Utah. So costs would be much higher than $35 million. ES could not just dig material close to the cell for the fill material because it would change the groundwater flow and the surface water flow around the cell and affect the long term performance of the cell. No approval should be given until the early closure costs are accepted by ES and included in their surety.*

- **Division Response Judd-04:** The Division disagrees with the additional cost amount as estimated by the Commenter for implementing early closure of the CAW embankment, if that becomes necessary. That estimate is apparently based on the assumption that it would be necessary to import clean soil sufficient to allow the cover system to be constructed at the designed elevation.

If the site were to close prematurely, it would be necessary to import some soils to produce a surface contour upon which the cover system could be constructed in order to meet all applicable design requirements. As described in Division Response HEAL-07, the Division's reviews of the Licensee's annual surety cost report includes an allowance for the cost to prepare a design for recontouring the disposal unit should closure occur in the coming year.

Thus, the Division ensures annually that all costs associated with closure, should it occur during the following 12 months, are covered by the surety provided by the Licensee. This will continue to be the case upon amendment of the license to allow construction of the Class A West embankment. Importing of soils and recontouring would be done so as to allow for shedding of runoff and to minimize impacts to groundwater and surface water. Investigations related to issues of potential impacts to groundwater and surface waters from use of clay materials from nearby soils are currently being undertaken by ES and reviewed by the DRC.

See also Background, Part 1 of this Response.

***Comment Judd-05:***

5. *PROPER STUDIES COULD NOT HAVE BEEN DONE ON THE NEW "SUPERCELL" BECAUSE THE PHASING OF WASTE PLACEMENT HAS NOT BEEN ESTABLISHED.*

*The phasing of waste placement has not been addressed in this amendment. This is not a normal requirement of the NUREGs, but needs to be addressed because of the unique approach that is being proposed. The idea of bridging two cells with waste over a 25 year period has not been done before. The cell will perform differently depending on how the waste is placed. If ES begins to put waste in the new section, then the old sections will be left open for too many years. If ES puts waste in the old sections, then the differential settlement becomes a much bigger issue because time between the different waste columns is even longer. ES should be required to establish their plans for phasing waste placement in advance so it can be included in the analysis of the embankment. The proper analysis cannot have been done at his time because we do not know the phasing of the embankment. This problem is exaggerated by the fact that ES does not have an idea of how much waste is coming in each year. If they do know, they should provide some idea so that the proper phasing can be done in the embankment. After proper information is provided then proper analysis can be done. After that the public should be allowed to comment on the proposal.*

**Division Response Judd-05:** Those areas in the gap that do not have a prepared liner and foundation will be constructed as per the Construction Quality Assurance Quality Control Manual (CQA/QC Manual). The foundation plus liner are inspected prior to waste placement to ensure that there are no significant cracks or other deformations that would indicate that the foundation plus liner are not stable. If determined to be unstable, then it will be surcharged (weight will be placed on it for a period of time) to make it stable, (to complete any primary consolidation that might be occurring). There will be additional settlement of the liner and foundation unit during waste placement due to primary and secondary consolidation due to the load of the placed waste. The load on the foundation of the completed CAW cell will be about 10,000 lbs. per square feet. Settlement due to consolidation will be monitored with the cell settlement monitoring program that measures/monitors waste + foundation + liner settlement. Moreover, prior to construction

of the final cover, the Licensee must have demonstrated through settlement monitoring that settlement has stabilized to acceptable levels.

The Division agrees that attention must be paid to placement of the waste and to settlement within the waste and the interim cover to ensure that the final cover system is constructed on a stable foundation. There is reasonable assurance that settlement will have stabilized so that the final cover can be constructed within the 17-year open cell limit (EnergySolutions, LLC. 2012). The Licensee has options available to accelerate consolidation as described in the CQA/QC Manual.

Existing license and permit conditions provide adequate assurance that conditions necessary for long-term stability and proper performance will be achieved. The commenter has not provided any support for his assertion that reviewing and giving approval to the schedule of waste shipments and locations for waste placements at this time is justified.

**REFERENCES**

EnergySolutions, LLC. 2012. Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No. UGW450005, Amendment and Modification Request – Class A West Embankment: Response to Round 3 Interrogatory URCR R313-25-7(3)-04, with attachments. Letter from Tim Orton, EnergySolutions, to Mr. Rusty Lundberg, Utah Division of Radiation Control, dated March 20, 2012.

EnergySolutions, LLC 2012. LLRW and 11e.(2) Construction Quality Assurance/Quality Control (CQA/QC) Manual" Revision 26d), May 7, 2012.

***Comment Judd-06:***

***Judd Detailed Comments, Page 3***

6. *THERE IS NOT ENOUGH ROCK MATERIAL TO SUPPORT THE NEW DESIGN. UTAH MAY HAVE TO PAY TO HAUL ROCK FROM LONG DISTANCES TO COVER THE NEW EMBANKMENT.*

*The new design calls for more rock rip rap. In the past year, ES has tried to obtain rock from their new rock source. This rock source did not provide the type and amount of rock rip rap that they have suggested. Instead, the new rock source produces a large amount of sand and less than 1 inch material. The new design calls for more of larger rock which is limited in the ES rock source. ES has only reserved less than 200,000 cubic yards of bank run material for their rock materials. This would produce less than 100,000 cubic yards of material that is beneficial for rock cover. There is less than 1.5 million cubic yards of bank run material in the entire pit. This material is also being used by other companies. ES has not reserved close to enough material to finish the new cell, let alone the other cells that will need to be covered. ES does not have access to enough material to construct rock rip rap with the new design. If ES were to go out of business the State of Utah would [be] required to build cover without having access to rock for its construction. That would mean tens of millions of extra costs that would have to be borne by the State of Utah and its citizens.*

**Division Response Judd-06:** As previously described, the new cover design EnergySolutions is considering is not before the Division at this time. See Division

Response to Judd-01. The Division has evaluated the question of whether there are adequate sources of materials for construction of the currently-approved Class A West cover system during its review of the Licensee's amendment request (LAR). The Licensee has provided suitable documentation to demonstrate that adequate supplies of materials are indeed available and the commenter has provided no information to the contrary. The clay and rock resource calculations are in Attachment 9 of the LAR. The Division is satisfied that sufficient suitable materials are available to construct the Class A West cover system.

Refer also to Background, Part 1, and Division Response Judd-01 above.

***Comment Judd-07:***

7. *ENERGYSOLUTIONS HAS UNDERESTIMATED THE COSTS TO PRODUCE AND PLACE ROCK COVER FOR THE NEW "SUPERCELL". THESE EXTRA COSTS WILL BE PAID BY THE STATE OF UTAH UNLESS A FINANCIAL REVIEW IS DONE BEFORE THE AMENDMENT IS APPROVED.*

   *The cost for the rock rip rap material that is shown in the surety is not sufficient for the actual costs that will be incurred. A recent project by ES for rock production showed that the costs for rock production are significantly more expensive than previously shown in the surety. The rock material had to be handled several times before it was placed on the mixed waste cell. ES excavated the rock from the pit and had to use a dozer to loosen the material. ES found that there were large amounts of caliche in the rock source that will become more and more of a problem over time because they used the best material this time. The rock then was put through a screening process which is way more expensive than ES suggests in their surety. The screening revealed that there was a smaller amount of usable material than expected in the bank run material. The rock then had to be sorted again to get it to the right specifications. The rock then was picked up again and loaded into trucks and hauled again. Finally the rock was placed. The total cost per cubic yard for material is much higher than suggested in the surety. The State of Utah and its citizens are in danger of having to pay these extra costs, especially if the new design is approved with thicker rock in the cover design*

   - **Division Response Judd-07:** See Division Response to Judd-06.

***Comment Judd-08:***

8. *CHANNELING IN THE COVER HAS NOT BEEN STUDIED SUFFICIENTLY TO PROTECT THE STATE OF UTAH IF UTAH IS REQUIRED TO COVER THE WASTE.*

   *No studies have been done to examine the new design's effect on channeling in the cover. This is especially of concern because of the longer flow lines in both the top rock and the side slope rock and because ES original LARW cell has shown that there is significant differential settlement when waste is place at different times. A review of the LARW cell shows that when waste is placed at different times there is differential settlement in the cover directly over the areas where waste is placed at different times. This creates channeling in the flow as water is placed on the embankment. The new CAW cell will have greater problems because the waste placed in the two existing cells is already settled. The time between that waste placement and the new waste placement is much longer. In fact, the older cells will have been in place for up to 15 years before new waste is placed next to it. This is sure to cause more channeling in the cover. This channeling will have more water flowing in it because of the longer flow lines. This issue needs to be investigated further.*

- **Division Response Judd-08:** The Commenter is mistaken in his statement that no studies have been done to examine the effects on channeling resulting from the new cover design. The Division reviewed and approved Attachment 10 to the revised license amendment request, which addressed the impacts on site drainage projected to result from the design changes associated with the Class A West license amendment request. The driving event was the updated Probable Maximum Precipitation (PMP) event. The characteristics of the proposed Class A West embankment cover system, including substantially longer flow lines, were incorporated into the design and analysis of the cover system's performance. [Cite]. The commenter has not provided information to suggest any problem with this analysis.

  All waste, newly and previously placed, will have to meet the same settlement requirements across the top of the embankment. Settlement must be reached before cover construction regardless of how long ago the waste material was placed. If consolidation of the waste unit is occurring at unacceptable rates then surcharging can occur. Acceptable rates are determined by drawing a consolidation or settling curve and determining where on the curve the current consolidation is. The consolidation is acceptable when it is on a flat part of the curve indicating that minimum to no settling due to consolidation is occurring. Quality assurances for all of these requirements are in the "transition to final cover" section of the CQA/QC Manual.

  The design approach employed conforms to the latest design guidance issued by the U.S. Nuclear Regulatory Commission (NUREG-1623 and NUREG/CR-4620). The results show an interstitial velocity within the Type A Filter Layer of 0.17 ft/sec on the top slope and 0.40 ft/sec on the side slope. These values are very comparable and slightly less than those calculated using the NUREG/CR-4620 methodology and show that erosion will be within acceptable levels. The projected water runoff velocity on the radon barrier over the top slope is calculated at 0.055 feet per second and over the side slope is calculated at 0.12 feet per second, both values well below any threshold where erosion might become possible.

  As to the potential for differential settlement that might disrupt the integrity of the Class A West cover system, Work Element-Temporary Cover Placement and Monitoring, Pre-Final Cover Settlement Monuments of the Construction Quality Assurance/QualityControl Manual specifies that final cover construction will not commence until results from the settlement monitoring system indicate that settlement of the interim cover has stabilized to acceptable levels. Stabilization to acceptable levels of the interim cover settlement has been generally observed to occur within in a few years of waste placement in the Class A and Class A North embankments. The Division considers the LARW cover system to be functioning correctly, and has confidence that the cover system will perform as intended.

  The commenter has not provided any information to suggest that these requirements will not be sufficient to address any concerns about differential settlement.

**REFERENCES**

NUREG-1623. NRC (U.S. Nuclear Regulatory Commission). "Design of Erosion protection for Long Term Stability". September 2002.

NUREG/CR-4620. Nelson, J.D., Abt, SK, Volpe, R.L., van Zyl, D., Hinkle, N.E., and Staub, W.P. "Methodologies for Evaluating Long-Term Stabilization Designs of Uranium Mill Tailings Impoundments". June 1986.

***Comment Judd-09:***

***Judd Detailed Comments, Page 4***

9. *THE FILTER ZONE WILL NOT PERFORM PROPERLY IN THE NEW SUPERCELL BECAUSE OF EXTREME SETTLEMENT IN THE AREA BETWEEN THE TWO EXISTING CELLS.*

*The attempt to build a higher cell will create a situation where the filter zones will not perform properly. The areas with waste placed later will settle more than the existing cells because the waste column is deeper and because the waste is being placed later This will create a situation where the filter zone will have areas where the flow line in the filter may go up hill and at least will not have the proper slope that is required on the top of the embankment. This will create channeling and possible ponding on the top of the embankment. The LARW cell is an example of how this differential settlement will affect flow on the top of the embankment. This is not acceptable for proper long term cover construction.*

**Division Response Judd-09:** As noted in Division Response Judd-08, the record in this matter demonstrates that the potential for differential settlement in the Class A West embankment cover system has been appropriately addressed. The Licensee is required to ensure that settlement with the interim cover has stabilized before construction of the final cover system commences. In addition, the Division is imposing additional license conditions that will provide assurance that the clay used in constructing the Class A West cover system will perform as required to accommodate any additional minor settlement that may occur following embankment closure. As described above in Division Response HEAL-09, the clay study will better define the allowable distortion value based on properties of site specific clays used in cover construction. The commenter has provided no information to support the statements made in this comment.

***Comment Judd-10:***

10. *ES HAS NOT ESTABLISHED THAT THE MAJOR CONSTRUCTION MATERIAL FOR THE CELL (CLAY) CAN HANDLE THE NEW "SUPERCELL". IF THE CLAY FAILS THE ENTIRE CELL FAILS. THE SETTLEMENT BETWEEN THE NEW CELL AREA AND THE TWO CURRENT CELLS WILL CAUSE THE CLAY LINER AND THE CLAY COVER TO FAIL*

*The clay used for construction is still an unknown. ES does not know if the clay that will be used can withstand the new type of construction. This is a great concern. The clay is the most important part of cell construction; it is used to contain the waste both on the bottom of the cell and the top of the cell. If it does not perform properly then the embankment will fail. With the new design it is very likely that the clay liner under the waste will fail. If the two licensed cells have been constructed for about 10 years before the clay liner between the two cells is constructed then the settlement will certainly create a failure between the new clay liner and the old clay liner. The settlement under the current cells is approximately 90% complete, probably settling over two feet. The new clay liner will now be constructed and then the new waste placed in this area. The waste column in the new area will be over 70 feet and should create settlement of the*

*clay liner of about three feet. It seems unlikely to think that the new clay liner will settle just the right amount to tie in exactly with the old clay liner. There will be a break between the new and old clay liners. This is not a good situation and should not be allowed. There is no reason that this risk should be taken.*

**Division Response Judd-10:** For response to the challenge that the liner will suffer damage because of the different times at which the different portions of the liner were/will have been constructed; refer to Division Response HEAL-08 and Judd-08.

The Division has previously accepted the clay material that is readily available for constructing the cover systems at the Clive facility. The Division's previous acceptance was based on the characteristics of similar clays whose properties had been demonstrated by others; this was determined to be sufficient for the previous designs. Because of different stresses that the new design would place on the clays, the Division is now pursuing information expected to provide additional confidence that the:

Clay actually planned for construction of the Class A West cover system will indeed accommodate what little additional differential settlement is expected following confirmation that settlement in the interim cover has stabilized (i.e., prior to constructing the final cover).

Cover system will perform as projected and as required. CAW's approval is conditional on settlement of the embankment prior to construction of the cover system. Differential settlement has to meet a criterion of 0.007 ft/ft prior to any construction of cover system. This assures the cover system is built on a stable embankment/foundation.

See also Background, Part 1, regarding Surety for the period before the clay study required by License Condition 41 is reviewed and approved, and any required changes are fully funded under a new Surety.

***Comment Judd-11:***

11. *THE TWO FOOT CLAY COVER IS NOT SUFFICIENT IF THE NEW "SUPERCELL" IS APPROVED. THERE IS LITTLE ROOM FOR ERROR WHEN THERE IS ONLY A TWO FOOT COVER.*

*In an attempt to save money, ES has decided to only put 2 feet of clay cover over the waste. This is an extremely risky proposal. Even though studies show that the 2 foot cover may be sufficient to hold in the radioactive material that only works if the 2 foot cover stays intact. There are many ways the clay cover could be compromised including through frost, erosion, cracking, stress, tension and penetration by animals and roots. It is much better to have extra amounts of clay cover to overprotect the waste in case any of these natural processes happen to the embankment. ES is proposing a new way to construct the clay cover where differential settlement is sure to increase. The expected settlement in some areas will be over 3 feet, which is more than the depth of the cover. Just as with the clay liner it is hard to get any settlement to happen at the same rate in an old embankment and a new embankment that are tied together. Therefore, it is very likely that the clay cover will fail due to cracks and differential settlement.*

**Division Response Judd-11:** The differential settlement cannot exceed the criteria set in the CQA/QC Manual. Prior to cover construction settlement must be reached as described

in Division Response Judd-10 above. The Licensee and Division have carefully evaluated the stability of the 2-foot-thick clay Radon Barrier and its performance as an infiltration and radon barrier. Information provided by Energy*Solutions* with the Class A West license amendment request demonstrates the adequacy of the radon barrier design relative to limiting radon emissions from the final surface of the cover system (URS 2012). A key design criterion is the limitation of allowable distortion of the upper radon barrier to less than or equal to the specified maximum allowable distortion criterion due to any settlement occurring within the CAW embankment. That is, settlement occurring within the CAW embankment due to settlement of waste and backfill must not result in a magnitude of differential settlement that would contribute to a distortion exceeding the specified maximum allowable distortion criterion. If required based on the laboratory testing results from the clay study, a revised maximum allowable distortion criterion for the cover will be identified and invoked as a final design criterion for the cover and imposed prior to final cover construction. The license amendment request demonstrates that earthen cover materials are provided in sufficient thickness above the Radon Barrier to preclude damage to the Radon Barrier (URS 2012). The Division has responded to the challenge that the clay cover will not remain stable (able to yield without cracking) in Division Responses HEAL-08 and Judd-09. The license amendment request demonstrates that root and animal penetration are unlikely to compromise the integrity of the cover system clay layer (URS 2012). Division Response HEAL-08 addresses the challenge that the liner system will not maintain its integrity following delayed placement of waste in the Class A West embankment.

The commenter did not provide any technical support for these comments, so no additional evaluation is possible.

**REFERENCES**

URS 2012. Safety Evaluation Report. Energy*Solutions* LLRW Disposal Facility Class A West Amendment Request. June 2012.

***Comment Judd-12:***

***Judd Page 5***

12. THE PROPOSED AMENDMENT IS IN CONTRADICTION TO THE "HUNTSMAN AND ES AGREEMENT".

*EnergySolutions signed an agreement with Governor Huntsman several years ago. This proposal is not in accordance with that agreement. The agreement was based on certain types of waste coming into the state. Instead this proposal allows for much hotter waste to come into the state by changing the waste accepted from 11 e2 waste to low level wastes. The governor's agreement was also based on a specific configuration of the waste and not expanding the height of the waste to such extreme elevations.*

*One of the main reasons that the Governor of Utah signed an agreement in 2007 was to get EnergySolutions to withdraw its amendment to build a "supercell". The Governor agreed on several concessions based on ES promise not to build the larger cell. Now 5 years later ES is asking for a new "supercell" that is almost identical to the one they promised not to build. ES has*

*committed to not build a combined Class A Cell. Now they want to build a combined Class A cell and just change the name. This is in direct violation of the current agreement.*

*The current request is not in accordance with the 2007 agreement. The 2007 agreement allows ES to build the existing low level cells that were licensed as of March of 2006. That would be the Class A cell and the Class A north cell. The agreement also allowed ES to convert a portion of the 11 e.(2) cell into low level waste volume. It does not allow the Class A cell and the Class A north cell to be combined and the height increased. In fact, this is the main reason the Governor made the agreement was to stop the combination of the two cells. ES should not be given this amendment because it is not in accordance with the 2007 agreement with Governor Huntsman. The State of Utah and its citizens should not be the ones that take all the risk so that ES can bring in more waste and leave it uncovered for decades.*

**Division Response Judd-12:** See Background, Part 2 and Division responses to HEAL-01, HEAL-02, HEAL-04, HEAL-05 and HEAL-06. The statement that "The governor's agreement was based on a specific configuration of the waste and not expanding the height of the waste to such extreme elevations" is also not supported by the language of the agreement itself (See Appendix E).

The comment that waste will be left ". . . uncovered for decades" is incorrect, as described in Division Response to Judd-03.

***Conclusion***

Comment addressed in this document led to modification of the Radioactive Material License, No. UT 2300249. The modifications and the associated justification is shown in the table below. The entire license, with changes marked in red-line format, is included in Appendix D.

| License Condition Modifications | Reason |
|---|---|
| 9.E. The Licensee may dispose of a volume of Class A Low-Level Radioactive Waste (LLRW) and Naturally Occurring and Accelerator Produced Radioactive Materials (NARM) in the Class A West disposal cell described in License Condition 40 not exceeding 8,724,097 cubic yards, and in the Mixed Waste Landfill Cell not exceeding 1,354,092 cubic yards. Together, the total aggregate volume of waste disposed of in the Class A West disposal cell and the Mixed Waste Landfill Cell shall not exceed 10.08 million cubic yards. Class A waste LLRW is defined in Utah Radiation Control Rule R313-15-1009 and NARM at R313-12-3. | The maximum waste volumes were added to the permit to avoid any confusion as to the maximum capacity of each cell. |
| 43. The Licensee shall, in the 2012 Surety submittal, provide cost estimates based on the Class A West design submitted on Drawings 10014 C01 through C06 listed in Table 2C of the GWQDP. The Licensee shall provide surety funding as approved by the Executive Director prior to commencing construction of the clay liner in the area between the previously approved Class and Class A North embankments. | The requirement was added to ensure that adequate surety funds will be provided well before waste is received for disposal in the newly approved Class A West embankment. |
| 76. The Licensee shall at all times maintain a Surety for perpetual care, using an instrument that satisfies the requirements of UAC R313-22 and R313-25. The Surety shall be in the amount last approved by the Radiation Control Board, as provided in Utah Code Ann. 19-1-307(2), as adequate to fund perpetual care, less the amount contributed to the Radioactive Waste Perpetual Care and Maintenance Account created under Utah Code Ann. 19-3-106.2 (but not including any part of that Account resulting from returns on investment). | EnergySolutions has provided this Surety for several years, but the Division determined that this arrangement should be formalized with a License Condition. |

## ***Reference Summary***

References that are particularly pertinent to a comment response have been listed with that response but this comment response document relies generally on the following records.

AMEC Earth & Environmental, Inc. 2011. Report: "Geotechnical Update Report – Energy*Solutions* Clive Facility Class A West Embankment," February 15, 2011.

EnergySolutions, LLC. License No: UT2300249; Revised Annual Surety Review, November 7, 2007.

Energy*Solutions*, LLC. 2011. Annual Surety Submittal, Radioactive Materials License UT2300249: Response to Request for Information.

Energy*Solutions*, LLC. 2012. Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No. UGW450005, Amendment and Modification Request – Class A West Embankment: Response to Round 3 Interrogatory URCR R313-25-7(3)-04, with attachments. Letter from Tim Orton, Energy*Solutions*, to Mr. Rusty Lundberg, Utah Division of Radiation Control, dated March 20, 2012.

EnergySolutions, LLC 2012. LLRW and 11e.(2) Construction Quality Assurance/Quality Control (CQA/QC) Manual" Revision 26d), May 7, 2012.

Huntsman, J.M., and Creamer, R. S. 2007. Agreement between the Governor of the State of Utah and Energy*Solutions*, LLC, dated March 15, 2007.

NUREG-1623, NRC (U.S. Nuclear Regulatory Commission). "Design of Erosion protection for Long Term Stability". September 2002.

NUREG/CR-4620. Nelson, J.D., Abt, SK, Volpe, R.L., van Zyl, D., Hinkle, N.E., and Staub, W.P. "Methodologies for Evaluating Long-Term Stabilization Designs of Uranium Mill Tailings Impoundments". ORNL/TM-1006, prepared for U.S. Nuclear Regulatory Commission, June 1986.

Temple, D.M., Robinson, K.M., Ahring, R.M., and Davis, A.G. 1987. *Stability Design of Grass-Lined Channels*. U.S. Department of Agriculture, Agricultural Handbook No. 667, U.S. Government Printing Office, Washington, D.C., 167 pp.

UDRC 2012. Energy*Solutions* 2011. Annual LLRW Surety Submittal, 2011 Engineering Module 13, Radioactive Materials License Number UT2300249: Conditional Approval. AMEC Earth & Environmental, Inc. 2005. Geotechnical Study: "Increase in Height and Footprint," May 27, 2005.

UDRC 2012. EnergySolutions 2011 Annual LLRW Surety Submittal, 2011 Engineering Module 13, Radioactive Materials License Number UT2300249: Conditional Approval.

URS 2012. Safety Evaluation Report. Energy*Solutions* LLRW Disposal Facility Class A West Amendment Request. June 2012.

US Nuclear Regulatory Commission (NRC), 2002. Office of Nuclear Material Safety and Safeguards. 2002. NUREG-1623, "Design of Erosion Protection for Long-term Stabilization", Final Report. September 2002.

Utah Division of Radiation Control 2012. Safety Evaluation Report. Energy*Solutions* LLRW Disposal Facility Class A West Amendment Request. June 2012.

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# APPENDIX A
# COMMENTS RECEIVED FROM
# MATT PACENZA, POLICY DIRECTOR
# HEAL UTAH

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HEAL UTAH POWERING ACTION TO PROTECT UTAH

To: Division of Radiation Control
From: HEAL Utah
Re: Public Comment on Class A West Amendment.
Date: 26 July 2012

The below comments are regarding an initial decision by the Director of the Utah Division of Radiation Control to amend the EnergySolutions (Licensee) Low-Level Radioactive Waste Disposal License (RML UT 2300249) and Ground Water Quality Discharge Permit (No. UGW450005).

Before we get to the substance of our comments, we think it essential to frame this decision and our response to it in a longer history of EnergySolutions' efforts to expand and shift capacity at the Clive site. It is critical that the Division of Radiation Control, along with DEQ officials and the Herbert Administration, make this particular decision within that broader policy context.

Let us start in 2006, when EnergySolutions sought permission from the DRC to create a "Supercell," merging the Class A and Class North embankments and increasing its LLRW capacity at Clive from 8.8 million cubic yards to 13.1 million cubic yards.

At the time, HEAL and others argued that such an expansion should trigger the provision of a 1990 law requiring that significant license changes be approved by the Legislature and the Governor. EnergySolutions disagreed with that interpretation, but, just in case, in February 2007, it successfully lobbied the State Legislature to pass a law removing the governor, Legislature and Tooele County Commission from the chain of required approvals for a significant capacity increase.

That led Gov. Jon Huntsman to threaten to exercise his veto power via the Northwest Interstate Compact on Low-Level Radioactive Waste Management to prevent the company from creating the Supercell. The Huntsman Administration and the company then entered into negotiations that then led, of course, to what has become known as the "Huntsman Agreement," a negotiated accord between the state of Utah and EnergySolutions.[1]

Obviously, as state regulators you are familiar with the agreement, so we do not intend to repeat all of its provisions here. The critical piece, however, was a trade:

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[1] http://www.utah.gov/governor/news_media/article.html?article=225

EnergySolutions agreed to give up its Supercell proposal in exchange for being allowed to convert approximately 3.6 million cubic yards of its already-permitted 11e.(2) disposal cell into capacity for low-level radioactive waste.

The agreement was signed in March 2007. Over the subsequent four years, the company and state regulators sought pathways to implement the conversion of 11e.(2) into low-level radioactive waste disposal and apparently encountered various legal and technical challenges..

In the meantime, however, the company made clear it was willing to jettison the Huntsman Agreement – as soon as it had grounds to do so.

Please see "EnergySolutions flips on deal not to expand waste site," a story from February 2010.[2] After the company won an initial court decision that determined that its Clive site wasn't under the jurisdiction of the Northwest Compact, it immediately announced that the Huntsman Agreement was "obsolete."

> "When the district court ruled that the Northwest Compact lacked jurisdiction over the Clive [Tooele County] facility," company president Val Christensen said in an e-mail to *The Tribune* this week, "the standstill agreement with Gov. Huntsman became unnecessary."

Company officials were clearly eager several years ago to abandon the Huntsman Agreement. We would thus conclude – and will make this case below – that the state should adopt an extremely cautious approach to drafting license language that leaves as little "wiggle room" as possible, in the effort to avoid opening up potential future loopholes that could lead to greater site expansion.

We also point out that same Tribune article from Feb. 2010 makes clear that Gov. Gary Herbert supports the Huntsman Agreement and its volume caps.

We now move to May 2011, when EnergySolutions applied to the state for permission to create a new Class A West cell. Like the Supercell, it merges the existing Class A and Class North embankments, although this version is somewhat smaller. The company returned to the merged cell proposal, it said, because it and the state could not satisfactorily resolve outstanding legal and engineering hurdles that stood in the way of the Class A South/11e(2) conversion.

Effectively, the proposal before the state and the public now is a reversal of the trade at the heart of the Huntsman Agreement: Instead of giving up the Supercell proposal in exchange for the Class A South conversion, the company now proposes to give up the Class A South conversion in exchange for creating a slightly smaller Supercell.

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[2] http://www.sltrib.com/News/ci_14329478

Please keep the above history in mind as we move to our substantive comments on the current Class A West Amendment.

1. We applaud the Division for the following amendment to RML UT 2300249:

   *The Licensee may dispose of a volume of Class A Low-Level Radioactive Waste (LLRW) and Naturally Occurring and Accelerator Produced Radioactive Materials (NARM) in both the Class A West and Class A North disposal cell described in License Condition 40, and in the Mixed Waste Landfill Cell not exceeding a total of 10.1 million cubic yards. Class A waste is defined in Utah Radiation Control Rule R313-15-1008 and NARM at R313-12-3.*

   The ***not exceeding a total of 10.1 million cubic yards*** language is welcome, because it codifies in the license for the first time (we believe) a volume cap for that portion of the Clive site. We do not yet know if the licensee has agreed to this language, but if they have, and it stands, it is a step in the right direction of limiting efforts to continually expand the Clive site.

2. However, we urge the DRC to further amend the license to include the following: a total cap on LLRW volume for the entire Clive site, including the unused portion of the Class A South/11e(2) cell.

   This additional language is essential if the DRC intends to preserve the total volume caps in the Huntsman Agreement, as Gov. Herbert and regulators have previously indicated they wish to. We believe that EnergySolutions, without violating this license, could come back to the Division in a few years and say they've now figured out a way to safely engineer Class A South and so would like to propose to re-open that 3.5 million cubic yard proposal. That would grant the company a significant expansion in total capacity -- which obviously the Huntsman Agreement was seeking to prevent.

   We believe EnergySolutions will be able to argue that the newly RML UT 2300249 supersedes the Huntsman Agreement. It explicitly and directly contradicts the Agreement. It, for example, grants the licensee permission to merge the Class A and Class North embankments – which the Agreement was designed to prevent.

   Is it unrealistic or perhaps paranoid to think that EnergySolutions will seek to further expand its LLRW capacity Clive beyond the 10.1 million cubic yards it is permitted in the Class A West and Mixed Waste disposal cells? To identify additional space elsewhere at Clive – such as Class A South – where it will be able to dispose of additional waste, and continue to bring material to Utah for decades to come? We would argue, that it is, rather, very likely that the licensee will seek to do just that, for the following reasons:

- As mentioned above, the licensee as recently as 2010 sought to jettison the volume caps in the Huntsman Agreement as soon as it had a pretext for doing so. Clearly, EnergySolutions has seen the agreement as a document it would seek to abandon as soon as it could, rather than one that it was bound to in good faith. To our knowledge, EnergySolutions has not publicly indicated they believe they are currently bound to the terms of the original agreement.
- The company faces tremendous financial pressure to demonstrate to investors that its long-term revenue prospects are solid. Undoubtedly, regulators have noted the recent wave of bad news for EnergySolutions: It dismissed its CEO and CFO[3]. Its stock plummeted, losing more than half its value.[4] Standard & Poor's and other key rating agencies down-graded the company's debt to BB- and BB+, aka "speculative grade" or junk bond levels. [5] The company announced it was looking to sell its U.K. and European business[6], which, according to a recent Associated Press story ("Company charged with dismantling Zion nuclear plant struggling financially") represents at least 60 percent of its total revenue.[7]
  At the same time, the company has previously made clear that disposal at Clive is among its most profitable work, as it long ago paid the upfront costs for building and engineering the facility. Its newer proposed revenue streams – such as decommissioning shuttered nuclear reactors – have turned out to lose money.
  Given those economic realities, it would be a surprise if the company were to not seek to expand the potential disposal volume at Clive – to reassure investors that its most profitable revenue stream will continue for many years.
- In addition, those financial difficulties – and what experts have suggested is at least a possibility that EnergySolutions may face bankruptcy or liquidation – must be fully factored into this license amendment. It would be prudent for the Division to consider what impact the new Class A West proposal has upon the line of credit and perpetual care fund designed to

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[3] http://www.sltrib.com/sltrib/money/54281263-79/company-energysolutions-executive-changes.html.csp

[4] http://finance.yahoo.com/echarts?s=ES+Interactive#symbol=es;range=3m;compare=;indicator=volume;charttype=area;crosshair=on;ohlcvalues=0;logscale=off;source=undefined;

[5] http://www.sltrib.com/sltrib/money/54292551-79/company-energysolutions-lockwood-credit.html.csp

[6] http://finance.yahoo.com/news/energysolutions-announces-consideration-sale-uk-130000885.html

[7] http://www.chicagotribune.com/business/ct-biz-0701-zion-20120630,0,6686911,full.story

ensure that the State of Utah will have sufficient resources to safely maintain the Clive facility in case the company no longer can. In other words, will anything about the super cell proposal either a) increase near-term closure costs if the company goes bankrupt, or b) increase costs associated with perpetual care of the site? For instance: Will tying two cells together into a super cell increase costs for fill material if EnergySolutions goes bankrupt before filling the new supercell? Will differential settlement be more likely in a supercell, and create additional financial risks in the long-term? In order to protect Utah's health and environment, and the Utah taxpayer, we believe it is necessary to estimate the impact of the proposed super cell on short-term closure and long term perpetual care costs prior to making a final licensing decision on the proposed super cell.

3. We do believe that merging two different cells into a larger "supercell" presents some unique technical challenges, including: How can the clay liners for the existing cells be adequately "stitched" together, given that the clay liners underlying the existing cells are of different vintages and have been subject to different weights and pressures as the cells have settled? And, importantly, when the supercell is filled, will differential settlement across the various portions of the supercell cause the cover to crack or eventually create ponding or accelerated erosion?

   The report indicates that two important documents have not yet been submitted for final state approval: a report explaining the cover design as well as a report examining clay performance. We believe these reports must be submitted and reviewed as part of the overall licensing procedure and that it would be inappropriate for the state to approve the current license amendment in the absence of those two reports.

We appreciate the Division taking the time to carefully consider these comments. We would like to repeat our most important point for emphasis: the Huntsman Agreement was incredibly important for codifying a trade: the company gave up the Supercell and got back the Class A South conversion. And, now, EnergySolutions proposes to flip that trade: It will give up Class A South in exchange for Class A West. Here's the fundamental problem: *Only half that deal is in writing.* The company gets Class A West – but there is as yet no language that ensures that the former Class A South Cell will never be developed.

The division must require the licensee to commit to an overall volume cap and to agree to not seek to convert Class A South or any other possible cell at Clive in the future. If the State does not take this critically important step, we fear this current license could have the unfortunate impact of nullifying the most important

component of the landmark Huntsman Agreement—namely, a cap on total waste at the site of 10.1 million cubic yards.

Sincerely,

Matt Pacenza
Policy Director
HEAL Utah

***
824 South 400 West
Suite B111
Salt Lake City, 84101
matt@healutah.org
801-355-5055

# APPENDIX B
# SUPPLEMENTAL COMMENTS RECEIVED FROM CHRISTOPHER THOMAS, EXECUTIVE DIRECTOR HEAL UTAH

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John Hultquist <jhultquist@utah.gov>

# Fwd: Additional comment related to Public Comment on EnergySolutions' Class A West Amendment

1 message

**rad public** <radpublic@utah.gov> Tue, Nov 20, 2012 at 4:40 PM
To: John Hultquist <jhultquist@utah.gov>

——— Forwarded message ———
From: **Christopher Thomas** <christopher@healutah.org>
Date: Thu, Jul 26, 2012 at 4:58 PM
Subject: Additional comment related to Public Comment on EnergySolutions' Class A West Amendment
To: radpublic@utah.gov

Dear Mr. Lundberg:

I am submitting this small comment in addition to our longer comments submitted by HEAL Utah's Policy Director, Matt Pacenza.

There is a proposed license amendment that reads:

The Licensee may dispose of a volume of Class A Low-Level Radioactive Waste (LLRW) and Naturally Occurring and Accelerator Produced Radioactive Materials (NARM) in both the Class A West and Class A North disposal cell described in License Condition 40, and in the Mixed Waste Landfill Cell not exceeding a total of 10.1 million cubic yards. Class A waste is defined in Utah Radiation Control Rule R313-15-1008 and NARM at R313-12-3.

We believe the reference to Utah Radiation Control Rule R313-15-1008 is incorrect; we believe it should be Utah Radiation Control Rule R313-15-1009, "Classification and Characteristics of Low-Level Radioactive Waste," which includes waste classification tables.

Please see the rule online at: http://www.rules.utah.gov/publicat/code/r313/r313-015.htm#T46

Please do not hesitate to contact me if you have any questions.

Sincerely,

–
Christopher Thomas
Executive Director
HEAL Utah
801-355-5055 (main)
801-560-1915 (cell)
www.facebook.com/healutah
www.healutah.org

--
Division of Radiation Control
Phone: (801) 536-4250
Fax: (801) 533-4097
www.radiationcontrol.utah.gov

# APPENDIX C
# COMMENTS RECEIVED FROM
# CEDAR MOUNTAIN ENVIRONMENTAL, INC.,
# CHARLES JUDD, PRESIDENT

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CEDAR MOUNTAIN ENVIRONMENTAL INC.

July 26, 2012


DRC-2012-002356

Rusty Lundberg, Director
Utah Division of Radiation Control
195 North 1950 West
P.O. Box 144850
Salt Lake City, Utah 84114-4850

Dear Rusty Lundberg:

Included with his letter are the public comments on EnergySolutions(ES) proposed amendment to create a supercell referred to as the new CAW cell. In general, the amendment is flawed because it is in direct contradiction with the agreement ES has with Governor Huntsman. The agreement specifies what cells could be constructed for LLRW and certainly the Governor did not want a "supercell" as is requested here. Now it seems that because ES cannot fit enough LLRW in the 11e.(2) cell they have asked for a new "supercell" for their own convenience.

The problem is that for ES convenience the State of Utah and its citizens are put at great risk. ES has been getting paid to accept waste for the last 12 years and have yet to cover that waste. While the company executives have been taking out millions of dollars each year the stock price of the company has dropped from over $25 a share to under $2 a share. Meanwhile, the waste that has been accepted and paid for continues to sit in the west desert without a cover. This amendment creates a situation where the waste will continue to sit uncovered for many more years with the increasing possibility that the State of Utah will be responsible to cover the waste. It is not a good idea for the Division of Radiation Control to permit Utah and its citizens to be at great risk when it is in clear contradiction to Governor Huntsman's agreement with ES. It does not seem that this proposed amendment is good for Utah or its citizens. Thank you for your consideration of these public comments.

Sincerely,

Charles A Judd

Charles Judd

2028 EAST FORT UNION BLVD., STE. 102-A; SALT LAKE CITY, UT 84121

1. THE FINANCIAL STABILITY OF THE COMPANY IS DETERIORATING QUICKLY. IT IS POSSIBLE THAT THE STATE OF UTAH WILL SOON BE RESPONSIBLE TO CLOSE THE CELLS. THERE ARE NOT ENOUGH RESOURCES TO CLOSE THE NEW CELL, SO THE STATE WILL BE RESPONSIBLE TO PAY THE EXTRA COSTS OF THIS NEW SUPERCELL.

The financial stability of the company is of great concern. Stock prices have dropped over 90 percent and the debt of the company is huge. To top it off there was no review done of the financial surety of the site if the new supercell were approved. The DRC must do a financial review of the amendment before it is approved. The surety is the main way the State of Utah is protected from the failure of the company. The State of Utah is at huge risk at this time. There are many issues surrounding the surety that are unknowns. First, the design of the facility is not even known. No one has shown how the new facility would be closed if the company goes bankrupt. It would be a huge cost to fill the cell up to the limits needed to provide proper drainage. There is not enough cover materials identified to complete the cells at the site. Their amount of money set aside to pay for rock is way low. The settlement issues create a time concern for closure that has not been addressed. It is clear that the protection of the State of Utah has not been considered in the proposal. This financial review needs to be done before this proposal is sent out to public comment.

The SER was based on a management team that has now drastically changed. The company has gone through several major changes in the past 5 years. These changes are probably based on the financial situation at the company since the stock price has dropped from over 27 dollars to under 2 dollars. The new management needs to be evaluated to determine if they are willing to maintain proper controls at the company even though the financial situation at the company is very concerning. The citizens of Utah should not be expected to pay tens of millions of dollars to close a new supercell after executives of the company have been paid millions in benefits. A complete surety review is needed and a review of the company's financial stability and management should be required before a new supercell is considered. It is clear that a second public comment period is needed when the financial surety review is completed.

2. APPROVAL SHOULD NOT BE GIVEN WHEN MAJOR DESIGN ISSUES ARE UNKNOWN. UTAH MAY END UP WITH MILLIONS OF CUBIC YARDS OF WASTE TO COVER AND NO WAY TO COVER THE WASTE.

There are two major issues that have not been resolved to the State's satisfaction, one concerning the clay to be used for cell construction and one concerning the rock for cell construction. Instead of solving these issues before public comment, the SER was sent out and DRC is moving forward without knowing if the new design will work. This is not acceptable. The commenters do not have access to significant issues such as what is the cover design. The cover design is one of the major issues in waste facility control since it is the major item to contain the waste for thousands of years. Without proper clay and proper rock there is no way the waste can be contained. A conditional approval is not an acceptable procedure in this situation. ES could go out of business and leave the State of Utah and its citizens with millions of cubic yards of waste that are uncovered and no proper design to cover the waste. ES should wait until they have completed major design items on the cell before they seek approval. It is clear that a second public comment is needed when the design is completed.

3. THE NEW SUPERCELL ALSO GIVES ES APPROVAL TO LEAVE WASTE UNCOVERED FOR UP TO 30 YEARS. ES CONTINUES TO GET PAID TO ACCEPT WASTE BUT IS NOT PROPERLY COVERING IT, WHICH IS THE MOST IMPORTANT PART OF CELL CONSTRUCTION. IF ES GOES OUT OF BUSINESS THEN THERE IS MILLIONS OF CUBIC YARDS OF WASTE THAT UTAH WILL BE RESPONSIBLE TO COVER.

ES continues to delay the covering of waste material. This request only lengthens the time the waste is uncovered. Originally, ES was to cover waste with a final cover within 5 years. They then committed to cover it in 10 years. Now this amendment will change it so that ES can leave waste open for up to 30 years. This is not acceptable for several reasons. First of all, it leaves the State of Utah at greater risk because there is more waste open that will need to be handled if ES goes out of business (which is more likely every year). Second the waste is open to many elements for too long; open to wind, rain, freeze thaw and other elements. This too brings more risk to the people in Utah. It is convenient for ES to leave waste open for decades, but just creates more risk for everyone else. It is possible that ES does not have the money to pay for the closure now so they are just trying to leave it open for decades and then have someone else be responsible to cover the waste.

4. NO REVIEW HAS BEEN DONE OF EARLY CELL CLOSURE FOR THIS NEW SUPERCELL. IF THE AMENDMENT WERE APPROVED, THEN UTAH COULD BE RESPONSIBLE FOR EARLY CELL CLOSURE WHICH WOULD COST OVER $35 MILLION EXTRA.

Once construction of the new supercell starts, there is no approved way to close the cell early if the company goes out of business. The only approved option would be to close the entire cell. This means that the State of Utah may need to bring in over 3,000,000 cubic yards of fill material to complete the cell. Fill material is costing over $12 per cubic yard. This means that the State of Utah is accepting an additional $35 million in cost. This money is not covered under the surety. ES does not have access to this amount of material right now and neither does the State of Utah. So costs would be much higher than $35 million. ES could not just dig material close to the cell for the fill material because it would change the groundwater flow and the surface water flow around the cell and affect the long term performance of the cell. No approval should be given until the early closure costs are accepted by ES and included in their surety.

5. PROPER STUDIES COULD NOT HAVE BEEN DONE ON THE NEW SUPERCELL BECAUSE THE PHASING OF WASTE PLACEMENT HAS NOT BEEN ESTABLISHED.

The phasing of waste placement has not been addressed in this amendment. This is not a normal requirement of the NuREGs, but needs to be addressed because of the unique approach that is being proposed. The idea of bridging two cells with waste over a 25 year period has not been done before. The cell will perform differently depending on how the waste is placed. If ES begins to put waste in the new section, then the old sections will be left open for too many years. If ES puts waste in the old sections, then the differential settlement becomes a much bigger issue because the time between the different waste columns is even longer. ES should be required to establish their plans for phasing waste placement in advance so it can be included in the analysis of the embankment. The proper analysis cannot have been done at this time because we do not know the phasing of the embankment. This problem is

exaggerated by the fact that ES does not have an idea of how much waste is coming in each year. If they do know, they should provide some idea so that the proper phasing can be done in the embankment. After proper information is provided then proper analysis can be done. After that the public should be allowed to comment on the proposal.

6. THERE IS NOT ENOUGH ROCK MATERIAL TO SUPPORT THE NEW DESIGN. UTAH MAY HAVE TO PAY TO HAUL ROCK FROM LONG DISTANCES TO COVER THE NEW EMBANKMENT.

The new design calls for more rock rip rap. In the past year, ES has tried to obtain rock from their new rock source. This rock source did not provide the type and amount of rock rip rap that they have suggested. Instead, the new rock source produces a large amount of sand and less than 1 inch material. The new design calls for more of larger rock which is limited in the ES rock source. ES has only reserved less than 200,000 cubic yards of bank run material for their rock materials. This would produce less than 100,000 cubic yards of material that is beneficial for rock cover. There is less than 1.5 million cubic yards of bank run material in the entire pit. This material is also being used by other companies. ES has not reserved close to enough material to finish the new cell, let alone the other cells that will need to be covered. ES does not have access to enough material to construct rock rip rap with the new design. If ES were to go out of business the State of Utah would required to build cover without having access to rock for its construction. That would mean tens of millions of extra costs that would have to be borne by the State of Utah and its citizens.

7. ENERGYSOLUTIONS HAS UNDERESTIMATED THE COSTS TO PRODUCE AND PLACE ROCK COVER FOR THE NEW SUPERCELL. THESE EXTRA COSTS WILL BE PAID BY THE STATE OF UTAH UNLESS A FINANCIAL REVIEW IS DONE BEFORE THE AMENDMENT IS APPROVED.

The cost for the rock rip rap material that is shown in the surety is not sufficient for the actual costs that will be incurred. A recent project by ES for rock production showed that the costs for rock production are significantly more expensive than previously shown in the surety. The rock material had to be handled several times before it was placed on the mixed waste cell. ES excavated the rock from the pit and had to use a dozer to loosen the material. ES found that there were large amounts of caliche in the rock source that will become more and more of a problem over time because they used the best material this time. The rock then was put through a screening process which is way more expensive than ES suggests in their surety. The screening revealed that there was a smaller amount of usable material than expected in the bank run material. The rock then had to be sorted again to get it to the right specifications. The rock then was picked up again and loaded into trucks and hauled again. Finally the rock was placed. The total cost per cubic yard for material is much higher than suggested in the surety. The State of Utah and its citizens are in danger of having to pay these extra costs, especially if the new design is approved with thicker rock in the cover design.

8. CHANNELING IN THE COVER HAS NOT BEEN STUDIED SUFFICIENTLY TO PROTECT THE STATE OF UTAH IF UTAH IS REQUIRED TO COVER THE WASTE

No studies have been done to examine the new designs effect on channeling in the cover. This is especially of concern because of the longer flow lines in both the top rock and the side slope rock and because ES original LARW cell has shown that there is significant differential settlement when waste is place at different times. A review of the LARW cell shows that

when waste is placed at different times there is differential settlement in the cover directly over the areas where waste is placed at different times. This creates channeling in the flow as water is placed on the embankment. The new CAW cell will have greater problems because the waste placed in the two existing cells is already settled. The time between that waste placement and the new waste placement is much longer. In fact, the older cells will have been in place for up to 15 years before new waste is placed next to it. This is sure to cause more channeling in the cover. This channeling will have more water flowing in it because of the longer flow lines. This issue needs to be investigated further.

9. THE FILTER ZONE WILL NOT PERFORM PROPERLY IN THE NEW SUPERCELL BECAUSE OF EXTREME SETTLEMENT IN THE AREA BETWEEN THE TWO EXISTING CELLS.

The attempt to build a higher cell will create a situation where the filter zones will not perform properly. The areas with waste placed later will settle more than the existing cells because the waste column is deeper and because the waste is being placed later. This will create a situation where the filter zone will have areas where the flow line in the filter may go up hill and at least will not have the proper slope that is required on the top of the embankment. This will create channeling and possible ponding on the top of the embankment. The LARW cell is an example of how this differential settlement will affect flow on the top of the embankment. This is not acceptable for proper long term cover construction.

10. ES HAS NOT ESTABLISHED THAT THE MAJOR CONSTRUCTION MATERIAL FOR THE CELL (CLAY) CAN HANDLE THE NEW SUPERCELL. IF THE CLAY FAILS THE ENTIRE CELL FAILS. THE SETTLEMENT BETWEEN THE NEW CELL AREA AND THE TWO CURRENT CELLS WILL CAUSE THE CLAY LINER AND THE CLAY COVER TO FAIL.

The clay used for construction is still an unknown. ES does not know if the clay that will be used can withstand the new type of construction. This is a great concern. The clay is the most important part of cell construction; it is used to contain the waste both on the bottom of the cell and the top of the cell. If it does not perform properly then the embankment will fail. With the new design it is very likely that the clay liner under the waste will fail. If the two licensed cells have been constructed for about 10 years before the clay liner between the two cells is constructed then the settlement will certainly create a failure between the new clay liner and the old clay liner. The settlement under the current cells is approximately 90% complete, probably settling over two feet. The new clay liner will now be constructed and then the new waste placed in this area. The waste column in the new area will be over 70 feet and should create settlement of the clay liner of about three feet. It seems unlikely to think that the new clay liner will settle just the right amount to tie in exactly with the old clay liner. There will be a break between the new and old clay liners. This is not a good situation and should not be allowed. There is no reason that this risk should be taken.

11. THE TWO FOOT CLAY COVER IS NOT SUFFICIENT IF THE NEW SUPERCELL IS APPROVED. THERE IS LITTLE ROOM FOR ERROR WHEN THERE IS ONLY A TWO FOOT COVER.

In an attempt to save money, ES has decided to only put 2 feet of clay cover over the waste. This is an extremely risky proposal. Even though studies show that the 2 foot cover may be sufficient to hold in the radioactive material that only works if the 2 foot cover stays intact.

There are many ways the clay cover could be compromised including through frost, erosion, cracking, stress, tension and penetration by animals and roots. It is much better to have extra amounts of clay cover to overprotect the waste in case any of these natural processes happen to the embankment. ES is proposing a new way to construct the clay cover where differential settlement is sure to increase. The expected settlement in some areas will be over 3 feet, which is more than the depth of the cover. Just as with the clay liner it is hard to get any settlement to happen at the same rate in an old embankment and a new embankment that are tied together. Therefore, it is very likely that the clay cover will fail due to cracks and differential settlement.

12. THE PROPOSED AMENDMENT IS IN CONTRADICTION TO THE HUNTSMAN AND ES AGREEMENT.

EnergySolutions signed an agreement with Governor Huntsman several years ago. This proposal is not in accordance with that agreement. The agreement was based on certain types of waste coming into the state. Instead this proposal allows for much hotter waste to come into the state by changing the waste accepted from 11 e2 waste to low level wastes. The governor's agreement was also based on a specific configuration of the waste and not expanding the height of the waste to such extreme elevations.

One of the main reasons that the Governor of Utah signed an agreement in 2007 was to get EnergySolutions to withdraw its amendment to build a "supercell". The Governor agreed on several concessions based on ES promise not to build the larger cell. Now 5 years later ES is asking for a new "supercell" that is almost identical to the one they promised not to build. ES has committed to not build a combined Class A Cell. Now they want to build and combined Class A cell and just change the name. This is in direct violation of the current agreement.

The current request is not in accordance with the 2007 agreement. The 2007 agreement allows ES to build the existing low level cells that were licensed as of March of 2006. That would be the Class A cell and the Class A north cell. The agreement also allowed ES to convert a portion of the11 e.(2) cell into low level waste volume. It does not allow the Class A cell and the Class A north cell to be combined and the height increased. In fact, this is the main reason the Governor made the agreement was to stop the combination of the two cells. ES should not be given this amendment because it is not in accordance with the 2007 agreement with Governor Huntsman. The State of Utah and its citizens should not be the ones that take all the risk so that ES can bring in more waste and leave it uncovered for decades.

# APPENDIX D
# AMENDED LICENSE RML NO. UT 23000249
# RESULTING FROM PUBLIC COMMENTS

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DRC-03
October 1989

# LICENSE AMENDMENT

## UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
## DIVISION OF RADIATION CONTROL
## RADIOACTIVE MATERIAL LICENSE

Pursuant to Utah Code Ann. Title 19, Chapter 3 and the Radiation Control Rules, Utah Administrative Code R313, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material designated below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This licensee is subject to all applicable rules, and orders now or hereafter in effect and to any conditions specified below.

**********

LICENSEE

1. Name: EnergySolutions, LLC (EnergySolutions)

2. Address: 423 West 300 South
Suite 200
Salt Lake City, UT 84101

3. License Number UT 2300249
Amendment # ~~13~~14

4. Expiration Date
January 25, 2013

License Category – 4-a

**********

| 6. | Radioactive material (element and mass number) | 7. | Chemical and/or physical form | 8. | Maximum quantity licensee may possess at any one time |
|---|---|---|---|---|---|
| A. | Any Radioactive Material including Special Nuclear Material specified in License Condition 13 A through J. | A. | Notwithstanding Conditions 9 (Authorized Use), 16 (Prohibitions and Waste Requirements), and 56 (containerized waste), typically large volume, bulky or containerized, soil or debris. Debris can include both decommissioning (cleanup) and routinely generated operational waste including but not limited to radiologically contaminated paper, piping, rocks, glass, metal, concrete, wood, bricks, resins, sludge, tailings, slag, residues, personal protective equipment (PPE) that conforms to the size limitations in currently approved QA/QC Manual. | A. | 20,000 Curies*** |

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| 6. | Radioactive material (element and mass number) | 7. | Chemical and/or physical form | 8. | Maximum quantity licensee may possess at any one time |
|---|---|---|---|---|---|
| B. | Special Nuclear Material | B. | See 7.A of this license | B. | As specified in License Condition 13.A through J. (1,000 Ci) total except as specified by Condition 15 |
| C. | Cesium-137 | C. | Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation | C. | Not to exceed 11 millicuries per source; Not to exceed 6 sources total |
| D. | Americium-241 | D. | Sealed Neutron Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation | D. | Not to exceed 51 millicuries per source; Not to exceed 6 sources total. |
| E. | Americium-241<br>Americium-243<br>Neptunium-237<br>Plutonium-236<br>Plutonium-239<br>Plutonium-242<br>Thorium-229<br>Thorium-230<br>Uranium-232<br>Uranium-238<br>Curium-244<br>Hydrogen-3<br>Carbon-14<br>Iron-55<br>Nickel-59<br>Nickel-63<br>Technetium-99 | E. | Liquid | E. | Not to exceed 5 microcuries total activity per isotope; Not to exceed 16 sources total. |
| F. | Strontium-90/Yttrium-90 | F. | Liquid | F. | Not to exceed 5 microcuries total activity |

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| 6. | Radioactive material (element and mass number) | 7. | Chemical and/or physical form | 8. | Maximum quantity licensee may possess at any one time |
|---|---|---|---|---|---|
| G. | Americium-241 | G. | Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation | G. | Not to exceed 5 microcuries total activity |
| H. | Thorium-230 | H. | Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation | H. | Not to exceed 48.6 microcuries total activity |
| I. | Plutonium-239 | I. | Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation | I. | Not to exceed 21.9 microcuries total activity |
| J. | Strontium-90/Yttrium-90 and Americium-241 | J. | Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation | J. | Not to exceed 8.1 millicuries per source; Not to exceed 6 sources total. |
| K. | Am-241, Cd-109, Co-57, Te-123m, Cr-51, Sn-113, Sr-85, Cs-137, Co-60, Y-88, Th-230, Na-22, Mn-54, Eu-155 and Pb-210 | K. | Calibration or Reference Source(s) | K. | Not to exceed 5 microcuries per isotope; Not to exceed 25 sources total. |
| L. | Uranium-234, Uranium-235, Uranium-238, Americium-241, and Plutonium-239 | L. | Calibration or Reference Source(s) | L. | Not to exceed 20 nanocuries per isotope |
| M. | Cobalt-60 and Cesium-137 | M. | Calibration or Reference Combined Source(s) | M. | Not to exceed 0.4 microcuries per source; Not to exceed 6 sources total. |
| N. | Reserved | N. | Reserved | N. | Reserved |
| O. | Americium-241 and Europium-152 | O. | Calibration or Reference Combined Sources | O. | Not to exceed 2 microcuries per source; Not to exceed 4 sources total. |
| P. | Cesium-137 | P. | Sealed Source(s) registered pursuant to R313-22-210 or an | P. | Not to exceed 12 millicuries per |

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| 6. | Radioactive material (element and mass number) | 7. | Chemical and/or physical form | 8. | Maximum quantity licensee may possess at any one time |
|---|---|---|---|---|---|
| | | | equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation | | source; Not to exceed 3 sources total. |

***Applies to undisposed maximum quantity at the Class A West disposal cell and the Mixed Waste landfill cell.
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~~**~~

9. AUTHORIZED USE

A. Licensee may receive, store, and dispose by land burial, radioactive material as naturally occurring and accelerator produced material (NARM) and low-level radioactive waste. Prior to receiving an initial, low-level radioactive waste shipment for disposal from a generator, the Licensee shall obtain documentation which demonstrates that the low-level radioactive wastes have been approved for export to the Licensee. Approval is required from the low-level radioactive waste compact of origin (including the Northwest Compact), or for states unaffiliated with a low-level radioactive waste compact, the state of origin, to the extent a state can exercise such approval.

B. In accordance with Utah Code Annotated 19-3-105, the Licensee may not receive Class B or Class C low-level radioactive waste without first receiving approval from the ~~Executive Secretary~~Director of the Utah Division of Radiation Control (Director) ~~Board~~ and also receiving approval from the Governor and the Legislature.

C. The Licensee shall fulfill and maintain compliance with all conditions and shall meet all compliance schedules stipulated in the Ground Water Quality Discharge Permit, number UGW 450005 (hereafter GWQ Permit), issued by the ~~Executive Secretary~~Director of the Utah Division of Radiation Control ~~Water Quality Board~~.

D. The Licensee may receive and store up to twenty (20) empty radioactive waste transportation casks under the following conditions:

- The casks are dedicated to the transportation of low level radioactive wastes.
- Storage of the casks is confined to the Restricted Area within the area specified in License Condition 10, except when staged for return to commerce within 7 days.
- Internal contamination is kept minimal as practical but will not exceed the contamination limits specified for Department of Transportation, Class 7 Hazardous Material, Radioactive Material, Excepted Package-Empty Packaging, UN2908.
- During storage, casks are to be secured in accordance with their Department of

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Transportation or Nuclear Regulatory Commission approved design specifications.

E. The Licensee may dispose of a volume of Class A Low-Level Radioactive Waste (LLRW) and Naturally Occurring and Accelerator Produced Radioactive Materials (NARM) in the Class A West disposal cell described in License Condition 40 not exceeding ~~8,742,097~~ 8,724,097 cubic yards, and in the Mixed Waste Landfill Cell not exceeding ~~1,353,004~~ 1,354,092 cubic yards. Together, the total aggregate volume of waste disposed of in the Class A West disposal cell and the Mixed Waste Landfill Cell shall not exceed 10.08 million cubic yards. Class A waste LLRW is defined in Utah Radiation Control Rule R313-15-1009 and NARM at R313-12-3.

F. Effective January 1, 2002, the Licensee shall not accept, possess, store or dispose of any radioactive waste delivered to the disposal site by any conveyance, unless the associated Shipping Documents have a valid Generator Site Access Permit number, issued by the Utah Division of Radiation Control, affixed.

G. The Licensee may receive and treat radioactively contaminated aqueous liquids and liquid mercury as characterized in the waste profile at the mixed waste facilities only, the waste must be Class A LLRW at receipt. Treated aqueous liquids may be disposed at the Mixed Waste Facility or the LLRW Facility, in accordance with Exhibit 3 of the Waste Characterization Plan. Treated (amalgamated) liquid mercury shall be disposed at the Mixed Waste Facility only.

H. Reserved

I. Licensed material in Items 6.C and 6.D, sealed source(s) contained in compatible portable gauging devices (registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation) for measuring properties of materials.

J. Licensed material in Items 6.E through 6.O, for operational checks and efficiency determinations of radiation detection instrumentation.

K. Reserved

L. Licensed material in Item 6.P, sealed source(s) contained in MGP Instruments, Inc. Model IRD-2000 dosimeter calibrators/irradiators for tests and source checks of electronic dosimeters.

**SITE LOCATION**

10. A. The Licensee may receive, store and dispose of licensed material at the Licensee's facility located in Section 32 of Township 1 South and Range 11 West, Tooele County, Utah.

B. Section 32, Township 1 South and Range 11 West, Tooele County, Utah, is defined by the following

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points of reference:

| | |
|---|---|
| Southwest Section Corner: | Latitude 40° 40' 51.890" N<br>Longitude 113° 7' 28.580" W |
| Elevation | 4269.76 feet above mean sea level (amsl) |
| Southeast Section Corner | Latitude 40° 40' 51.879" N<br>Longitude 113° 6' 20.011" W |
| Elevation | 4277.27 feet-amsl |
| Northwest Section Corner | Latitude 40° 41' 44.098" N<br>Longitude 113° 7' 28.654" W |
| Elevation | 4273.06 feet-amsl |
| Northeast Section Corner | Latitude 40° 41' 44.086" N<br>Longitude 113° 6' 20.109" W |
| Elevation | 4280.83 feet-amsl |

C. The Southwest Section Corner marker of Section 32 shall be the Point of Beginning (POB).

D. The Licensee shall cause a survey to be conducted by a Utah licensed land surveyor to identify the section corners of Section 32, Township 1 South, and Range 11 West, Tooele County, Utah (as defined in Condition 10.B). Licensee shall place monuments with brass caps at the identified section corner locations. Monuments shall be permanent and constructed in a manner that will protect them from being disturbed.

E. Authorized Use of Sealed Sources
   i. Licensed material in Items 6.C and 6.D used as authorized in 9.I, and licensed materials in Items 6.E through 6.P used as authorized in 9.J and identified as sealed sources may be used and stored on all property owned by the Licensee at their Clive facility. The property is located in Sections 29, 32 and in parts of Sections 28 and 33 in Township 1 South, Range 11 West and parts of Sections 4, 5 and 6 in Township 2 South, Range 11 West SLBM, Tooele County, Utah.
   ii. Licensed material not authorized for use specified in License Conditions 9.I and 9.J or not defined as sealed sources in License Condition 9.J shall be used and stored only at the Licensee's facilities referenced in Condition 10.B.

11. The open cell area within the Class A West ~~and Class A North~~ disposal embankments, where waste disposal/placement has occurred or may occur, but the cover system has not been completed shall be limited to 3,650,000 square feet. Uncovered radioactive waste shall be limited to a surface area of 1,020,000 square feet.

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12. Pursuant to UAC R313-12-55(1), the Licensee is granted an exemption to UAC R313-25-9, as it relates to land ownership and assumption of ownership.

**SPECIAL NUCLEAR MATERIAL**

13 In accordance with the Order issued by the U.S. Nuclear Regulatory Commission dated January 14, 2003, Docket No. 040-8989, License No. SMC-1559, EnergySolutions may possess Special Nuclear Material (SNM) within the restricted area of the EnergySolutions facility as described in Condition 10 provided that:

A. Concentrations of SNM in individual waste containers must not exceed the values listed in Table 13-A at time of receipt:

Table 13-A

| Column 1 Radionuclide | Column 2 Maximum Concentration (pCi/g) | Column 3 Measurement Uncertainty (pCi/g) |
|---|---|---|
| U-235[a] | 1,900 | 285 |
| U-235[b] | 1,190 | 179 |
| U-235[c] | 26 | 10 |
| U-235[d] | 680 | 102 |
| U-233 | 75,000 | 11,250 |
| Pu-236 | 500 | 75 |
| Pu-238 | 10,000 | 1,500 |
| Pu-239 | 10,000 | 1,500 |
| Pu-240 | 10,000 | 1,500 |
| Pu-241 | 350,000 | 50,000 |
| Pu-242 | 10,000 | 1,500 |
| Pu-243 | 500 | 75 |
| Pu-244 | 500 | 75 |

a - for uranium below 10 percent enrichment and a maximum of 20 percent of the weight of the waste of materials listed in License Condition 13.B

b - for uranium at or above 10 percent enrichment and a maximum of 20 percent of the weight of the waste of materials listed in License Condition 13.B

c - for uranium at any enrichment with unlimited quantities of materials listed in License Condition

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13.B and License Condition 13.C

d - for uranium at any enrichment with sum of materials listed in License Condition 13.B and License Condition 13.C not exceeding 45 percent of the weight of the waste

* The measurement uncertainty values in Column 3 above represent the maximum one-sigma uncertainty associated with the measurement of the concentration of the particular radionuclide.

The SNM must be homogeneously distributed throughout the waste. If the SNM is not homogeneously distributed, then the limiting concentrations must not be exceeded on average in any contiguous mass of 600 kilograms.

B. Except as allowed by notes a, b, c, and d in Condition 13.A, waste must not contain "pure forms" of chemicals containing carbon, fluorine, magnesium, or bismuth in bulk quantities (e.g., a pallet of drums, a B-25 box). By "pure forms," it is meant that mixtures of the above elements such as magnesium oxide, magnesium carbonate, magnesium fluoride, bismuth oxide, etc. do not contain other elements. These chemicals would be added to the waste stream during processing, such as at fuel facilities or treatment such as at mixed waste treatment facilities. The presence of the above materials will be determined by the generator, based on process knowledge or testing.

C. Except as allowed by notes c and d in Condition 13.A, waste accepted must not contain total quantities of beryllium, hydrogenous material enriched in deuterium, or graphite above one percent of the total weight of the waste. The presence of the above materials will be determined by the generator, based on process knowledge, physical observations, or testing.

D. Waste packages must not contain highly water soluble forms of uranium greater than 350 grams of uranium-235 or 200 grams of uranium-233. The sum of the fractions rule will apply for mixtures of U-233 and U-235. Highly soluble forms of uranium include, but are not limited to: uranium sulfate, uranyl acetate, uranyl chloride, uranyl formate, uranyl fluoride, uranyl nitrate, uranyl potassium carbonate, and uranyl sulfate. The presence of the above materials will be determined by the generator, based on process knowledge or testing.

E. Mixed waste processing of waste containing SNM will be limited to stabilization (mixing waste with reagents), micro-encapsulation, macro-encapsulation using low-density and high density polyethylene, macroencapsulation using cementatious mix (Macro Mix), and thermal desorption.

When waste is processed using the thermal desorption process, EnergySolutions shall confirm the SNM concentration following processing and prior to returning the waste to temporary storage.
Liquid waste may be stabilized provided the SNM concentration does not exceed the SNM concentration limits in License Condition 13.A. For containers of liquid waste with more than 600 kilograms of waste, the total activity (pCi) of SNM shall not exceed the SNM concentration in License Condition 13.A times 600 kilograms of waste. Waste containing free liquids and the solids shall be

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mixed prior to treatment. Any solids shall be maintained in a suspended state during transfer and treatment.

F. EnergySolutions shall require generators to provide the following information for each waste stream:

Before Receipt

1. Waste Description. The description must detail how the waste was generated, list the physical forms in the waste, and identify uranium chemical composition.
2. Waste Characterization Summary. The data must include a general description of how the waste was characterized (including the volumetric extent of the waste, and the number, location, type, and results of any analytical testing), the range of SNM concentration ranges, and the analytical results with error values used to develop the concentration ranges.
3. Uniformity Description. A description of the process by which the waste was generated showing that the spatial distribution of SNM must be uniform, or other information supporting spatial distribution.
4. Manifest Concentration. The generator must describe the methods to be used to determine the concentrations on the manifests. These methods could include direct measurement and the use of scaling factors. The generator must describe the uncertainty associated with sampling and testing used to obtain the manifest concentrations.

EnergySolutions shall review the above information and, if adequate, approve in writing this pre-shipment waste characterization and assurance plan before permitting the shipment of a waste stream. This will include statements that EnergySolutions has a written copy of all the information required above, that the characterization information is adequate and consistent with the waste description, and that the information is sufficient to demonstrate compliance with Conditions 13.F.1 through 13.F.4. Where generator process knowledge is used to demonstrate compliance with Conditions 13.A, 13.B, 13.C, or 13.D, EnergySolutions shall review this information and determine when testing is required to provide additional information in assuring compliance with the conditions. EnergySolutions shall retain this information as required by the State of Utah to permit independent review.

At Receipt

EnergySolutions shall require generators of SNM waste to provide a written certification with each waste manifest that states the SNM concentrations reported on the manifest do not exceed the limits in Condition 13.A, that the measurement uncertainty does not exceed the uncertainty value in Condition 13.A, and that the waste meets Conditions 13.B through 13.D.

G. Sampling and radiological testing of waste containing SNM must be performed in accordance with the following: One sample for each of the first ten shipments of a waste stream; or one sample for each of the first 100 cubic yards of waste up to 1,000 cubic yards of a waste stream; and one sample for each additional 500 cubic yards of waste following the first ten shipments or following the first 1,000 cubic yards of a waste stream. Sampling and radiological testing of debris waste containing SNM can be

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waived if the SNM concentration is lower than one tenth of the applicable limit in License Condition 13.A.

H. EnergySolutions shall notify the NRC, Region IV office within 24 hours if any of the above conditions are violated, including if a batch during a treatment process exceeds the SNM concentration in License Condition 13.A. A written notification of the event must be provided within 7 days.

I. EnergySolutions shall obtain NRC approval prior to changing any activities associated with the above conditions.

J. Notwithstanding License Condition13.A through 13.I, for the Containerized Waste Facility described in License Condition 40, the following limits for possession of SNM apply to the total combined quantities of SNM at the Containerized Waste Facility:

Consistent with the definition of special nuclear material given in UAC R313-12-3, the maximum quantity of special nuclear material which the EnergySolutions may possess at any one time, shall not exceed: 350 grams of U-235, 200 grams of U-233, and 200 grams Pu, or any combination of them in accordance with the following formula:

$$\frac{(\text{Grams U-235})}{350} + \frac{(\text{Grams U-233})}{200} + \frac{(\text{Grams Pu})}{200} \leq 1$$

"Possession" and "Disposal" are defined in License Conditions 63 and 64 respectively.

**MIXED WASTE**

14. A. The Licensee may receive for treatment, storage, and disposal any radioactive waste as authorized by this license that is also determined to be hazardous (commonly referred to as mixed waste) as permitted by the "Hazardous Waste Plan Approvals" issued and modified by the ~~Executive Secretary~~Director, of the Utah Division of Solid and Hazardous Waste ~~Control Board~~ and "HSWA Permit" issued by the U.S. Environmental Protection Agency.

B. The Licensee may dispose of treated mixed waste in the Class A West ~~North or the Class A~~ disposal cells if it meets the criteria described in Exhibit 3 of the Waste Characterization Plan.

C. All other mixed wastes shall be disposed in the Mixed Waste Landfill Cell only.

**WASTE TREATMENT AND PROCESSING**

15. A. Prior to receipt of any low level radioactive or mixed wastes requiring treatment before disposal, the Licensee shall, based on knowledge of the technology to be used for treatment/processing of each particular radioactive or mixed waste, calculate and document that the resultant processed waste is neither Class B nor Class C waste.

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C. Following treatment at the Mixed Waste facility the Licensee shall classify the resultant processed waste in accordance with UAC R313-15-1009.

D. The Licensee shall manifest treated waste from the Mixed Waste facility for disposal in accordance with UAC R313-15-1006.

**PROHIBITIONS AND WASTE ACCEPTANCE REQUIREMENTS**

16. A. Sealed sources as defined in Utah Administrative Code (UAC) R313-12 shall not be accepted for disposal.

B. In accordance with UAC R313-15-1009(2)(a)(v), waste shall not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.

C. In accordance with UAC R313-15-1009(2)(a)(vi), waste shall not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.

D. In accordance with UAC R313-15-1009(2)(a)(vii), waste shall not be pyrophoric.

E. Waste containing untreated biological, pathogenic, or infectious material including radiologically contaminated laboratory research animals is prohibited

F. Liquid Waste Restrictions

i. Except for liquid mercury and minimal quantities as described in Condition 17 and in the Waste Characterization Plan, receipt of non-aqueous liquid waste is prohibited unless specifically approved by the ~~Executive Secretary~~Director.

ii. Treated liquid radioactive waste shall be disposed at the Mixed Waste Facility or the LLRW Facilities in accordance with Exhibit 3 of the Waste Characterization Plan.

iii. Only Utah Division of Radiation Control approved solidification or absorption agents as listed in the State-issued Part B Permit are authorized for liquid waste treatment.

iv. Liquid radioactive waste shall be solidified or absorbed in a manner such that no liquid component is disposed.

v. Only containers authorized by the U. S. Department of Transportation as specified in the regulations (49 CFR parts 100 thru 180) for transporting liquid radioactive materials shall be accepted for all liquid radioactive wastes, regardless of radioactivity concentrations.

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G. In accordance with UAC R313-15-1009(2)(a)(viii), gaseous waste received for disposal in the Containerized Waste Facility shall be packaged at an absolute pressure that does not exceed 1.5 atmospheres at a temperature of 20 degrees Celsius and the total activity of any container shall not exceed 100 curies ($3.7 \times 10^{12}$ Bequerels).

H. In accordance with UAC R313-15-1009(2)(a)(ii), waste received for disposal in the Containerized Waste Facility shall not be packaged in cardboard or fiberboard containers.

I. The Licensee shall not accept for disposal any neutron source (e.g., polonium-210, americium-241, radium-226 in combination with beryllium or other target).

J. Incinerator ash shall be treated, in preparation for disposal, in a manner that renders it non-dispersible in air.

K. Radioactive waste containing chelating agents greater than 0.1 percent by weight shall be disposed of in the Mixed Waste Landfill Cell.

L. The Licensee shall not accept containerized radioactive waste unless each waste package has been:
   i. Classified in accordance with R313-15-1009, "Classification and Characteristics of Low-Level Radioactive Waste." In addition, the Licensee shall require that all radioactive waste received for disposal meet the requirements specified in the Nuclear Regulatory Commission, "Branch Technical Position on Concentration Averaging and Encapsulation", as amended.
   ii. Marked as either Class A Stable or Class A Unstable as defined in the most recent version of the "Low-Level Waste Licensing Branch Technical Position on Radioactive Waste Classification." originally issued May, 1983 by the U.S. Nuclear Regulatory Commission.
   iii. Marked with a unique package identification number, clearly visible on the package, that can be correlated with the manifest for the waste shipment in which the package arrives at the facility.

M. The Licensee may accept containerized Class A LLRW in the following waste packages for disposal in the Containerized Waste Facility of the Class A West ~~or Class A North~~ disposal cell:
   i. DOT "strong, tight" containers in accordance with 49 CFR 173 and meeting the following void space criteria: void spaces within the waste and between the waste and its packaging shall be reduced to the extent practicable, but in no case shall less than 85 percent of the capacity of the container be filled.
   ii. High-Integrity Containers (HICs) exceeding the void space criteria provided in License Condition 16.M.i, shall be approved by the ~~Executive Secretary~~Director.
   iii. DOT "strong, tight" containers in accordance with 49 CFR 173 exceeding the void space criteria provided in License Condition 16.M.i and large components shall be placed as approved by the ~~Executive Secretary~~Director.
   iv. Oversized DOT containers (larger than 215 cubic feet) meeting the void space criteria provided in License Condition 16.M.i shall be placed in accordance with the currently approved LLRW

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**MANAGEMENT OF FREE LIQUIDS**

17. A. In accordance with UAC R313-15-1009(2)(a)(iv), solid waste received for disposal shall contain as little free standing and non-corrosive liquid as reasonably achievable, but shall contain no more free liquids than one percent of the volume of the waste.

    B. Solid waste received and containing unexpected aqueous free liquid in excess of 1% by volume shall have the liquid removed and placed in the evaporation ponds or the liquid solidified prior to management.

    C. Unexpected non-aqueous free liquids less than 1% of the volume of the waste within the container shall be solidified prior to disposal.

    D. Should shipment(s) arrive with greater than 1% unexpected free liquids (total of aqueous and non-aqueous), the Licensee shall notify the Division of Radiation Control within 24 hours that the shipment(s) failed the requirements for acceptance and manage in accordance with the Waste Characterization Plan.

**RADIATION SAFETY**

18. The Licensee shall comply with the provisions of UAC R313-18, "Notices, Instructions and Reports to Workers by Licensees or Registrants—Inspections"; and UAC R313-15, "Standards for Protection Against Radiation."

19. The Licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of UAC R313-19-100, "Transportation."

20. Written procedures incorporating operating instructions and appropriate safety precautions for licensed activities shall be maintained and available at the location specified in License Condition 10.A. The written procedures established shall include the activities of the radiation safety and environmental monitoring programs, the employee training program, operational procedures, analytical procedures, and instrument calibration. At least annually, the Licensee shall review all procedures to determine their continued applicability.

21. The Licensee's Director of Health Physics shall review and approve written procedures as stated in License Condition 20 and subsequent changes to the procedures related to waste disposal operations.

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**ROUTINE MONITORING AND CONTAMINATION SURVEYS FOR NEW LICENSEES:**

22. The Licensee shall conduct contamination surveys in accordance with Table 22-A:

**TABLE 22-A**

| Type | Location | Frequency |
|---|---|---|
| A. Gamma Radiation Levels | 1. Perimeter of Restricted Area(s) | 1. Weekly |
| | 2. Office Area (s) | 2. Weekly |
| | 3. Lunch/Change Area(s) | 3. Weekly |
| | 4. Transport Vehicles | 4. Upon vehicle arrival at site and before departure. |
| | 5. Mixed Waste Facility | 5. Weekly |
| | 6. Decontamination facilities | 6. Weekly |
| B. Contamination Wipes | 1. Eating Area(s)<br>2. Change Area(s) | 1. Weekly<br>2. Weekly |
| | 3. Office Areas(s) | 3. Weekly |
| | 4. Railcar rollover and control shack | 4. Weekly |
| | 5. Equipment/Vehicles | 5. Once before release |
| | 6. Decontamination facilities | 6. Weekly |
| | 7. Mixed Waste Facility | 7. Weekly |
| | 8. Shredder Facility and control room | 8. Weekly |
| | 9. Rotary Dump and control room | 9. Weekly |
| C. Employee/Personnel | 1. Skin & Personal clothing | 1. Prior to exiting restricted area |
| D. Gamma Exposure | 1. Administration Bldg.(s) | 1. Quarterly |
| E. Radon Concentration | 1. Administration Bldg.(s) | 1. Quarterly |

23. The Licensee shall determine internal exposure of employees under its bioassay program, in accordance with UAC R313-15-204.

24. The Licensee shall implement a respiratory protection program that is in accordance with UAC R313-15-703.

25. The Licensee shall calibrate air sampling equipment at intervals not to exceed six months.

26. The operational environmental monitoring program shall be conducted in accordance with the Environmental Monitoring Plan (dated January 5, 2012, or the most recent approved amendment to that plan ~~September 30, 2010~~).

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27. Vehicles, containers, facilities, materials, equipment or other items for unrestricted use shall not be released from the Licensee's control if contamination exceeds the limits found in Table 27-A. Except as provided in 49 CFR 173.443(d), conveyances used for commercial transport of radioactive waste or materials, may not be returned to service until the radiation dose rate at each accessible surface is 0.005 mSv per hour (0.5mrem per hour) or less, and there is no surface removable (non-fixed) radioactive surface contamination as specified in paragraph (a) of 49 CFR 173.443.

**TABLE 27-A**

| Nuclide[a] | Column 1 Average [b,c,f] | Column 2 Maximum [b,d,f] | Column 3 Removable [b,e,f] |
|---|---|---|---|
| U-nat, U-235, U-238, and associated decay products | 5,000 dpm alpha/ $100cm^2$ | 15,000 dpm alpha/ $100cm^2$ | 1,000 dpm alpha/ $100cm^2$ |
| Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129 | 100 dpm/$100cm^2$ | 300 dpm/$100cm^2$ | 20 dpm/$100cm^2$ |
| Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133 | 1,000 dpm/$100cm^2$ | 3,000 dpm/$100cm^2$ | 200 dpm/$100cm^2$ |
| Beta-gamma emitters (nuclides with decay modes other than alpha emissions or spontaneous fission) except Sr-90 and other noted above. | 5,000 dpm beta, gamma/$100cm^2$ | 15,000 dpm beta-gamma/$100cm^2$ | 1,000 dpm beta-gamma/$100cm^2$ |

a. Where surface contamination on both alpha-and beta-gamma emitting nuclides exists, the limits established for alpha-and beta-gamma emitting nuclides should apply independently.
b. As used in this table, dpm (disintegration's per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
c. Measurements of average contamination should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.
d. The maximum contamination level applies to an area of not more than 100 $cm^2$.
e. The amount of removable radioactive material per 100 $cm^2$ of surface area should be determined by wiping the area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
f. The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters shall not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

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28. The Licensee shall submit the following to the ~~Executive Secretary~~Director for review and approval pending resolution of all issues as judged by the ~~Executive Secretary~~Director:
    A. The Licensee shall submit a corrective action plan for the Cover Test Cell for ~~Executive Secretary~~Director approval by no later than July 23, 2008. The corrective action plan shall identify all means necessary to collect valid data to verify actual performance of the cover system. Said plan shall include Cover Test Cell design, construction, instrumentation, monitoring, reporting, and comparison of actual performance to projected performance. The Cover Test Cell corrective action plan shall include:
        i. Performance goals to meet the objective of verifying modeled cover system performance.
        ii. Methodologies and plans that provide quantitative and qualitative results capable of satisfying the objective.
        iii. Design, construction, and operational plans to implement the methodologies and plans.
        iv. Quality control and quality assurance requirements of work to be performed. Quality control and quality assurance specifications and procedures shall state specific actions and processes the Licensee will use to ensure compliance with designs and specifications, monitoring, reporting, ensure data validity, timely detect data deficiencies, enhance accuracy of data interpretation, and ensure correctness of results prior to being submitted to the Division.
        v. In the event that the plan results in new instrumentation or construction, the Licensee shall complete all such activities within 30-days of ~~Executive Secretary~~Director approval. Within 30-days of completion of said construction, the Licensee shall submit an As-Built report for ~~Executive Secretary~~Director approval.

    B. The Licensee shall submit an annual report for ~~Executive Secretary~~Director approval by March 1 of each calendar year. This annual report shall detail the Licensee's progress in implementing the corrective action plan, provide the data collected in the past year, analyze the data, and interpret the meaning of the data relative to the overall objective of the corrective action plan.

**REPORTING**

29. The Licensee shall submit the following reports to the ~~Executive Secretary~~Director:

    A. Quarterly results from the Environmental Monitoring Program ~~(Env. Monitoring Plan~~, as amended~~)~~. The report(s) shall be submitted within 90 days after the expiration of each calendar quarter. Calendar Quarter shall mean:

| | |
|---|---|
| First Quarter | January, February, and March |
| Second Quarter | April, May, and June |
| Third Quarter | July, August, and September |
| Fourth Quarter | October, November, and December |

    B. A quarterly summary report detailing the radioisotopes, activities, weighted average concentrations, volume, and tonnage for waste received during the calendar quarter. The report of volume (cubic feet and cubic yards) and tonnage (tons) shall be partitioned according to waste type: Low Level

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Radioactive Waste (LLRW), LLRW with PCBs, Mixed Waste (MW), MW with PCBs, MW Treatment, NORM, Containerized Class A, uranium/thorium mill tailings (i.e. 11e.(2) wastes), and waste generated prior to congress passing the Uranium Mill Tailings Radiation Control Act in 1978. The report(s) shall be submitted within 30 days after the expiration of each calendar quarter. Calendar Quarter shall mean:

| | |
|---|---|
| First Quarter | January, February, and March |
| Second Quarter | April, May, and June |
| Third Quarter | July, August, and September |
| Fourth Quarter | October, November, and December |

C. Reserved

D. For the Mixed Waste Landfill Cell, the Licensee shall ensure that the maximum acceptable activities, used as source terms in the groundwater performance modeling are not exceeded after facility closure. Therefore, the Licensee shall notify the ~~Executive Secretary~~Director, at the earliest knowledge, that the following nuclides are scheduled for disposal: berkelium-247 and chlorine-36.

E. For the Class A West ~~and Class A North~~ disposal cell~~s~~, the Licensee shall ensure that the maximum acceptable activities used as source terms in the groundwater performance modeling are not exceeded after facility closure. Therefore, the Licensee shall notify the ~~Executive Secretary~~Director, at the earliest knowledge, that the following nuclides are scheduled for disposal: ~~aluminum-26,~~ berkelium-247, calcium-41, ~~californium-250,~~ chlorine-36, iodine-129, rhenium-187, ~~terbium-157, and terbium-158~~ and Technetium-99.

F. An annual report shall be submitted by March 31st and shall report the cumulative void space (expressed as a percent of waste volume) disposed of in the Containerized Waste Facility for the previous year.

30. Except as provided by this condition, the Licensee shall maintain the results of sampling, analyses, surveys, and instrument calibration, reports on inspections, and audits, employee training records as well as any related review, investigations and corrective actions, for five (5) years. The Licensee shall maintain personnel exposure records in accordance with UAC R313-15-201.

**STAFFING/QUALIFICATIONS**

31. Radiation Safety operations for bulk, containerized and mixed waste, portable gauging device(s), radioactive source(s), and dosimeter calibrator(s)/irradiator(s) shall be conducted by or under the supervision of Rick Chalk, Director of Health Physics.

32. A. The Licensee's staff shall meet the qualifications as described in Appendix I (November 7, 2011, rev 23).

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B. Licensed material in License Conditions 6.C and 6.D. shall be used by, or under the supervision and in the physical presence of, the Director of Health Physics or individuals who have been trained in the Licensee's standard operating and emergency procedures and have satisfactorily completed at least one of the following:
   i. The device manufacturer's training course for safe use and handling of portable gauging devices containing licensed material; or
   ii. A portable gauge training program conducted in accordance with the provisions of a specific license issued by the ~~Executive Secretary~~Director, an Agreement State or the U.S. Nuclear Regulatory Commission.

C. Licensed material in License Conditions 6.E through 6.P shall be used by, or under the supervision of, the Director of Health Physics, or individuals designated in writing by the Director of Health Physics.

D. The Licensee shall maintain the organizational independence of the programs that monitor and enforce employee safety, environmental protection, and public safety from programs responsible for production and profitability and other influences or priorities that might compromise quality and radiation safety.

E. The Licensee shall establish a method for any employee or contractor to anonymously submit questions, concerns, ideas, or other comments regarding employee safety, environmental protection, and public safety to the Director of Health Physics. The method shall include documentation of all comments submitted, the Applicant's response to each comment, and a method for communicating the Licensee's response to employees and contractors.

**CONSTRUCTION ACTIVITIES**

33. The Licensee shall obtain prior written approval from the ~~Executive Secretary~~Director prior to construction of significant facilities. Significant facilities shall include, but are not limited to waste, stormwater, and wastewater related handling, storage, and transfer projects.

34. The Licensee shall address and resolve all concerns the Division has identified regarding clay mining activities in areas adjacent to Section 32, as provided in a February 16, 2007 Division letter to the Licensee, including a February 9, 2007 Round 1 Interrogatory by the URS Corporation (URS 39400018.3090). The Licensee shall deliver detailed analyses, explanations, descriptions, and appropriate justification to the Division no later than July 1, 2008. If the ~~Executive Secretary~~Director determines that unacceptable adverse conditions exist or might develop or evolve, the Licensee shall submit for approval a remedial action plan within 30 days of written notice of the determination by the ~~Executive Secretary~~Director. The remedial action plan will address, among other topics, description of proposed activities, justification that the proposed activities will be adequate to protect the facilities in Section 32 from possible impacts of clay mining, and engineering design, specifications, and construction of proposed remedial actions.

35. A. In accordance with UAC R313-25-8, effective June 1, 2010 the Licensee shall not dispose of significant quantities of concentrated depleted uranium prior to the approval by the ~~Executive Secretary~~Director of

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the performance assessment required in R313-25-8.

B. Performance assessment: A performance assessment, in general conformance with the approach used by the Nuclear Regulatory Commission (NRC) in SECY-08-0147, shall be submitted for ~~Executive Secretary~~Director review and approval no later than June 1, 2011. The performance assessment shall be revised as needed to reflect ongoing guidance and rulemaking from NRC. For purposes of this performance assessment, the compliance period will be a minimum of 10,000 years. Additional simulations will be performed for a minimum 1,000,000-year time frame for qualitative analysis.

C. Revised disposal embankment design: If the performance assessment specified in paragraph 35.B indicates that changes to disposal operations and cover design are necessary to ensure compliance with the requirements of 10 CFR Part 61 or Utah Administrative Code R313, EnergySolutions will provide a revised design that does meet those requirements, for all wastes that have been and are reasonably anticipated to be disposed of at the facility within 180 days of ~~Executive Secretary~~Director approval of the performance assessment.

D. Remediation: If following the completion of DRC's review of the performance assessment described in paragraph 35.B, the disposal of DU as performed after the date of this license condition would not have met the requirements of the performance assessment, the facility will undertake remediation to ensure that the performance standards are met, or if that is not possible, shall remove the DU and transport it off-site to a licensed facility.

E. Surety: The Licensee shall fund the surety for the remediation, in License Condition 35.D. Within 30-days of the effective date of this license condition, the licensee shall submit for ~~Executive Secretary~~Director review and approval, the surety cost estimates for remediation of existing Savannah River DU waste disposal and planned, similar large quantity DU waste disposal.

36. A. The West Rail Spur and Unloading facility shall be operated as a transfer station for Surface Contaminated Objects (SCO) and large components, (waste storage is prohibited). These objects may be set on the gravel pad for 24 hours to facilitate unloading and transferring to the Class A West disposal cell.

B. The West Rail Spur and Unloading facility shall be operated as a transfer station for conveyances to be unloaded at the Containerized Waste Facility (unloading of waste packages is prohibited).

37. All ion exchange resins shall be disposed of as follows:
A. Solidified using solidification agents approved by the ~~Executive Secretary~~Director and disposed of in the Containerized Waste Facility; or

B. Packaged in High-Integrity Containers (HIC) approved by the ~~Executive Secretary~~Director, carbon-steel liners, unapproved HICs, or poly HICs meeting the void space criteria described in License

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Condition 16.M.i and disposed of in the Containerized Waste Facility; or

C. Packaged in High-Integrity Containers (HIC) approved by the ~~Executive Secretary~~Director, carbon-steel liners, unapproved HICs, or poly HICs not meeting the void space criteria described in License Condition 16.M.i and disposed of as approved by the Division under License Condition 16.M.ii or 16.M.iii in the Containerized Waste Facility; or

D. Disposed of in accordance with the requirements of the Construction Quality Assurance/Quality Control Manual.

38. The Licensee shall construct the Class A West disposal Cell identified in the Ground Water Quality Discharge Permit No. UGW450005 and in accordance with approved engineering design drawings "Series ~~982~~10014".

39. Waste placement and backfilling within the Containerized Waste Facility shall be conducted in accordance with the following:

A. The Containerized Waste Facility shall conform to the characteristics defined, analyzed, and described in the Engineering Justification Report "Class A Disposal Cell Containerized Waste Facility" (dated April 12, 2001); Engineering Justification Report, Addendum "Fifteen Percent Void Space Criteria" (Revision 1 dated October 10, 2001); and the AMEC letter to Envirocare of Utah, Inc. "Placement of Drums and B-25 Containers with 15 Percent Voids; Envirocare Class A - Containerized Waste Facility Near Clive, Utah" (dated October 2, 2001). Waste containers that have void space in excess of 15 percent shall be filled to the top of the container opening using Controlled Low Strength Material (CLSM) in accordance with the Construction QA/QC manual. The Licensee is exempt from the CLSM cold weather requirements and the 48 hour notification for void remediation only at the CWF Facility.

B. Waste container configurations, backfill materials and associated placement activities, shall be those approved by the ~~Executive Secretary~~Director following specifications contained in the Work Element: Containerized Waste Facility-Waste Placement Test Pad and the Work Element Containerized Waste Facility- Waste Placement Sections of the currently approved LLRW Construction Quality Assurance/Quality Control Manual.

C. Waste delivered in a shielded transportation cask shall remain in the cask until the waste is approved for disposal and the disposal location is prepared for the shipment. Waste received for disposal in the Containerized Waste Facility shall not be handled, stored or transferred within the contaminated portion of the Restricted Area without the approval of the Director of Health Physics.

D. The Containerized Waste Facility shall be operated as a contamination-free portion of the Restricted Area until containerized waste disposal operations are completed. Bulk waste may then be used to complete the filling of the cell.

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E Interim storage is applicable only to the Containerized Waste Facility. Packages containing radioactive material shall not be stored for a period of longer than 30 days from the date of receipt. Retention of waste materials above ground pending disposal up to 3 working days does not constitute storage. All packages in storage shall be shielded so that the package or shielding shall not exceed 40 mR/hour at one meter from the surface.

F. Disposal of non-containerized decomposable or compressible waste at the Containerized Waste Facility is prohibited. Such waste shall be disposed of as debris in bulk waste portions of the Class A West~~or Class A North~~ disposal embankments~~,~~ in accordance with debris placement requirements of the currently approved LLRW and 11e.(2) CQA/QC Manual.

40. The LARW and Class A West Disposal Cells, shall be defined by the areas enclosed by the points of reference in the Ground Water Quality Discharge Permit No. UGW450005. The Containerized Waste Facility within the Class A West disposal cell shall be separated from the non-containerized area by a 6-foot chain link fence on the berm around the Containerized Waste Facility perimeter area.

41. ~~Reserved.~~ On or before August 1, 2012, the Licensee shall submit, for Director's review and approval, a detailed plan for a study of the clayey soils to be used in the radon barrier of the CAW embankment cover. The objective of this study is to determine the amount of strain that the soils can withstand without cracking when subjected to both axial lengthening and bending as would be experienced when the clay settles differentially as part of the cover system. Within nine months of Director's approval of the study plan, the Licensee shall execute the study and submit a report with results of the study. Based on results of the study and the Director's review, the Director may require the Licensee to modify the embankment and cover design.

42. ~~Reserved.~~ On or before December 21~~25~~, 2012, the Licensee shall submit a revised cover design (including at least descriptions, design calculations, drawings, and specifications) and an assessment addressing performance of the revised Class A West cover design and transport of potential releases from the proposed Class A West disposal unit.

43. The Licensee shall, in the 2012 Surety submittal, provide cost estimates based on the Class A West design submitted on Drawings 10014 C01 through C06 listed in Table 2C of the GWQDP. The Licensee shall provide surety funding as approved by the Director prior to commencing construction of the clay liner in the area between the previously approved Class and Class A North embankments.

44. The Licensee shall fulfill all requirements and maintain compliance with all conditions in the LLRW CQA/QC Manual and engineering drawings currently approved by the ~~Executive Secretary~~Director.

45. All engineering related soil tests conducted by the Licensee to demonstrate compliance with Condition 44 shall be performed by a laboratory certified and accredited by the AASHTO Materials Reference Laboratory

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(AMRL). Said certification/accreditation shall apply to clay liner, clay radon barrier, soil filter layers, sacrificial soils, and riprap materials, or other soil or man-made materials as directed by the ~~Executive Secretary~~Director. Said certification shall include all engineering test methods required by License Condition 44, or as directed by the ~~Executive Secretary~~Director. Certification is not required for the DRC approved sealed single ring infiltrometer permeability test contained in Appendix B to the LLRW and 11e(2) CQA/QC Manual.

46. Reserved

47. The Licensee shall not initiate disposal operations in newly excavated or newly tied-in areas until the Division has inspected and the ~~Executive Secretary~~Director has approved the cell/embankment liner.

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**CONSTRUCTION DRAWINGS.**

48. A. The Licensee shall provide a comprehensive set of drawings for the entire Clive site. The drawings shall correctly: (1) locate all structures, utilities, fences, ponds, drainage features railroad tracks, roads, storage facilities, loading and off-loading facilities, disposal embankments, all environmental monitoring locations including instruments/devices, and any other appurtenances related to the operation, maintenance and closure of the disposal facility; and (2) provide survey control including elevations in sufficient detail to fully describe the site. The drawings shall be developed in accordance with the standards of professional care. A drawing index shall be included that identifies drawings by discrete number. Each drawing shall include a revision block that documents the latest changes or modifications by date and includes the initials of the responsible reviewer for QA/QC tracking purposes.

B. Drawings showing approved future designs shall be marked as "Final Drawings." Final drawings or drawings developed for construction shall be sealed by a Utah registered professional engineer. The drawings shall be developed in accordance with the standards of professional care.

C. Within 30 days of completion of any project that requires approval by the ~~Executive Secretary~~Director, a set of "As-Built" drawings shall be submitted for review. The drawings shall indicate as-built conditions as they existed no earlier than 30 days prior to the submittal. Drawings of finished construction shall be marked as "As-Built" in the final entry in the revision block.

**SITE OPERATING PROCEDURES**

49. Shipments containing free liquid in excess of 1% shall be absorbed, evaporated, or the liquids removed only at facilities with approved secondary containment or the rail rollover facility.

50. A. On-site generated waste shall be managed according to its radiological, physical and chemical characteristics. Solid phase material shall be disposed in either the Class A West Cell ~~Cell, Class A North Cell~~, Mixed Waste Cell, or the 11e.(2) Cell. Waste water from decontamination facilities will be put in the evaporation ponds or sprayed on disposal cells for purposes of dust and engineering controls.

B. Site equipment that has reached the end of its useful life, is not operational and does not meet the removable contamination limits of License Condition 27, Table 27-A, shall be disposed in the LLRW Class A West Cell ~~or Class A North Cell~~ within 90 days as debris in accordance with requirements of the LLRW Construction Quality Assurance/Quality Control Manual or stored on approved facilities for storage, transfer, and sampling of bulk waste.

C. Facility vehicles transferring or unloading waste shall not be left unattended.

51. The following shall be implemented for LLRW and 11e.(2) Waste segregation purposes:

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A. LLRW and 11e.(2) waste shall not be managed simultaneously at the Rail rollover facility, Shredder Facility, Rotary Dump Facility, or Rail Digging facility;

B. Any vehicle or facility used to manage waste for disposal within the 11e.(2) disposal embankment, must be clearly labeled to designate 11e.(2) management. The labels shall be visible from both sides of a vehicle/facility designated for 11e.(2) waste management.

C. Equipment, vehicles and facilities, which are used for management of LLRW will be cleaned of any material before being used for 11e.(2) waste management activities. Equipment, vehicles and facilities shall be cleaned of all waste material to a limit of 500 grams per square foot prior to being used for other waste types.

52. Waste shipments or transportation packages received shall meet the following contamination control requirements for removable contamination
    * Less then 220 dpm/100cm$^2$ alpha
    * Less then 2200 dpm/100cm$^2$ Beta-gamma

    If a shipment or transportation package does not meet the above contamination requirements, the Licensee shall take actions to reduce the risk for spread of contamination.

53. A. Quarterly, the Licensee shall clean the facility roads, or more frequently when needed. The material collected from cleaning the roads shall be disposed within an approved disposal embankment for Class A waste.

    B. On a biweekly basis (once every two weeks) between the first day of May and the last day of September, the Licensee shall spray a polymer solution on all exposed contaminated cell areas and areas of waste within the Class A West Cell ~~and Class A North Cell~~ which ~~have~~ has been disturbed in the previous two weeks. The Licensee will apply a polymer-based stabilizer in accordance with the manufacturer's instructions.

    C. The Licensee shall minimize the dust created during the process of placing and moving waste, through the use of water. Water or other engineering controls shall be placed on roads and in areas which work is being performed.

    D. The Licensee shall cease loading, hauling, and dumping of un-containerized waste whenever the 5-minute average wind velocities exceed 35 miles per hour. When both the 5-minute average and 5-minute maximum wind velocities are less than 35 mph as observed on the meteorological station, management of un-containerized waste may resume.

54. The Licensee shall fulfill and maintain compliance with all conditions and requirements in the Site Radiological Security Plan (Revision 4, October 6, 2011).

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55. ~~A. For the Class A and Class A North disposal cells, the Licensee shall ensure that the actual cumulative activity of chlorine-36 does not exceed 0.2828 picocuries per gram in accordance with the following formula:~~

~~Total Activity of chlorine-36 Received (picocuries) ≤ 0.2828 picocuries per gram~~
~~Total Mass of Active Cell (grams) + Completed Cell (grams)~~

A. For the Class A West disposal cell, the Licensee shall ensure that the average concentrations of selected radionuclides do not exceed the limits stated in Table 55A.

**Table 55A. Limiting Radionuclide Concentrations in Waste Disposed of in Class A West Disposal Cell.**

| Radionuclide | Maximum Average Radionuclide Concentration[1] in Waste Disposed of Under Top Slope (pCi/g) | Maximum Average Radionuclide Concentration[1] in Waste Disposed of Under Side Slope (pCi/g) |
|---|---|---|
| berkelium-247 | 0.0065 | 0.00388 |
| calcium-41 | 35,300 | 34.1 |
| chlorine-36 | 15.9 | 9.72 |
| iodine-129 | --- | 21.9 |
| rhenium-187 | --- | 19,100 |
| technetium-99 | --- | 1,720 |

1. Maximum average radionuclide concentration for a radionuclide is determined as the quotient of the Total Activity (in picocuries) of that radionuclide disposed of under the respective slope and the Total Mass disposed of under the respective slope for the Active Cell (in grams) + Completed Cell (in grams).

~~B. For the Class A and Class A North disposal cells, the Licensee shall ensure that the actual cumulative activity of berkelium-247 does not exceed 0.0001 picocuries per gram in accordance with the following formula:~~

~~*Total Activity of berkelium-247 Received (picocuries) ≤ 0.0001 picocuries per gram*~~
~~*Total Mass of Active Cell (grams) + Completed Cell (grams)*~~

~~C~~B. For the Mixed Waste disposal cell, the Licensee shall ensure that the actual cumulative activity of chlorine-36 does not exceed 8.75 picocuries per gram in accordance with the following formula:

*Total Activity of chlorine-36 Received (picocuries) ≤ 8.75 picocuries per gram*
*Total Mass of Active Cell (grams) + Completed Cell (grams)*

~~D~~C. For the Mixed Waste disposal cell, the Licensee shall ensure that the actual cumulative activity of berkelium-247 does not exceed 0.00314 picocuries per gram in accordance with the following formula:

*Total Activity of berkelium-247 Received (picocuries) ≤ 0.00314 picocuries per gram*

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*Total Mass of Active Cell (grams) + Completed Cell (grams)*

56. Containerized Class A waste shall be certified by the generator to meet the Waste Acceptance Criteria in accordance with the Waste Characterization Plan described in License Condition 58.

57. A. The Licensee shall move rail shipments into the Restricted Area within seven (7) days of arrival. The shipments may be returned to the carrier when management of the waste is not possible within the seven (7) day period, unless additional time is approved by the ~~Executive Secretary~~Director of the Utah Division of Radiation Control ~~Board~~.

B. Empty outbound railcars shall be picked up by the local rail service within seven (7) days of release from the Restricted Area, unless additional time is approved by the ~~Executive Secretary~~Director of the Utah Division of Radiation Control ~~Board~~.

C. Railcars that have been decontaminated and surveyed both internally and externally and found to meet criteria of non-fixed radioactive surface contamination less than 220 dpm/100 $cm^2$ Alpha, 2,200 dpm/100 $cm^2$ Beta and a dose rate less than 0.5 mrem/hr or that meet the limits found in Table 27-A do not have to picked up by local rail service within seven (7) days.

D. The Licensee may perform the following activities on incoming shipments on rail lines outside of Section 32, not including the main line adjacent to Section 32:
1. Visual Inspection
2. Radiation level surveys
3. Affix labels

58. The Licensee shall fulfill and maintain compliance with all conditions and requirements in the LLRW Waste Characterization Plan (dated October 8, 2009).

59. Reserved.

60. Wind dispersed Dry Active Waste (DAW) located outside of the Contaminated Restricted Area is prohibited.

61. Truck, railcar, and other equipment washdown (decontamination) facilities, including evaporation ponds, shall be controlled with fences or other approved barriers to prevent intrusion.

62. All burial embankments and waste storage areas, including immediately adjacent drainage structures, shall be controlled areas, surrounded by a six-foot chain link fence. Upon site closure, all permanent fences shall be six feet high chain link topped with three strand barbed wire, tip tension wire, and twisted selvedge.

63. Radioactive and mixed wastes within Section 32 and all rail spurs controlled by the Licensee around the Licensee's Disposal Facility are possessed by the Licensee. Waste conveyed to the facility by truck is in

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transport as long as the commercial carrier driver and vehicle remain at the Clive disposal facility. The Licensee does not possess such waste for purposes of determining compliance with surety requirements and SNM quantity limits, except that the Licensee does, however, possess any waste containing SNM that is not disposed of on the day it is delivered to the facility.

64. "Disposal" is the locating of radioactive waste into a lift of the disposal embankment. Disposal does not include the storage of waste in containers on a lift when the container will ultimately be emptied, the staging of containerized waste in the disposal embankment; or waste as "In Cell Bulk Disposal."

**MANIFEST/SHIPPING REQUIREMENTS**

65. The Licensee shall comply with UAC R313-15-1006 and UAC R313-25-33(8), Requirements for Low-Level Waste Transfer for Disposal at Land Disposal Facilities and Manifests.

66. The Licensee shall not accept radioactive waste for storage and disposal unless the Licensee has received from the shipper a completed manifest that complies with UAC R313-15-1006 and UAC R313-25-33(8).

67. The Licensee shall maintain copies of complete manifests or equivalent documentation required under Conditions 65 and 66 until the ~~Executive Secretary~~Director authorizes their disposition.

68. The Licensee shall immediately notify the ~~Executive Secretary~~Director or the Division's on-site representative of any waste shipment where there may be a possible violation of applicable rules or license conditions.

69. The Licensee shall require anyone who transfers radioactive waste to the facility to comply with the requirements in UAC R313-15-1006.

70. The Licensee shall acknowledge receipt of the waste within one (1) week of waste receipt by returning a signed copy of the manifest or equivalent document to the shipper. The shipper to be notified is the Licensee who last possessed the waste and transferred the waste to the Licensee. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received.

71. The Licensee shall notify the shipper (e.g., the generator, the collector, or processor) and the Division when any shipment or part of a shipment has not arrived within 60 days after receiving the advance manifest.

72. The Licensee shall maintain a record for each shipment of waste disposed of at the site. At a minimum, the record shall include:
    A. The date of disposal of the waste;

    B. The location of the waste in the disposal site;

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C. The condition of the waste packages received;

D. Any discrepancy between the waste listed on the shipment manifest or shipping papers and the waste received in the shipment;

E. A description of any evidence of leaking or damaged packages or radiation or contamination in excess of applicable regulatory limits; and

F. A description of any repackaging of wastes in any shipment.

**FINANCIAL ASSURANCE/CLOSURE**

73. The Licensee shall at all times maintain a Surety that satisfies the requirements of UAC R313-25-31 in an amount adequate to fund the decommissioning and reclamation of Licensees' grounds, equipment and facilities by an independent contractor. The Licensee shall annually review the amount and basis of the surety and submit a written report of its findings by December 1 each year for ~~Executive Secretary~~Director approval. At a minimum, this annual report shall meet the following requirements:

A. Summary of Changes – the annual report shall include a written summary of any change in the cost estimate previously approved by the ~~Executive Secretary~~Director, including, but not limited to:

i. A description of any modification, addition, or deletion of any direct cost or post-closure monitoring and maintenance (PCMM) cost line item, including supporting justification, calculations and basis;

ii. Any change to the unique reference number (cost line item) assigned approved by the ~~Executive Secretary~~Director for any direct or PCMM cost line item.

B. Indirect Costs shall be based on the sum of all direct costs in accordance with the following values:

| Surety Reference No. | Description | Percentage |
|---|---|---|
| 300 | Working Conditions | 5.5% |
| 301 | Mobilization——————/ Demobilization | 4.0% |
| 302 | Contingency | 11.0% |
| 303 | Engineering and Redesign | 2.25% |
| 304 | Overhead and Profit | 19.0% |
| 305 | Management Fee and Legal Expenses | 4.0% |
| 306 | DEQ Oversight | 4.0% |

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C. RS Means Guide estimates of direct construction costs provided in the annual report shall be derived from or based on the most recent ~~printed~~ edition of the RS Means Guide for Heavy Construction.

D. Report Certification – the annual report shall be prepared under the direct supervision of and certified by a Professional Engineer or Professional Geologist currently licensed by the State of Utah with at least five (5) years of construction cost estimation experience. The annual report shall be developed in accordance with the standards of professional care.

E. Electronic Format – the Licensee shall provide the report in both paper and electronic formats, as directed by the ~~Executive Secretary~~Director.

F. Within 60-days of ~~Executive Secretary~~Director approval of said annual report, the Licensee shall submit written evidence that the surety has been adequately funded.

G. The Licensee shall prepare and maintain current a gravel resource evaluation report on-site that quantifies the gravel reserves remaining in the Grayback Hills Gravel Pit located in Section 24 of T. 1 N., R. 12 W (SLBM). Such report shall be prepared and certified on or before December 1 of each year by a professional engineer or professional geologist currently registered in the State of Utah.

74. One (1) year prior to the anticipated closure of the site, the Licensee shall submit for review and approval by the ~~Executive Secretary~~Director a site decontamination and decommissioning plan. As part of this plan, the Licensee shall demonstrate by measurements and/or modeling that concentrations of radioactive materials which may be released to the general environment, after site closure, will not result in an annual dose exceeding 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public.

75. In accordance with UAC R313-25-33(6), the Licensee shall submit a financial statement annually by March 31st of each year for the previous year.

76. The Licensee shall at all times maintain a Surety for perpetual care, using an instrument that satisfies the requirements of UAC R313-22 and R313-25. The Surety shall be in the amount last approved by the Radiation Control Board, as provided in Utah Code Ann. 19-1-307(2), as adequate to fund perpetual care, less the amount contributed to the Radioactive Waste Perpetual Care and Maintenance Account created under Utah Code Ann. 19-3-106.2 (but not including any part of that Account resulting from returns on investment).

**SPECIAL HANDLING**

77. Except while waste packages are being handled in the active areas of the Containerized Waste Facility, external gamma radiation levels shall not exceed 40 mR/hr at one meter from the surface of any emplaced waste package or from shielding placed around disposed waste containers.

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78. The Licensee shall observe the following controls on waste handling at the Containerized Waste Facility:
    A. Before unloading any waste container whose external gamma radiation at the surface exceeds 10 R/hr, an ALARA review shall be performed and documented and a pre-job briefing shall be conducted.

    B. As part of the ALARA review, the Licensee shall determine and record (1) estimates of the radiation dose rates for the waste container, disposal unit working face, and any other potentially significant radiation sources; (2) expected durations of exposures to and distances from each radiation source; and (3) expected doses to each person involved in the actual disposal operation.

    C. Before unloading any waste container whose external gamma radiation at the surface exceeds 200 R/hr, a practice run shall be conducted. The practice run shall involve shielding, container(s) filled with non-radioactive material, and handling equipment that are similar to those involved with the actual shipment. Similarity includes similar rigging and physical characteristics (e.g., weight, dimensions, and attachments). Those personnel who will participate in receiving, processing, handling, and disposing of the actual waste will participate in the practice run, using actual procedures. The Licensee shall notify the Division 24 hours in advance of conducting the practice runs.

    D. On a case-by-case basis, the ~~Executive Secretary~~Director may exempt the Licensee from conducting the required practice run, considering the results of earlier practice runs and actual experience handling waste containers with high radiation levels.

79. Reserved.

80. The Licensee shall notify in writing the ~~Executive Secretary~~Director at the earliest possible date, but no later than 10 days before scheduled receipt of each shipment with contact radiation levels in excess of 200 R/hr. The notification shall include the anticipated dates of receipt and plan for disposal in the Containerized Waste Facility.

81. The Director of Health Physics or other qualified person designated by the Director of Health Physics shall be present for and shall observe the receipt, processing, handling, and disposal of each waste package with contact radiation levels in excess of 200 R/hr.

82. The Licensee shall dispose of only closed containers in the Containerized Waste Facility. The Licensee shall not dispose of any breached waste container in the Containerized Waste Facility without first repairing the breached container or overpacking it in an undamaged container. The Licensee is authorized to open packages at its facility only to:

    A. Repair or repackage breached containers.

    B. Inspect for compliance with conditions of this license.

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C. Confirm package contents and fill voids in packages/containers that have greater than 15% void space.

D. Accomplish other purposes as approved by the ~~Executive Secretary~~Director.

83. The Licensee shall handle and emplace LLRW packages in the Containerized Waste Facility such that packaging integrity is maintained during handling, emplacement, and subsequent backfilling. Waste packages deposited in the Containerized Waste Facility shall be protected from any adverse effects of operations which may damage them.

**SEALED SOURCES AND/OR DEVICES**

84. A. i. Sealed sources shall be tested for leakage and/or contamination at intervals not to exceed the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by equivalent regulations of an Agreement State.

ii. In the absence of a certificate from a transferor indicating that a leak test has been made within the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by equivalent regulations of an Agreement State prior to the transfer, a sealed source received from another person shall not be put into use until tested.

iii. Sealed sources need not be tested if they are in storage and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than 3 years without being tested for leakage and/or contamination.

iv. The leak test shall be capable of detecting the presence of 185 becquerels (0.005 μCi) of radioactive material on the test sample. If the test reveals the presence of 185 becquerels (0.005 μCi) or more of removable contamination, a report shall be filed with the ~~Executive Secretary~~Director in accordance with R313-15-1208, and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Utah Radiation Control Rules. The report shall be filed within 5 days of the date the leak test result is known with the Division of Radiation Control, P.O. Box 144850, Salt Lake City, Utah 84114-4850. The report shall specify the source involved, the test results, and corrective action taken.

v. (a) The Licensee is authorized to collect leak test samples in accordance with Condition 85.D of this license, the Licensee's renewal application (dated March 1, 2001), and the Licensee's Memo (dated March 11, 2002).

(b) The analysis of leak test samples shall only be performed by individuals who meet the qualifications of a Health Physics Technician I or II, as defined by this license. The analysis of leak test samples shall be performed in accordance with the Licensee's renewal application (dated March 1, 2001), and the Licensee's Memo (dated March 11, 2002). Alternatively, tests for leakage and/or contamination, including sample collection and analysis, may be performed by other persons specifically licensed by the ~~Executive Secretary~~Director, the U.S. Nuclear Regulatory Commission, or an Agreement State to perform such services.

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vi. Records of leak test results shall be kept in units of Becquerels or microcuries and shall be maintained for inspection by representatives of the ~~Executive Secretary~~Director.

B. Sealed sources or source rods, containing licensed material shall not be opened or sources removed from source holders, devices, or detached from source rods by the Licensee, except as specifically licensed by the ~~Executive Secretary~~Director, an Agreement State, or the U.S. Nuclear Regulatory Commission to perform such services.

C. The Licensee shall conduct a physical inventory every six months to account for all sealed sources and/or devices received and possessed under this license. The records of inventories shall be maintained for three years from the date of the inventory for inspection by the Division, and shall include the quantities and kinds of radioactive material, manufacturer's name and model numbers, location of the sources and/or devices, and the date of the inventory.

**PORTABLE GAUGING DEVICES:**

85. A. Each portable gauging device shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The gauge or its container must be locked when in transport, storage or when not under the direct surveillance of an authorized user.

B. Each portable gauging device shall be kept under the constant surveillance (direct surveillance) of individuals trained in accordance with Condition 32.B of this license, when the device is not in secured storage, as required by Condition C of this license condition.

C. Reserved.

D. Any cleaning and/or maintenance of portable gauging device(s) or the collection of leak test samples, performed by the Licensee, shall only be performed with the radioactive source/source rod in the safe shielded position.

E. All cleaning and/or maintenance of portable gauging device(s), performed by the Licensee shall only be performed in accordance with Condition D of this license condition, and the manufacturer's instructions and recommendations.

F. Any cleaning, maintenance, or repair of portable gauging device(s) that requires removal of the sources/source rod shall be performed only by the manufacturer or by other persons specifically licensed by the ~~Executive Secretary~~Director, an Agreement State, or the U.S. Nuclear Regulatory Commission to perform such services.

**DOSIMETER CALIBRATOR(S)/IRRADIATOR(S):**

86. A. The LDM-2000 reader shall only be connected to a maximum of two IRD-2000 irradiator modules.

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B. Devices(s) shall only be:
   i. installed in areas where device(s) can be secured and limited to individuals authorized to use device(s) pursuant to Condition A of this license condition and Condition 32.C of this license.
   ii. used by individuals who meet the qualifications of a Health Physics Technician I or II, as defined by this license.
   iii. used in accordance with the manufacturer's operating manual and certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by equivalent regulations of an Agreement State. The Licensee shall follow the manufacturer's recommendations for preventative maintenance and operational testing.

C. Maintenance and servicing of device(s) shall only be performed by the manufacturer or persons specifically licensed by the ~~Executive Secretary~~Director, the U.S. Nuclear Regulatory Commission, or an Agreement State to perform such services.

D. The Licensee shall not perform calibration(s) for non-MGP Instrument dosimeters.

**INCREASED CONTROL CONDITIONS**

87. The Licensee shall comply with the requirements described in the Division's letter dated November 14, 2005 and attached document to the Division's letter entitled "Increased Controls for Licensees that Possess Sources Containing Radioactive Material Quantities of Concern." The Licensee shall complete implementation of said requirements before May 15, 2006 or the first day that radionuclides in quantities of concern are possessed at or above the limits specified in Table 1, provided as an attachment to the Division's letter dated November 14, 2005, whichever is later. Within 25 days after the implementation of the requirements of this License Condition, the Licensee shall notify the ~~Executive Secretary~~Director in writing that it has completed the requirements of this License Condition.

88. The licensee shall comply with requirements described in the ~~Executive Secretary~~Director's letter dated May 16, 2008, Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material" and Attachment 2, "Specific Requirements Pertaining to Fingerprinting and Criminal History Records Checks." The requirements of this license condition shall be implemented as part of the trustworthiness and reliability program of the Increased Controls requirements.

A. On or before August 14, 2008, the licensee shall provide under oath or affirmation, a certification that the Trustworthiness and Reliability Official is deemed trustworthy and reliable by the licensee as required in paragraph 2.B of Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material."

B. All fingerprints obtained by the licensee pursuant to this requirement must be submitted to the U.S. Nuclear Regulatory Commission for transmission to the U.S. Federal Bureau of Investigation (FBI). Additionally, the licensee's submission of fingerprints shall also be accompanied by a certification, under oath and affirmation, of the trustworthiness and reliability of the Trustworthiness and Reliability

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Official as required by paragraph 2.B of Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material."

C. The licensee shall complete implementation of the fingerprinting requirements on or before November 12, 2008. The licensee shall notify the ~~Executive Secretary~~Director when full compliance with the requirements described in the ~~Executive Secretary~~Director's letter dated May 16, 2008, Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material" and Attachment 2, "Specific Requirements Pertaining to Fingerprinting and Criminal History Records Checks" have been achieved. Notification to the ~~Executive Secretary~~Director shall be made within twenty-five (25) days after full compliance has been achieved.

D. The licensee shall notify both the ~~Executive Secretary~~Director and the U.S. Nuclear Regulatory Commission within 24 hours if the results from a criminal history records check indicate that an individual is identified on the FBI's Terrorist Screening Data Base.

**CLOSEOUT CONDITIONS**

89. Except as specifically provided otherwise in this license, the Licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Utah Radiation Control Rules, Utah Administrative Code R313 shall govern unless the statements, representations, and procedures in the Licensee's application and correspondence are more restrictive than the rules.

A. License renewal application, Revision 2, dated June 20, 2005.

B. The following documents refer to revisions made in Amendment 22:
   (1) Letter CD04-0481, dated October 27, 2004, Amendment and Modification Request – Class A North Embankment.
   (2) Letter CD04-0548, dated December 23, 2004, Revised Class A North Disposal Embankment License Amendment Request.
   (3) URS Review of Revised Class A North Embankment Amendment Request, dated December 29, 2004.
   (4) Letter CD05-0024, dated January 17, 2005, Class A North Disposal Embankment License Amendment Request Revision 2.
   (5) Letter CD05-0265, dated May 20, 2005, Revision of Appendix R, Environmental Monitoring and Surveillance Plan.
   (6) Letter CD05-0266, dated May 25, 2005, Surety Calculations for the Class A North Disposal Cell.
   (7) Memo: Treesa Parker to John Hultquist, dated May 25, 2005, proposed revisions to RML for Amendment 22
   (8) Email: Treesa Parker to Christine Hiaring, dated June 1, 2005, License Amendment 22 Minor Changes for Consistency.

C. The following documents refer to revisions made in Amendment 22A:

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(1) Division letter dated November 14, 2005.

D. The following documents refer to revisions made in Amendment 22B:
(1) Letter CD05-0333, dated June 30, 2005, RML no. UT 2300249 Request for approval of revisions to Appendix I, Organization, and amendment of License Condition 32.A.
(2) Memorandum dated August 2, 2005, Subject; Review of Appendix I
(3) Letter CD05-0398, dated August 16, 2005, Request for approval of revisions to Appendix I, Organization and amendment of license condition 31.A,B,C, and 32.A.
(4) Letter CD05-0507, October 26, 2005, Additional information regarding proposed revisions to Appendix I, Organization and amendment of license condition 31.A,B,C, and 32.A.
(5) Letter CD05-0453, dated September 19, 2005 Request for amendment of License Condition 9.10 RML UT2300478; Organization.
(6) Letter dated November 22, 2005, Request for information regarding request to revise Appendix I of the 11e(2) License Application and Amendment of L.C. 9.10.
(7) Letter dated October 11, 2005, Re: Request for Information: Revision to Appendix I and amendment 31A. B. C. and 32.A. dated August 16, 2005 (CD05-0398).
(8) Memorandum, dated October 3, 2005, Subject; Appendix I, revisions to RML UT2300249 conditions 31 A, B, C, and 32 A.
(9) Letter CD05-0411, dated August 23, 2005, Payment of administrative cost for Appendix I amendment request dated August 16, 2005.
(10) Letter CD05-0472, dated September 30, 2005, License condition 39.E amendment
(11) Email dated August 10, 2005, Subject: Draft amendment for LC 39.E and attached August 10, 2005, License Condition 39 E. amendment "draft".
(12) Email dated September 16, 2005, Subject: RE: FW: Draft amendment for LC 39.E.
(13) Letter CD05-0285, dated June 1, 2005, Envirocare containerized waste facility concrete overpacks corrective action plan.
(14) Letter dated June 2, 2005, filling waste package voids at the containerized waste facility using controlled low strength material (CLSM)
(15) Letter CD05-0326, dated June 27, 2005, Re: Letter to Mr. Dane Finerfrock, dated April 13, 2005, CD05-0181.
(16) Letter CD05-0366, dated July 26, 2005, Re: Letter to Dane Finerfrock, dated June 27, 2005, CD05-0326.
(17) Letter CD06-0011, dated January 12, 2006, Request to amend License Condition No. 2, Address.
(18) Letter CD06-0043, dated February 3, 2006, Request to amend License Condition No. 1, Company Name.
(19) Letter dated February 6, 2006, evidence of name change with the Utah Department of Commerce.
(20) Email dated October 6, 2005, Subject: License condition 39.E.
(21) Memorandum from Woodrow W. Campbell through Loren Morton and Dane Finerfrock to Envirocare File, dated January 13, 2006 regarding AMRL Soils Lab Certification for the Envirocare Soils Lab.

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(22) Email dated February 15, 2006, from Loren Morton to Dan Shrum, Subject: License Amendment for Condition 73.
(23) Email dated December 23, 2005, from Loren Morton to Dane Finerfrock, Subject: Proposed Changes to License Condition 73 - Annual Surety Evaluation Report.
(24) Letter dated February 22, 2006, Subject: Revise void remediation procedure OPC-6.0.

E. The following documents refer to revisions made in Amendment 22C:
(1) Letter CD05-0435, dated September 8, 2005, Request to amend RML UT 2300249: Condition 58, Waste Characterization Plan.
(2) Letter CD05-0557, dated December 5, 2005, RML UT 2300249; Condition 58 Waste Characterization Plan –Revised License Amendment Request.
(3) Letter CD06-0072, dated February 27, 2006, Radioactive Material License UT 2300249: Condition 58 Waste Characterization Plan – Revised License Amendment Request.
(4) Email dated February 24, 2006, from Boyd Imai to Sean McCandless Re: Waste Characterization Plan.
(5) Letter CD06-0059, dated February 15, 2006, Radioactive Material License UT 2300249 –Self Identified Noncompliance.
(6) Letter dated March 17, 2006, from the DRC regarding the February 15, 2006, letter of noncompliance.
(7) Letter CD06-0055) dated February 9, 2006, Request to Amend RML UT 2300249 to show addition of Liquid Radioactive Sources to License Condition 6.E.
(8) Letter (CD06-0092) dated March 8, 2006, RML UT 2300249; Request for administrative amendment. Conditions 21.A and B and Condition 81.

F. The following documents refer to revisions made in Amendment 22E:
(1) CD06-0389, "Request to amend Radioactive Materials License No. UT 23000249 and 11e.(2) Radioactive Materials License No. UT 23000478 – Request for approval revised Appendix I, *Organization*," October 6, 2006.
(2) Shredder Facility
a. CD05-0448, "Radioactive Materials License No. UT 2300249 (RML) and Groundwater Quality Discharge Permit UGW450005 (GWQDP). Request to Construct Shredding Facility," September 15, 2005.
b. CD05-0532, "Request to Construct Shredding Facility – Revised Design and Interrogatory Response," November 14, 2005.
c. CD05-0556, "Request to Construct Shredding Facility – Additional Information," December 2, 2005.
d. CD06-0036, "Request to Construct Shredding Facility – Response to Round 2 Interrogatories", February 1, 2006.
e. CD06-0098, "Request to Construct Shredding Facility – Response to Round 3 Interrogatory," March 10, 2006.
f. ASTM F-1417, "ASTM Method F 1417-92," March 29, 2006.

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g. CD06-0188, "Request to Construct Shredder Facility – Response to Round 4 Interrogatory," May 9, 2006.
h. CD06-0211, "Request to Construct Shredder Facility – Response to Round 4B Interrogatory," May 25, 2006.
i. CD06-0234, "Requests to Construct Shredder and Rotary Dump Facilities – Revised Wastewater Management Process," June 19, 2006.
j. "EnergySolutions LLC Low-Level Radioactive Waste Closure & Post-Closure Trust License UT 2300249 Trust #16673400," June 29, 2006.
k. CD-0346, "Interim Wastewater Management Plan for the Shredder Facility – Response to August 18, 2006, Request for Additional Information," August 31, 2006.
l. CD06-0388, "Radioactive Material License UT 2300429 and Groundwater Quality Discharge Permit (GWDP) No UGW450005 Shredder Facility – Request to Operate," October 5, 2006.
m. CD06-0407, "Comment on Proposed Amendment of Radioactive Material License UT 2300249 and Groundwater Quality Discharge Permit (GWDP) No UGW450005, October 18, 2006.
n. CD06-0414, "Radioactive Material License UT 2300249 and Groundwater Quality Discharge Permit No UGW450005 Shredder Facility – Submittal of Revised Drawings" October 25, 2006.
o. CD06-0425, "Groundwater Quality Discharge Permit No UGW450005 (GWQDP) Submittal of Revised Appendix J and K," November 7, 2006.

(3) Rotary Dump Facility
a. CD05-0564, "Request to Construct – Rotary Dump," December 12, 2005.
b. CD05-0570, "Request to Construct Rotary Dump 00 Submittal of Dose Assessment," December 16, 2005.
c. CD06-0086, "Request to Construct Rotary Dump Facility – Response to Round 1 Interrogatory", March 2, 2006.
d. ASTM F-1417, "ASTM Method F 1417-92," March 29, 2006.
e. CD06-0147, "Request to Construct Rotary Dump Facility – Revised Drawings," April 10, 2006.
f. CD06-0210, "Request to Construct Rotary Dump Facility – Response to Round 2 Interrogatory," May 25, 2006.
g. CD06-0211, "Request to Construct Rotary Dump Facility – Response to Round 4B Interrogatory", May 25, 2006.
h. CD06-0226, "Request to Construct Rotary Dump Facility – Response to Round 2B Interrogatories," June 8, 2006.
i. CD06-0234, "Requests to Construct Shredder and Rotary Dump Facilities – Revised Wastewater Management Process," June 19, 2006.

(4) Intermodal Container Wash Building

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a. CD05-0291a, "Radioactive Materials License No. UT 2300249 (RML) and Groundwater Quality Discharge Permit UGW450005 (GWQDP). Request to Construct Intermodal Container Wash Building and Access Control Building," June 9, 2005.
b. CD05-0388, "Request to Construct Intermodal Container Wash Building – Revised Design and Supplemental Information," August 8, 2005.
c. CD05-0432, "Request to Construct Intermodal Container Wash Building – Revised Design and Interrogatory Response," September 1, 2005.
d. CD06-0110, "MARSSIM Release for New Intermodal Container Wash Facility," March 22, 2006.
e. CD06-0206, "Radioactive Material License UT 2300249 and Groundwater Quality Discharge Permit No UGW450005 Intermodal Container Wash Building – Request to Operate," May 22, 2006.
f. "EnergySolutions LLC Low-Level Radioactive Waste Closure & Post-Closure Trust License UT 2300249 Trust #16673400," June 29, 2006.
g. CD06-0259, "Groundwater Quality Discharge Permit (GWDP) No UGW450005 Intermodal Container Wash Building – Revised Appendix J and K," July 10, 2006

(5) Decontamination Access Control Building
a. CD05-0291b, "Radioactive Materials License No. UT 2300249 (RML) and Groundwater Quality Discharge Permit UGW450005 (GWQDP). Request to Construct Intermodal Container Wash Building and Access Control Building," June 9, 2005.
b. CD05-0367, "MARSSIM Release of New Boxwash Access Control", July 26, 2005.
c. CD06-0139, "Radioactive Material License UT 2300249 and Groundwater Discharge Quality Permit (GWDP) No UGW450005 Decontamination Access Control Building – Request to Operate", April 6, 2006.
d. "EnergySolutions LLC Low-Level Radioactive Waste Closure & Post-Closure Trust License UT 2300249 Trust #16673400," June 29, 2006.
e. CD06-0245, "Groundwater Discharge Quality Permit (GWDP) No UGW450005 Decontamination Access Control Building – Revised Appendix J and K and Drawing No 05015-S100," June 30, 2006.

(6) East Side Drainage Project
a. CD06-0175, "Request to Construct East Side Drainage and Gray Water System Modifications," May 1, 2005.
b. CD06-0244, "East Side Drainage and Gray Water System Modifications – Response to DRC Review," June 30, 2006.
c. CD06-0293, "Groundwater Discharge Quality Permit No UGW450005 East Side Drainage and Gray Water System – Revised Design and BAT Plans," August 4, 2006.
d. CD06-0327, "Groundwater Discharge Quality Permit No UGW450005 East Side Drainage and Gray Water System – Revised Appendix J BAT Performance Monitoring Plan and Appendix K BAT Contingency Plan," August 23, 2006.
e. CD06-0328, "Groundwater Discharge Quality Permit No UGW450005 East Side Drainage and Gray Water System – Revised Drawings," August 24, 2006.

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G. The following documents refer to revisions made in Revision 0 of the License Renewal Application:

(1) AGRA Earth & Environmental, Inc. 1999. Summary Seismic Stability and Deformation Analysis: Envirocare LARW Disposal Facility, Clive, Tooele County, Utah. September 1, 1999. (1998 LRA Appendix J)
(2) AGRA Earth & Environmental, Inc. 2000a. Evaluation of Settlement of Compressible Debris Lifts: LARW Embankments, Clive, Tooele County, Utah. June 1, 2000.
(3) AGRA Earth & Environmental, Inc. 2000b. Evaluation of Settlement of Incompressible Debris Lifts: LARW Embankments, Clive, Tooele County, Utah. June 1, 2000.
(4) AMEC Earth & Environmental, Inc. 2000a. Letter Report: Allowable Differential Settlement and Distortion of Liner and Cover Materials. October 4, 2000.
(5) AMEC Earth & Environmental, Inc. 2000b. Letter Report Stability Considerations: Proposed LLRW Embankment. October 25, 2000.
(6) AMEC Earth & Environmental, Inc. 2000c. Letter Report Stability Considerations - Addendum: Proposed LLRW Embankment. November 8, 2000.
(7) AMEC Earth & Environmental, Inc. 2001. Response to Interrogatory Number 2: Placement if HICs in Caissons. October 1, 2001.
(8) AMEC Earth & Environmental, Inc. 2002. Placement of Large Liners in Caissons. June 19, 2002.
(9) Bingham Environmental. 1996. Project Memorandum HEC-1 and HEC-2 Analysis, LARW Application for License Renewal, Envirocare Disposal Facility, Clive Utah. November 26, 1996. (1998 LRA Appendix KK)
(10) EnergySolutions (Rebeccah McCloud) to Utah Division of Radiation Control (Dane Finerfrock). 2006. Correspondence concerning corporate ownership and name changes. February 6, 2006.
(11) EnergySolutions (Tye Rogers) to Utah Division of Radiation Control (Dane Finerfrock). 2006. Correspondence concerning corporate ownership and name changes. February 3, 2006.
(12) EnergySolutions LLC. 2007. "2006 Annual 083106 Rev 052107.xls" [annual surety review], Revision 22, May 21, 2007
(13) EnergySolutions to Utah Division of Radiation Control. 2006. Letter number CD06-0348, Radioactive Materials License No. UT2300249 – Revision to License Condition 26, Appendix R request submitted to DRC on March 17, 2006. September 1, 2006.
(14) Envirocare of Utah, Inc. to URS Corporation. 2005. Personal communication via electronic mail (Sean McCandless and Robert D. Baird, PE). January 27, 2005.
(15) Envirocare of Utah, Inc. to Utah Division of Radiation Control. 2004. Letter number CD04-0287, Updated Specific Gravity Report and Request for Eliminating Specific Gravity Monitoring. June 9, 2004.
(16) Envirocare of Utah, Inc. to Utah Division of Radiation Control. 2005. Letter number CD05-0487, Cover Test Cell Evaporative Zone Depth (EZD) Report. October 13, 2005 June 9, 2004.
(17) Envirocare of Utah, Inc. 2000a. Pre-Licensing Plan Approval Application for a License Amendment Allowing Disposal of Class B & C Low-Level Radioactive Waste. (revision of January 5, 2000 plan) March 15, 2000.

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(18) Envirocare of Utah, Inc. 2000b. Rock Cover Design. July 26, 2000.
(19) Envirocare of Utah, Inc. 2001. "Clive Facility Total Ditch Flow Calculations." October 30, 2001.
(20) Envirocare of Utah, Inc. 2003c. Application for Renewal: Radioactive License Materials License Number UT-2300249. July 2, 2003.
(21) Envirocare of Utah, Inc. 2005d. Application for Renewal: Radioactive License Materials License Number UT-2300249, Revision 2 (including all Appendices). June 20, 2005.
(22) Montgomery-Watson (John Pellicer and Patrick Corser) to Envirocare of Utah, Inc. (Tim Orton). 2000. Letter Report LLRW Cover Frost Penetration. March 1, 2000.
(23) Rogers and Associates Engineering for the Utah Division of Radiation Control. 2000. Siting Evaluation Report for Proposed Disposal Under URCR R-313-25-3 of Class B & C Low Level Radioactive Waste. May 2, 2000.
(24) Shrum, Dan to Robert D. Baird, PE, CCE (URS Corporation). 2005. Via electronic mail. February 28, 2005.
(25) SWCA Environmental Consultants, Inc. 2000. Assessment of Vegetative Impacts on LLRW.
(26) Tooele County Recorder. 1993. Entry No. 5489, Book 348, Page 104. March 16, 1993.
(27) Utah Bureau of Radiation Control (Larry F. Anderson) letter to Envirocare of Utah, Inc. (Khosrow B. Semnani, President). 1987. "Radioactive Material License No. UT 2300249." November 18, 1991.
(28) Utah Department of Environmental Quality (Diane R. Nielson, Executive Director) and Envirocare of Utah, Inc. (Khosrow B. Semnani, President). 1993. "Agreement Establishing Covenants and Restrictions." March 16, 1993.
(29) Utah Division of Radiation Control (Dane Finerfrock) to Envirocare of Utah, Inc. (Daniel Shrum). 2007. "EnergySolutions 2006 Annual Surety Submittal, May 21, 2007 Update." June 1, 2007.
(30) Utah Division of Radiation Control (Dane Finerfrock) to Envirocare of Utah, Inc. (Tye Rogers). 2004. "Restoration of Site Drainage." November 12, 2004.
(31) Utah Division of Radiation Control (Dane Finerfrock) to Envirocare of Utah, Inc. (Tye Rogers). 2005a. "Response to December 4, 2004 Report - Restoration of Site Drainage: Request for Additional Information." February 23, 2005.
(32) Utah Division of Radiation Control (Dane Finerfrock) to Envirocare of Utah, Inc. (Tye Rogers). 2005b. "Response to March 25, 2005 Envirocare Response to the February 27, 2005 DRC Request for Information - Restoration of Site Drainage." April 22, 2005.
(33) Utah Division of Radiation Control (Dane Finerfrock) to Envirocare of Utah, Inc. (Tye Rogers). 2007. "Restoration of Grade - Round 1 Interrogatories: Notice of Upcoming Requirements and Request for Schedule." February 16, 2007.
(34) Utah Division of Radiation Control (Loren Morton) to EnergySolutions (Tye Rogers) . 2006. Correspondence regarding "DRC Response to Eight Submittals by EnergySolutions Regarding Proposed Class A Combined (CAC) Disposal Cell: Request for Additional Information, Round 3 Interrogatory." March 3, 2006.
(35) Utah Division of Radiation Control to EnergySolutions, LLC. 2006. Letter of approval of Revision 20 of the CQA/QC Manual. September 21, 2006.
(36) Utah Division of Radiation Control (William Sinclair) to Envirocare of Utah, Inc. 2000.

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Correspondence concerning expectations in addressing the land ownership issue. March 6, 2000.
(37) Utah Division of Radiation Control. 2006a. Memorandum: Analysis of the December 20, 2005 Envirocare Submittal of Settlement Monitoring Plan Update. February 2, 2006. (Johnathan P. Cook to Loren Morton)
(38) Whetstone Associates, Inc. memorandum to Envirocare of Utah, Inc. 2000. Technical Memorandum 41010 Infiltration Through Lower Radon Barrier, Class A, B, & C Cell Cover. November 7, 2000.
(39) Whetstone Associates, Inc. 2000a. Revised Envirocare of Utah Western LARW [Class A] Cell Infiltration and Transport Modeling. July 19, 2000.
(39a) Whetstone Associates, Inc. memorandum to Envirocare of Utah, Inc. 2001. Technical Memorandum 4101M Results of Cf-251 Modeling for the Class A Cell, Using the 898-year Half Life, August 21, 2001.
(40) Whetstone Associates, Inc. 2001a. "Travel Time Through Class A Cell Cover." June 22, 2001.
(41) Whetstone Associates, Inc. 2003b. Memorandum to Dan Shrum, Envirocare of Utah, "Open Cell Modeling Results for Years 7 – 12," Technical Memorandum 4101T, August 28, 2003.
(42) Whetstone Associates, Inc. 2004. Revised Western LARW Cell Infiltration and Transport Modeling. July 19, 2004.
(43) Zion's Bank and Energy Solutions, LLC, 2007. Surety Details. March 27, 2007.
(44) "Envirocare's Cover Test Cell Evaporative Zone Depth (EZD) Report", Daniel B. Shrum of Envirocare of Utah, LLC to Dane L. Finerfrock of Utah Division of Radiation Control, CD05-0487, October 13, 2005.
(45) "Cover Test Cell Data Report Addendum: Justification to Change EZD from 18-inches to 24-inches", Envirocare of Utah, LLC, October 5, 2005.
(46) "October 13, 2005 Envirocare Submittal Regarding Cover Test Cell Evaporative Zone Depth (EZD) Report: CAC Cell Round 2 Interrogatory", Loren B. Morton of Utah Division of Radiation Control to Daniel B. Shrum of Envirocare of Utah, LLC, November 1, 2005.
(47) "Class A Combined Embankment Interrogatories: Clarification of Envirocare October 13, 2005 Evaporative Zone Depth Report", Daniel B. Shrum of Envirocare of Utah, LLC to Dane L. Finerfrock of Utah Division of Radiation Control, CD05-0518, November 2, 2005.
(48) "Response to DRC Letter dated November 1, 2005 in Regards to Envirocare's October 13, 2005 Evaporative Zone Depth Report", Daniel B. Shrum of Envirocare of Utah, LLC to Dane L. Finerfrock of Utah Division of Radiation Control, CD05-0520, November 3, 2005.
(49) "Cover Test Cell As-Built Report", Envirocare of Utah, LLC, January 24, 2002.
(50) Appendix N, "Cover Test Cell Monitoring Report" dated June 20, 2003, Envirocare of Utah, LLC, License Renewal Application, Revision 2, dated June 20, 2005
(51) Appendix G, "Drawings" variously dated, Envirocare of Utah, LLC, License Renewal Application, Revision 2, dated June 20, 2005.
(52) "Attachment 4: EZD Cover Test Cell Data" CD-ROM attached to "Radioactive Material License #UT2300249 and Groundwater Quality discharge Permit No. UGW450005. Class A Combined Disposal Embankment – Response to September 19, 2005 Interrogatories", Tye Rogers of Envirocare of Utah, LLC to Dane L. Finerfrock of Utah Division of Radiation Control, CD05-

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0574, December 16, 2005.
(53) "HDU Data", Mike LeBaron of Envirocare of Utah, LLC to Loren Morton of Utah Division of Radiation Control and Robert Baird of URS Corporation, e-mail dated December 19, 2005.
(54) "Cover Test Cell WCR Data", Mike LeBaron of Envirocare of Utah, LLC to Loren Morton of Utah Division of Radiation Control and Robert Baird of URS Corporation, e-mail dated December 20, 2005.
(55) "Matric Potential Conversion Factor", Mike LeBaron of Envirocare of Utah, LLC to Loren Morton of Utah Division of Radiation Control and Robert Baird of URS Corporation, e-mail dated December 21, 2005.
(56) "RE: Evaporative Pan Data (39400085.10300 OUT)", Mike LeBaron of Envirocare of Utah, LLC to Loren Morton of Utah Division of Radiation Control and Robert Baird of URS Corporation, e-mail dated December 22, 2005.
(57) "Report Combined Embankment Study: Envirocare", AMEC Earth and Environmental, Inc., December 13, 2005.
(58) "Geotechnical Study Increase in Height and Footprint: Envirocare LARW Facility Near Clive, Utah", AMEC Earth and Environmental, Inc., May 27, 2005.
(59) "Class A Disposal Cell: Containerized Waste Facility: Engineering Justification Report", Envirocare of Utah, April 12, 2001.
(60) "Class A Disposal Cell: Containerized Waste Facility: Engineering Justification Report: Addendum 15 Percent Void Space Criteria", Envirocare of Utah, October 2, 2001.
(61) "Mixed Waste Embankment Engineering Justification Report" Revision 2, Envirocare of Utah, October 20, 2001
(62) "Minimum Temperature Return Rates", personal communication from Jim Ashby, November 1, 2000.
(63) "Review of Cover Design for LARW Cell", TerraMatrix/Montgomery Watson to Envirocare of Utah, February 5, 1998.
(64) "Cover Test Cell As-Built Report", Envirocare of Utah, January 24, 2002.
(65) Letter CD02-0097, "Revised CQA/QC Manual - Containerized Waste Facility: Placement of Large Liners/HICs", Envirocare of Utah to Utah Division of Radiation Control, March 18, 2002.
(66) Letter CD02-0269, "Revised CQA/QC Manual - Containerized Waste Facility: Placement of Large Liners/HICs - Response to Interrogatories", Envirocare of Utah to Utah Division of Radiation Control, July 3, 2002.
(67) Letter CD02-0315, "Revised CQA/QC Manual - Containerized Waste Facility: Placement of Large Liners/HICs - Revised Settlement Analysis and CQA/QC Language", Envirocare of Utah to Utah Division of Radiation Control, August 7, 2002.
(68) Letter CD02-0339, "Revised CQA/QC Manual - Containerized Waste Facility: Placement of Large Liners/HICs - Proposed Revision 15 of the LLRW CQA/QC Manual", Envirocare of Utah to Utah Division of Radiation Control, August 26, 2002.
(69) Letter CD01-0212, "Engineering Justification Report - Waste Placement with CLSM", Envirocare of Utah to Utah Division of Radiation Control, May 16, 2001.
(70) Letter CD01-0296, "Containerized Waste Facility - Placement of Class A Ion-Exchange Resins in

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Polyethylene HICs and Steel Liners", Envirocare of Utah to Utah Division of Radiation Control, July 5, 2001.

H. The following documents refer to revisions made in Amendment 1:
(1) Letter CD07-0420, "RML UT2300249, Condition 58 –Request for Amendment to the Waste Characterization Plan, dated July 23, 2007.
(2) Letter CD08-0078, "RML UT2300249, Condition 58 –Request for Amendment to the Waste Characterization Plan."
(3) Letter CD08-0004, "RML UT2300249 Amendment for Calibration Sources" dated January 2, 2008.
(4) Letter CD08-0066, "RML UT2300249; Request to amend License Condition 32" dated February 28, 2008.
(5) Email dated February 29, 2008, from Boyd Imai to Mark Ledoux Re: Amendment Request (CD08-004).
(6) Email dated November 23, 2007, from John Hultquist to Sean McCandless, Request for Information regarding WCP:
(7) Letter dated March 7, 2008, Utah Division of Radiation Control (Dane Finerfrock) to EnergySolutions, LLC. (Sean McCandless). "Appendix I Organization dated February 28, 2008."
(8) Memorandum from John Hultquist to File; dated March 11, 2008, Review of WCP revised November 9, 2007, and March 10, 2008.

I. The following documents refer to revisions made in Amendment 2:
(1) Executive Secretary's letter dated May 16, 2008 [LA# 116-2008]

J. The following documents refer to revisions made in Amendment 3:
(1) Letter CD08-0218, "Clive Transportation Hub" dated July 9, 2008.
(2) Email dated July 28, 2008, from Mark Ledoux to Boyd Imai, "Clive cask hub."
(3) Letter CD08-0339, Request to Amend License Conditions 10, 38, 43, and Table 40.A, dated October 21, 2008.
(4) Letter CD08-0137, Request for Amendment to Condition 54, Site Radiological Security Plan, dated May 5, 2008.
(5) Email dated May 6, 2008, from Mark Ledoux to John Hultquist, License condition 57 proposed changes.
(6) Letter CD08-0111, RML UT2300249 License Condition 26, and RML UT2300478 License Condition 13.1.D Environmental Monitoring Plan, dated April 4, 2008
(7) Letter CD08-0115, RML UT2300249 License Condition 26, and RML UT2300478 License Condition 13.1.D Environmental Monitoring Plan, dated April 9, 2008
(8) Email dated November 13, 2008, from John Hultquist to Sean McCandless, Summary of meeting regarding the Env. Monitoring Plan.
(9) Email dated December 11, 2008, from Sean McCandless to John Hultquist, Procedure CL-RS PR-120 Rev 2. Access Control Points, DRC Comment Rev.
(10) Letter CD08-0376, RML UT2300249 License Condition 26, and RML UT2300478 License

**UTAH DIVISION OF RADIATION CONTROL**
**RADIOACTIVE MATERIALS LICENSE**
**SUPPLEMENTARY SHEET**

License # UT 2300249
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Condition 13.1.D Environmental Monitoring Plan, dated November 24, 2008

(11) Email dated December 15, 2008, from Sean McCandless to John Hultquist, Procedure CL-RS PR-120 Rev 2. Access Control Points, Form update.

K. The following documents refer to revisions made in Amendment 4:

(1) Letter dated January 26, 2009, (CD09-0020) from Daniel Shrum to Dane Finerfrock; Radioactive Material License No: UT230029 and UT2300478; Revision of Appendix I, *Organization*.

(2) Letter dated January 28, 2009, John Hultquist to Dan Shrum, Request for Information, Revision to Appendix I *Organization* submitted January 26, 2009.

(3) Letter dated February 9, 2009, (CD09-0038) from Dan Shrum to Dane Finerfrock, Revision to Appendix I *Organization*. Response to Request for Information.

L. The following documents refer to revisions made in Amendment 5:

(1) Letter dated July 27, 2009, (CD09-0188) from Daniel Shrum to Dane Finerfrock; Radioactive Material License Number UT 2300249 - Request for Amendment.

(2) Letter dated May 6, 2009, (CD09-0116) from Sean McCandless to Dane Finerfrock, Radioactive Material License #UT 2300249 – Request for Amendment and Response to April 15, 2009, Request for Information.

(3) Letter dated May 28, 2009, Dane Finerfrock to Sean McCandless, 2009 Module 14 Engineering Inspection – Soil Lab and Testing Methods with accreditation for License Condition 45, Radioactive Materials License UT 2300249 Closeout Letter.

(4) Letter dated April 7, 2009, (CD09-0091) from Sean McCandless to Dane Finerfrock Radioactive Material License #UT 2300249 and Ground Water Quality Discharge Permit No. UGW450005 - Response to DRC Request for Information

(5) Memorandum from Dave Esser to File, dated May 21, 2009, Proposed correction to the Ground Water Quality Discharge Permit UGW45005 and Radioactive Material License UT2300249 – Amendment Review regarding section, disposal cell, and buffer zone Latitude and Longitude coordinates.

M. The following documents refer to revisions made in Amendment 6:

(1) Letter dated October 22, 2007, (CD07-0340) from Sean McCandless to Dane Finerfrock; Radioactive Material License Number UT 2300249 - Request for Amendment to Conditions 14.B and 16.F.ii.

(2) Letter dated November 20, 2007, from John Hultquist to Sean McCandless, Formerly Characteristic Hazardous Waste meeting, request to Amendment, Radioactive Material License #UT 2300249.

(3) URS Memorandum dated December 10, 2007, Gary Merrell to Dane Finerfrock Review of Whetstone Technical Memorandum, "Formerly Characteristic Waste Modeling of Class A and Class A North Cells," from Susan Wyman to Dan Shrum, September 25, 2007.

(4) Letter dated January 21, 2009, (CD09-0015) from Sean McCandless to Dane Finerfrock Formerly Characteristic Waste – Response to Letter dated November 20, 2007.

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(5) Letter dated January 21, 2009, (CD09-0014) Timothy Orton to Dennis Downs, Div. of Solid and Hazardous Waste, Class 2 Modification – Management of Wastes at the Mixed Waste Facility that will be disposed at the LLRW Facility.
(6) Memorandum dated February 18, 2009, from Boyd Imai to John Hultquist, EnergySolutions Amendment Request (CD07-0340).
(7) Memorandum dated September 21, 2009, from Boyd Imai to John Hultquist, Review; Formerly Characteristic Waste – License Amendment Request.
(8) Letter dated August 31, 2009, Sean McCandless to Dane Finerfrock, Radioactive Material License No. UT2300249 – Revised request for Amendment – Formerly Characteristic (LLRW Destined) Waste.
(9) Email dated October 15, 2009, Sean McCandless to John Hultquist, Formerly Characteristic, Attachments Revised RML 10/8/09 and WCP Revised 10/8/09.
(10) Memorandum dated October 19, 2009, from Boyd Imai to John Hultquist, Formerly Characteristic Wastes – Transfer to LLRW.

N. The following documents refer to revisions made in Amendment 7:
(1) Letter dated September 21, 2009, (CD09-0241) from Val J. Christensen to Amanda Smith; RML No. UT2300249 – Commitments Relating to Depleted Uranium Disposal.
(2) Letter dated October 1, 2009, (CD09-0258) from Val J. Christensen to Dane Finerfrock; RML No. UT2300249 – Commitments Relating to Depleted Uranium Disposal
(3) Notice of Agency Action to Consider Proposed License Condition No. 35 dated October 21, 2009.
(4) Email dated February 22, 2010, from Laura Lockhart to Dane Finerfrock and John Hultquist, License Condition documents –comment response document.

O. The following document refer to revision made in Amendment 8:
(1) Letter dated June 1, 2010, (CD10-0162) from Sean McCandless to Dane Finerfrock; RML No. UT2300249—Request for Amendment.
(2) Letter dated July 15, 2010, (CD10-0200) from Sean McCandless to Rusty Lundberg; RML No. UT2300249—Revision of Appendix I, *Organization.*
(3) Letter dated August 2, 2010, (CD10-0219) from Sean McCandless to Rusty Lundberg; RML No. UT2300249—Revision of Appendix I, *Organization.*
(4) Letter dated November 1, 2010, (CD10-0298) from Rick Chalk to Rusty Lundberg; 1. Radioactive Material License UT 2300249, License Condition 16.1 (sic) Letter dated November 23, 2009 to Dane Finerfrock from Mark Ledoux, CD09-0323, 2. Administrative request from DRC to EnergySolutions to amend License UT 2300249, License Conditions 6, 7, and 8.
(5) Email date November 18, 2010, from Thomas Brown to Boyd Imai, LC 8 E, K, M and O.

P. The following documents refer to revision made in Amendment 9:
(1) Letter dated December 6, 2010, (CD10-0347) from Dan B. Shrum to Rusty Lunberg; RML No. UT2300249—Amendment Request – Condition 35.B, Depleted Uranium.
(2) Memorandum dated December 13, 2010, from John Hultquist to File regarding Amendment

**UTAH DIVISION OF RADIATION CONTROL**
**RADIOACTIVE MATERIALS LICENSE**
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License # UT 2300249
Amendment # ~~13~~14

request.

Q. The following documents refer to revision made in Amendment 10:
(1) Letter dated February 24, 2011, (CD11-0045) from Dan Shrum to Rusty Lundberg; Radioactive Material License No. UT2300249, License Condition 35.B.
(2) Letter dated February 24, 2011, from Rusty Lundberg to Dan Shrum Radioactive Material License No. UT2300249, License Condition 35.B Depleted Uranium Performance Assessment.
(3) Letter dated March 14, 2011 (CD11-0075) from Dan Shrum to Rusty Lundberg Radioactive Material License No. UT2300249, License Condition 35.B Depleted Uranium Performance Assessment.

R The following documents refer to revision made in Amendment 11:
(1) Letter dated September 30, 2010, (CD10-0264) from L. Wayne Johns to Rusty Lundberg; Radioactive Material License No. UT2300249, License Condition 26, and Radioactive Material License No. UT2300478, License Condition 13.1.D Environmental Monitoring Plan.
(2) Letter dated October 21, 2010, (CD10-0290) from L. Wayne Johns to Rusty Lundberg; Radioactive Material License No. UT2300249, License Condition 26, and Radioactive Material License No. UT2300478, License Condition 13.1.D Environmental Monitoring Plan.
(3) Memorandum dated October 21, 2010, from Bill Craig to File; EnergySolutions request to change Appendix R.
(4) Email dated January 25, 2011, from John Hultquist (DRC) to Sean McCandless (ES) regarding draft license and statement of basis.
(5) Email dated January 27, 2011, from John Hultquist (DRC) to Sean McCandless (ES) responding to proposed language change to LC 60.

S The following documents refer to revisions made in Amendment 12:
(1) Letter dated August 2, 2011, (CD11-0183) from Sean McCandless to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 6.E, 9 and 10.
(2) Letter dated August 17, 2011, (CD11-0224) from Sean McCandless to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 6.E, 9 and 10; Revised Request.
(3) Letter dated August 25, 2011, (CD11-0234) Sean McCandless to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 52 and 54.
(4) Email dated October 5, 2011, from Ryan Johnson (DRC) to Sean McCandless (ES); Request to Amend License Condition 52.
(5) Email dated October 5, 2011, from Ryan Johnson (DRC) to Sean McCandless (ES); Request to Amend License Condition 54.
(6) Letter dated October 13, 2011 (CD11-0282) Sean McCandless to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 52 and 54.
(7) Letter dated October 27, 2011, from Rusty Lundberg to Dan Shrum; Radioactive Material License

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License # UT 2300249
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No. UT2300249: Division of Radiation Control's (DRC) Response to Amend License Conditions 52 and 54, dated August 25, 2011.

(8) Letter dated October 27, 2011, (CD11-0293) from Sean McCandless to Rusty Lundberg; Radioactive Material License No. UT2300249, Response to Inspection Report dated October 18, 2011. Radiation Safety Inspection, Containerized Waste Facility (CWF) Operations.

(9) Letter dated November 2, 2011, (CD11-0298) from Rick Chalk to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 6.E, 9 and 10; Revised Request.

(10) Letter dated November 7, 2011, from Rusty Lundberg to Sean McCandless; Radioactive Material License No. UT2300249: Division of Radiation Control's (DRC) Response to Amend License Conditions 39.B, dated October 27, 2011.

(11) Email dated November 8, 2011, from Ryan Johnson (DRC) to Sean McCandless (ES); Draft Statement of Basis and Amendment #12 of Radioactive Material License UT2300249.

(12) Letter dated November 8, 2011, (CD11-0307) from Sean McCandless to Rusty Lundberg, Radioactive Material License No. UT2300249; Revision of Appendix I, *Organization*.

(13) Email dated November 15, 2011, from Ryan Johnson (DRC) to Sean McCandless (ES); Amendment request for LC 32.A.

T The following documents refer to revisions made in Amendment 13:

(1) Letter dated August 2, 2011, (CD11-0183) from Sean McCandless to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 6.E, 9 and 10.

(2) Letter dated August 17, 2011, (CD11-0224) from Sean McCandless to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 6.E, 9 and 10; Revised Request.

(3) Letter dated November 2, 2011, (CD11-0298) from Rick Chalk to Rusty Lundberg; Radioactive Material License No. UT2300249, Request to Amend License Conditions 6.E, 9 and 10; Revised Request.

(4) Email dated November 17, 2011, from Ryan Johnson (DRC) to Sean McCandless (ES); Amendment request to store gauges on Section 29.

U. The following documents were submitted in support of proposed Amendment #14:

1) AMEC Earth & Environmental, Inc. 2011. Report: Geotechnical Update Report – EnergySolutions Clive Facility Class A West Embankment, February 15, 2011

2) AMEC Earth & Environmental, Inc. 2011. Cover Letter – Response to Interrogatory CAW R313-25-8(4)-16/1: Seismic Hazard Evaluation, EnergySolutions Clive Facility, Class A West Embankment, Clive, Tooele County, Utah. report: Geotechnical Update Report – EnergySolutions Clive Facility Class A West Embankment, Clive, Tooele County, Utah. October 25, 2011.

3) AMEC Earth & Environmental, Inc. 2011. Response to Interrogatory CAW R313-25-8(4)-16/1: Seismic Hazard Evaluation, EnergySolutions Clive Facility, Class A West Embankment, Clive, Tooele County, Utah. October 25, 2011

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4) AMEC Earth & Environmental, Inc. 2011. Response to Interrogatory CAW R313-25-8(4)-16/2: Seismic Hazard Evaluation, EnergySolutions Clive Facility, Class A West Embankment, Clive, Tooele County, Utah. December 23. 2011.
5) AMEC Earth & Environmental, Inc. 2012. Report: Response to Interrogatory CAW R313-25-8(4)-16/3: Seismic Hazard Evaluation/Seismic Stability Analysis Update, EnergySolutions Clive Facility, Class A West Embankment, Clive, Tooele County, Utah. April 6, 2012.
6) AMEC Earth & Environmental, Inc. 2012. Addendum: Additional Cyclic Softening Analysis, EnergySolutions Clive Facility, Class A West Embankment, Clive, Tooele County, Utah. May 3, 2012.
7) EnergySolutions, LLC. 2011. (CD11-0123) License Amendment Request: Class A West Embankment, with Attachments 1 Through 7 and cover letter from Sean McCandless to Mr. Rusty Lundberg at Utah Division of Radiation Control dated May 2, 2011.
8) EnergySolutions, LLC. 2011. (CD11-0207) Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No. UGW450005. Amendment and Modification Request – Class A West Embankment; Correction to Letter dated July 27, 2011, to Mr. Rusty Lundberg at Utah Division of Radiation Control.
9) EnergySolutions, LLC. 2011. (CD11-0295) Responses to Round 1 Interrogatories: License Amendment Request (UT2300249) for the Class A West Embankment and cover letter to Mr. Rusty Lundberg at Utah Division of Radiation Control, October 28, 2011.
10) EnergySolutions, LLC. 2011. (CD11-0327) Supplemental Responses to Round 1 Interrogatories: License Amendment Request (UT2300249) for the Class A West Embankment, November 28, 2011 and cover letter to Mr. Rusty Lundberg at Utah Division of Radiation Control, November 29, 2011.
11) EnergySolutions, LLC. 2012. (CD12-008) Radioactive Material License #UT2300249, Class A West - Round 2 Interrogatory Response, dated January 12, 2012.
12) EnergySolutions, LLC. 2012. (CD12-0049) Radioactive Material License #UT2300249, Class A West - Response to Division Request and Round 3 Interrogatory dated February 23, 2012.
13) EnergySolutions, LLC. 2012. (CD12-0065) Radioactive Material License #UT2300249, Revised CAW Well Spacing Analysis, dated March 3, 2012.
14) EnergySolutions, LLC. 2012. (CD12-0075) Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No. UGW450005, Amendment and Modification Request - Class A West Embankment: Response to Round 3 Interrogatory URCR R313-25-7(3)-04, with attachments. Letter from Tim Orton, EnergySolutions, to Mr. Rusty Lundberg, Utah Division of Radiation Control, dated March 20, 2012.
15) EnergySolutions, LLC. 2012. (CD12-0093) Radioactive Material License #UT2300249 - Class A West Embankment: Class A West: Round 3 Seismic Stability Response, dated April 4, 2012.
16) Email dated April 6, 2012, from Sean McCandless to John Hultquist and Robert Baird; Final Report for CAW Round 3 Interrogatory Response.
17) EnergySolutions, LLC. 2012. (CD12-0095) Radioactive Material License #UT 2300249 and Ground Water Quality Discharge Permit No. UGW450005. Amendment and Modification Request – Class A West Embankment: Complete, Electronic Submittal.

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18) EnergySolutions, LLC. 2012. (CD12-0114) Radioactive Material License #UT2300249 - Class A West Embankment: Liquefaction Addendum, Response to DRC Comments and Suggestions and Complete Electronic Copy.
19) Whetstone Associates, Inc. 2011. EnergySolutions Class A West Disposal Cell Infiltration and Transport Modeling Report, April 19, 2011.
20) Whetstone Associates, Inc. 2011. EnergySolutions Class A West Disposal Cell Infiltration and Transport Modeling Report, November 28, 2011.
21) Whetstone Associates, Inc. 2012. EnergySolutions Class A West Disposal Cell Infiltration and Transport Modeling Report, February 23, 2012.
22) EnergySolutions, LLC. 2012. (CD12-00185) Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No. UGW450005 - Class A West Embankment: Clay Distortion Study Plan.

**UTAH DIVISION OF RADIATION CONTROL ~~BOARD~~**

_____ _____

Rusty Lundberg, ~~Executive Secretary~~Director Date

# APPENDIX E
# COPY OF HUNTSMAN – ENERGY*SOLUTIONS* AGREEMENT – MARCH 15, 2007

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# AGREEMENT

This agreement is entered into by and between the Governor of the State of Utah and EnergySolutions, LLC, and any successor or assignee ("EnergySolutions") as follows:

1. EnergySolutions will promptly withdraw the Combined Class A Cell license amendment currently pending before the Utah Board of Radiation Control and its Executive Secretary. EnergySolutions may complete the required licensing process for conversion of the remaining already licensed unused capacity (the "converted already licensed capacity") of the currently-licensed 11e.(2) Cell to a Class A Cell (the "Converted Class A Cell"), and upon successfully meeting all technical and legal requirements, utilize the converted already licensed capacity for the disposal of low-level radioactive waste in the Converted Class A Cell.

2. EnergySolutions and the State of Utah reiterate their commitment that they do not support Class B or C low-level radioactive waste or radioactive waste having a higher radionuclide concentration than the highest radionuclide concentration allowed under licenses existing on February 25, 2005, being disposed in the State of Utah as outlined in Utah Code Annotated Section 19-3-103.7.

3. For so long as EnergySolutions refrains from applying for a license, license amendment, or license renewal for disposal of low-level radioactive waste beyond the currently-licensed low-level radioactive waste cell volumes, which were licensed as of May 1, 2006, and the Converted Class A Cell, the Governor agrees to refrain from making, and shall not permit his designee to make, any request to the Northwest Interstate Compact on Low-Level Radioactive Waste Management (the "Compact") regarding low-level radioactive waste volumes for receipt by EnergySolutions, except as necessary to facilitate the Converted Class A Cell volume, or to initiate or support action to limit the volume of low-level radioactive waste on Section 32, Township 1S, Range 11W, of EnergySolutions' Clive Facility.

4. Nothing in this agreement shall be construed as an admission by EnergySolutions that the Compact has jurisdiction over its operations or facilities or a waiver of EnergySolutions' rights of recovery, if any, for unlawful taking without due process of law, impairment of third-party contracts, violation of vested property rights, or similar claims, based on future actions of the State of Utah or the Compact. Notwithstanding the foregoing, this agreement shall not be used as the basis for any claims against the State of Utah or the Compact.

5. Except for the commitments made by the Governor pursuant to this agreement, nothing in this agreement shall alter or limit the authority or legal rights of the State of Utah, the Compact, the Utah Board of Radiation Control, or the Board's Executive Secretary.

This Agreement will take effect upon the signatures of the parties.

Jon M. Huntsman, Jr.
Governor
State of Utah

March 15, 2007
Date

By Steve Creamer
Chief Executive Officer
EnergySolutions, LLC

3/15/07
Date

# APPENDIX F

## COPY OF ENGINEERING DRAWING 10014-C08
## "KEYING IN" CELL LINER
## APRIL 28, 2011

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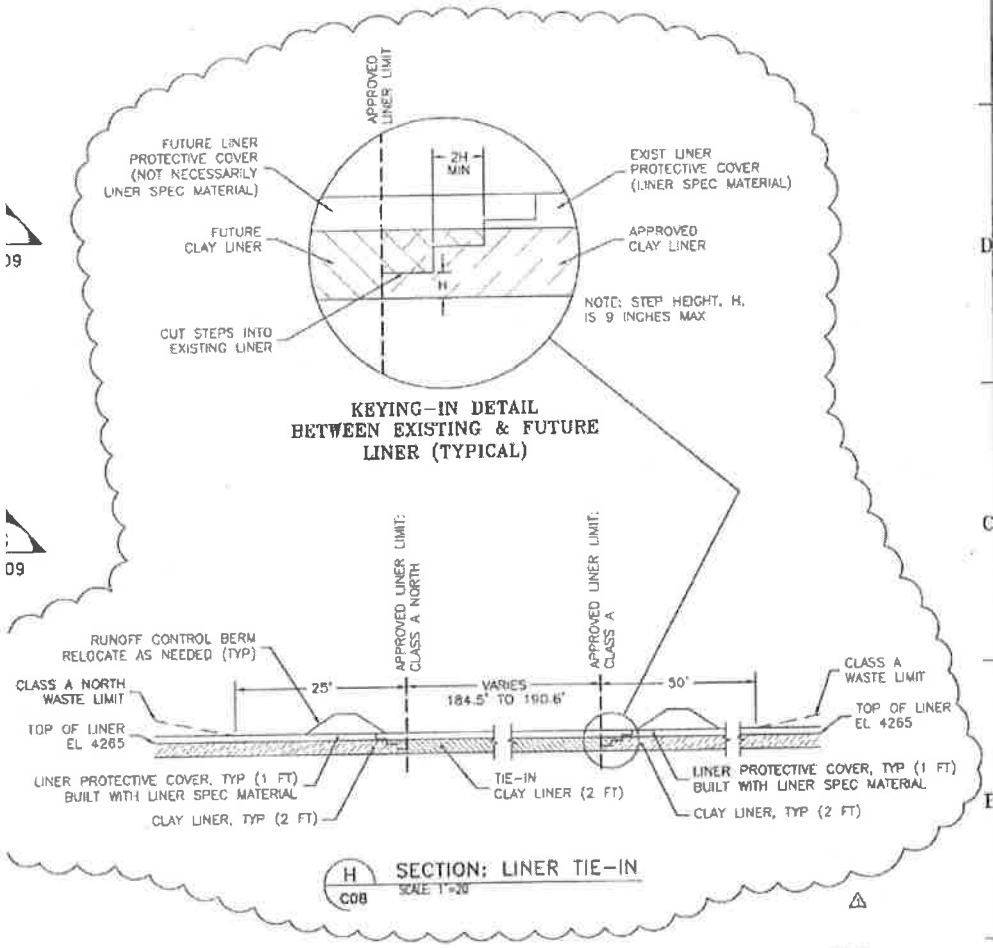


LEGEND:

- CLASS A & CLASS A NORTH EMBANKMENTS
- WASTE LIMITS: CLASS A WEST
- BREAKLINES: CLASS A WEST
- LINER LIMITS: CLASS A WEST
- CWF DISPOSAL AREAS

LICENSED PROFESSIONAL ENGINEER
No. 189500
DAVID F BOOTH
1/5/12
STATE OF UTAH

| DATE | BY | DESCRIPTION OF CHANGE |
|---|---|---|
| 1/5/12 | | ISSUED FOR LICENSING/CONSTRUCTION: REVISED WASTE LIMIT (TOE OF WASTE) AT |
| 4/28/11 | | ISSUED FOR LICENSING/CONSTRUCTION |

ENERGYSOLUTIONS

ENERGYSOLUTIONS "CLIVE" FACILITY
CLASS A WEST EMBANKMENT
CLASS A, CLASS A NORTH & CLASS A WEST MAP
CLIVE, UTAH

FINAL DRAWING

| | |
|---|---|
| D. BOOTH | |
| C. DUTSON | |
| D. BOOTH | |
| AS NOTED | 04/28/11 |

10014
C08

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# Appendix G

Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No UGW 450005; Request for Variance to Approve Waste Limits for the Class A Cell

ENERGY*SOLUTIONS*

April 11 2012 DRC-2012-001315 CD12 0085

RECEIVED
APR 12 2012
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Mr Rusty Lundberg
Director
Utah Division of Radiation Control
P O Box 144810
Salt Lake City UT 84114 4810

Re Radioactive Material License #UT2300249 and Ground Water Quality Discharge Permit No UGW 450005 Request for Variance to Approved Waste Limits for the Class A Cell

Dear Mr Lundberg

Energy*Solutions* submitted a request for license amendment and discharge permit modification for the Class A West cell design on May 5, 2011 It is our understanding that technical review of the request is nearly complete with outstanding interrogatories relating to seismic and liquefaction issues awaiting response from Energy*Solutions* Our consultant on these issues reports that the response is expected within the week This response will then require DRC technical review It is hoped that final approval following a public comment period can be achieved sometime this summer

However ongoing waste disposal operations will require additional capacity prior to that time Although the Class A North cell design is fully approved and provides more than adequate capacity for ongoing disposal operations as well as site closure volumes the site is near the open cell limit of 3 65 million square feet provided at License condition 11 One option given this situation is to amend the license to increase this limit and move ongoing disposal operations into the Class A North cell Such an amendment would require supporting surety calculations and funding as well as its own public comment period However given the status of the Class A West design review the need for additional open cell area is likely to be short term and therefore may not be the best use of the Division s licensing resources

As an alternative to increasing the open cell area, Energy*Solutions* requests approval to place a limited volume of waste on top of the Class A cell This waste would be placed above the existing height limits for the Class A cell design (but within the limits proposed for the Class A West cell design) in accordance with all applicable waste placement requirements in the LLRW and 11e (2) CQA/QC Manual In terms of the LLRW surety the material will be considered overbuild volume and funded as such prior to implementation of any approval

EnergySolutions requests approval for up to 70 000 cubic yards of material to be placed as overbuild volume in this manner The attached surety calculations show that this volume in addition to the existing overbuild allowance of 33 611 (based on August 2011 as built surveys) requires an additional $380 365 in surety funding This funding will be added to the current approved (2010 annual update) LLRW surety total of $70 030 485 46 prior to any waste placement under the variance

EnergySolutions understands that any waste material placed above the current approved Class A cell limits will be done at our own risk If for any reason the Class A West design must be revised such that waste placed under the requested variance must be relocated that activity will be completed entirely at our expense

Please contact me at 801 649 2151 with any questions regarding this issue

Sincerely

Sean McCandless
Director of Compliance and Permitting

encl

cc John Hultquist DRC (w/ encl )

| | A | B | | | E | | G | | | | K | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | k | Item | | | | | Units | Quantity | 2011 Unit Cost | 2010 Unit Cost | Total Cost | Means Reference # | Notes |
| 45 | 203 | HEALTH PHYSICS STAFF AND RAD SURVEY EQUIPMENT | | | | | | | | | | | |
| 45 | | Note Assume HP support is needed for 24 months to account for pre closure preparation | | | | | | | | | | | |
| | | and post closure shutdown | | | | | | | | | | | |
| | | This includes three to four months for survey set up and other miscellaneous HP functions | | | | | | | | | | | |
| 45 | | HEALTH PHYSICS AND SURVEY EQUIPMENT | | | | | | | | | | | |
| | | | PPE & miscellaneous supplies | | | | Each | 1 00 | $ 12 940 65 | $12 686 91 | $12 941 | | |
| | | | In situ gamma spectrometer | | | | Each | 2 00 | $ 68 370 00 | $68 370 00 | $136 740 | | Revised per Third Party Quote 2008 |
| 45 | | | Badging | | | | LS | 1 00 | $ 19 410 95 | $19 030 34 | $19 411 | | |
| 45 | | | Analytical costs | | | | LS | 1 00 | $ 127 247 64 | $124 752 58 | $127 248 | | |
| | | HEALTH PHYSICS PERSONNEL | | | | | | | | | | | |
| 46 | | | Senior Health Physicist | | | | Days | 520 00 | $ 648 72 | $ 636 00 | $337 335 | | Revised per Third Party Quote of $79 50/hr |
| 2 | | | Senior HP Technician | | | | Days | 520 00 | $ 403 92 | $ 396 00 | $210 039 | | Revised per Third Party Quote of $49 50/hr |
| 46 | | | HP Technician (2) | | | | Days | 1 040 00 | $ 336 60 | $ 330 00 | $350 064 | | Revised per Third Party Quote of $41 25/hr |
| | | | CLOSURE REPORT | | | | Each | 1 00 | $ 23 857 80 | $ 23 390 00 | $23 858 | | 520 hours of mid level engineer reporting at $44 98/hr Revised Estimate per Hourly Mean Wage from latest BLS Occupational Employment and Wages May 2007 |
| 46 | | | | | | | | | | | | | |
| 46 | | HEALTH PHYSICS PERSONNEL FOR DECONTAMINATION OF EQUIPMENT IN GENERAL CLEAN UP SECTION | | | | | | | | | | | |
| 46 | | | | | | | Hours | 3500 00 | $ 42 08 | 41 25 | $147 280 | | Revised per Third Party Quote of $41 25/hr |
| 46 | | | | | | | | | | | | | |
| 46 | | | | | | | | | Total | | $1,364,916 | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | 204 | DISPOSAL VOLUMES AND LINER CONSTRUCTION | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | Summary of Volumes from Previous Sections in Cubic Yards (CY) | | | | | | | | | | | |
| | | Debris to be disposed with CLSM | | | | | | 31 052 06 | | | | | |
| | | Debris | | | | | | 115 476 97 | | | | | |
| | | | | | | | | | | | | | Soil volume is greater than debris volume therefore assuming 1 1 placement with Compactor no additional fill is required |
| | | Fill required for Debris | | | | | | 0 00 | | | | | |
| | | Contaminated Soil Ballast and Stored Waste | | | | | | 214 839 16 | | | | | |
| | | Total Material Disposed of | | | | | | 361 368 19 | | | | | |
| | | | | | | | | | | | | | |
| | | Overbuild removal and placement | | | | | | | | | | | |
| | | | Excavation | | | | CY | 73 611 00 | $ 1 80 | | $132 500 | 31 23 16 42 0260 | Excavate down to native soils add 15 / for loading costs |
| | | | Haul | | | | CY | 73 611 00 | $ 2 33 | | $171,514 | 31 23 23 20 1014 | Haul material using a 12 CY dump truck @ 0 5 miles RT |
| | | | Placement | | | | CY | 73,611 00 | $ 1 55 | | $114,098 | 31 23 23 17 0020 | Place soil in cell w/dozer |

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**LLRW SURETY**
**2010 Annual Revision**

| | k | Item | Units | Quantity | 2011 Unit Cost | 2010 Unit Cost | Total Cost | Means Reference # | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 5 | | Compaction of material in cell | CY | 73 611 00 | $ 0 67 | | $49 320 | 31 23 23 23 5600 | excav/backfill/compact compaction sheepsfoot 6 lift 2 passes |
| | | LINER | | | | | | | |
| | | Note Need to construct the following to meet design criteria | | | | | | | |
| | | Liner | SF | 71 596 00 | | | | | |
| | | Remove Overburden | CY | 1 745 82 | $ 1 42 | | $2 480 | 31 23 16 42 0260 | Assume remove top 1 of 10 Unit 4 layer (11 / of cover volume is overburden) |
| | | Excavation of clay | CY | 7 935 56 | $ 2 49 | | $19 760 | 31 23 16 42 0260 | add 75 / to excavation cost to account for heavy soil and loading into trucks |
| | | Haul volumes | CY | 7,935 56 | $ 2 33 | | $18 490 | 31 23 23 20 1014 | Haul material using a 12 CY dump truck @ 0 5 miles RT |
| | | Place material in cell | CY | 7 935 56 | $ 1 55 | | $12 301 | 31 23 23 17 0020 | Place soil in cell w/dozer |
| | | Compaction of material in cell | CY | 7 935 56 | $ 0 67 | | $5 317 | 31 23 23 23 5600 | excav/backfill/compact compaction sheepsfoot 6 lift 2 passes |
| | | | | | Total | | $525 780 | | |
| | 205 | SETTLEMENT MONITORING | | | | | | | |
| | | Temporary Cover | | | | | | | |
| | | Temporary Cover (one foot of native soil) | | | | | | | |
| 0 | | | | | | | | | |
| | | Remove Overburden | CY | 14 759 21 | $ 1 42 | | $20 959 | 31 23 16 42 0260 | Assume remove top 1 of 10 Unit 4 layer (11 / of cover volume is overburden) |
| | | Excavation of clay | CY | 134 174 67 | $ 2 49 | | $334 095 | 31 23 16 42 0260 | add 75 / to excavation cost to account for heavy soil and loading into trucks |
| | | Haul volumes | CY | 134 174 67 | $ 2 33 | | $312 627 | 31 23 23 20 1014 | Haul material using a 12 CY dump truck @ 0 5 mile RT |
| | | Placement of material | CY | 134 174 67 | $ 1 55 | | $207 971 | 31 23 23 17 0020 | Place soil in cell w/dozer |
| | | Compaction of material | CY | 134 174 67 | $ 0 67 | | $89 898 | 31 23 23 23 5600 | excav/backfill/compact compaction sheepsfoot 6 lift 2 passes |
| | | Surveys | Each | | | | | | |
| | | Monuments | Each | 384 00 | $ 45 32 | $44 43 | $17 403 | | Based on current purchase costs and increased annually for inflation |
| | | Labor | Hours | 320 00 | $ 89 74 | $87 98 | $28 717 | | Based on hourly surveyor cost of $80 per hour |
| | | Bi annual Engineering Review | | 2 00 | $ 2 691 63 | $2 638 85 | $5 384 | | Based on 24 hours of engineer time at $100 per hour for each review |
| | | | | | Total | | $1 017 054 | | |
| | 206 | SURCHARGING | | | | | | | |

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**LLRW SURETY**
**2010 An ual Rev s on**

| | k | Item | C | D | | F | Units | Quantity | 2011 Unit Cost | J 2010 Unit Cost | Total Cost | Means Reference # | N Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 58 | $ 103 258 | $ 57 981 | 83 | 103 258 05 | $ 45 212 | | | | |
| | | | | 59 | $ 103 258 | $ 57 407 | 84 | 103 258 05 | $ 44 764 | | | | |
| | | | | 60 | $ 103 258 | $ 56 838 | 85 | 103,258 05 | $ 44 321 | | | | |
| | | | | 61 | $ 103 258 | $ 56 276 | 86 | 103 258 05 | $ 43 882 | | | | |
| | | | | 62 | $ 103 258 | $ 55 718 | 87 | 103 258 05 | $ 43 447 | | | | |
| 04 | | | | 63 | $ 103 258 | $ 55 167 | 88 | 103 258 05 | $ 43 017 | | | | |
| | | | | 64 | $ 103 258 | $ 54 621 | 89 | 103 258 05 | $ 42 591 | | | | |
| | | | | 65 | $ 103 258 | $ 54 080 | 90 | 103 258 05 | $ 42 170 | | | | |
| | | | | 66 | $ 103 258 | $ 53 544 | 91 | 103 258 05 | $ 41 752 | | | | |
| | | | | 67 | $ 103 258 | $ 53 014 | 92 | 103 258 05 | $ 41 339 | | | | |
| | | | | 68 | $ 103 258 | $ 52 489 | 93 | 103 258 05 | $ 40 929 | | | | |
| | | | | 69 | $ 103 258 | $ 51 970 | 94 | 103 258 05 | $ 40 524 | | | | |
| | | | | 70 | $ 103 258 | $ 51 455 | 95 | 103 258 05 | $ 40 123 | | | | |
| | | | | 71 | $ 103 258 | $ 50 946 | 96 | 103 258 05 | $ 39 726 | | | | |
| | | | | 72 | $ 103 258 | $ 50 441 | 97 | 103,258 05 | $ 39 332 | | | | |
| 04 | | | | 73 | $ 103 258 | $ 49 942 | 98 | 103 258 05 | $ 38 943 | | | | |
| | | | | 74 | $ 103 258 | $ 49 447 | 99 | 103 258 05 | $ 38 557 | | | | |
| | | | | 75 | $ 103 258 | $ 48 958 | 100 | 103 258 05 | $ 38 176 | | | | |
| | | | | | | | | Second 50 Years | $ 2 460 924 | | | | |
| | 502 | **SUBTOTAL SUMMARY** | | | | | | | | | | | |
| | | Closure Costs | | | | | | | $ 55 020 234 37 | | | | |
| | | Post Closure Costs (Year 1 50) | | | | | | | $ 4 339 061 63 | | | | |
| | | Post Closure Costs (Year 51 100) | | | | | | | $ 2 460 924 45 | | | | |
| | 503 | **TOTAL SUMMARY** | | | | | | | | | | | |
| | | TEMPORARY STORAGE TANKS | | | | | | | | | | | |
| | | Decontamination and release only | | | | | 0 00 | 3 096 00 | $ | | | | |
| | | **PROPOSED AMOUNT FOR CLOSURE IS** | | | | | | | **$ 61,820,220 45** | | | | |
| | | | | | | | | Current Value | $ 55 980 707 63 | | | | |
| | | | | | | | | Increase over Current | $ 5 839 512 82 | | | | |
| | | | | | | Perpetual Care Fund Balance as of 11/23/2011 | | | $ 4 409 369 99 | | | | |
| | | | | | | | | Perpetual Care Requirement | $ 13 000 000 00 | | | | |
| | | | | | | | | Perpetual Care LOC Value | $ 8 590 630 01 | | | | |
| | | | | | | | | Combined Total | $ 70 410 850 46 | | | | |
| | | | | | | Current Combined Total | | | $ 65 393 882 18 | | | | |
| | | | | | | LOC Change | | | $ 5 016 968 28 | | | | |

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# Professional Certification

## CERTIFYING ENGINEER CERTIFICATION

I David F Booth P E (Utah No 189500 2202) do hereby certify that I have reviewed this revised annual surety submittal which was prepared in accordance with the approved drawings and specifications

David F Booth P E

4/11/12
Date

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