GROUND WATER QUALITY DISCHARGE PERMIT UGW450005

STATEMENT OF BASIS

Low-Level and 11e.(2) Radioactive Waste Disposal Facility

EnergySolutions, LLC
423 West 300 South, Suite 200
Salt Lake City, Utah 84101

February 13, 2012

Purpose

This Statement of Basis describes proposed changes to Ground Water Quality Discharge Permit No. UGW450005 (hereafter Permit) for the EnergySolutions Low-Level and 11e.(2) Radioactive Waste Disposal Facility at Clive, Tooele County, Utah; located in Section 32, Township 1 South, Range 11 West, Salt Lake Baseline and Meridian. The operation of a waste disposal facility encompasses a complicated process of continual on-going observation, surveillance, inspections, and evaluations to assure the satisfactory performance of the facility and to protect groundwater quality. To maintain facility performance and respond to Permittee requests, changes to the Permit are proposed, as outlined below. These changes are related to Permittee requests to the Utah Division of Radiation Control (hereafter DRC), ongoing assessments of the facility, and administrative changes to the Permit. The acceptance and implementation of these proposed changes will replace the previous Permit modification, dated June 8, 2011.

Each of the changes described below are considered minor in nature by the Executive Secretary, and as a result are not subject to a public comment period. Minor changes to the Permit are those that are considered to have no impact on the protection of the environment, a change of requirements to be more stringent than those already existing, or administration in nature to clarify Permit conditions. Proposed changes to the EnergySolutions' Ground Water Quality Discharge Permit, in a draft (redline/strikeout) version, are shown in Appendix A.

Minor Permit Changes

Table of Contents change - part number headings were added to the Table of Contents for clarity.

Various Font types and sizes were used as the Normal text in paragraphs in the Permit; therefore, to be consistent throughout the Permit, paragraphs were changed to one Font type and size (Times New Roman 12 pt).

Ground Water Protection Levels - Universal for all 11e.(2) Wells, Part I.C.2, Table 1C - in a letter dated June 3, 2010 the Permittee requested an amendment to their 11e.(2) License that replaced 11e.(2) License specific groundwater protection requirements with references to the

Permit. Ground water protection requirements in the 11e.(2) License were a legacy from the Nuclear Regulatory Commission (NRC) 11e.(2) License for the facility, when the State of Utah obtained Agreement State status from the NRC in August 2004 for 11e.(2) material. The Executive Secretary agreed with the Permittee proposal, and technical details are found in memorandums dated June 6, 2011 and November 29, 2011 that evaluated the utilization of the Permit for groundwater protection. Given the benefit of groundwater protection, and the design and operation standards imposed in the Permit, which specifies safe design and management practices to prevent the releases of contaminants, the DRC preferred the single, logical, and systematic procedures found in the Permit to provide for the protection of groundwater.

During this evaluation of groundwater protection in the 11e.(2) License, there were individual parameters identified in the 11e.(2) License, based upon the results of previous sampling events, or their probability of being found in 11e.(2) waste at the Clive facility, that needed to be added to the Permit analytical list for the 11e.(2) embankment (Table 1C). Parameters identified by the DRC during its evaluation as significant to 11e.(2) waste, but not included in the Permit parameter list for the 11e.(2) embankment, with proposed Ground Water Protection Levels (GWPL) are:

Parameter	*GWPL*
Benzo(a)anthrancene	0.010
Benzo(a)pyrene	0.010
Benzo(k)fluoranthene	0.010
Chlordane	0.002
Chrysene	0.010

The GWPLs proposed for Benzo(a)anthrancene, Benzo(a)pyrene, Benzo(k)fluoranthene, and Chrysene are the practical quantitation limits, and are the concentration limits used for these compounds in the Mixed Waste groundwater monitoring program. The groundwater protection level proposed for chlordane is the Utah Ground Water Quality Standard listed in Utah Administrative Codes (UAC) for Water Quality, UAC R317-6-2, and is the concentration limit used for this compound in the Mixed Waste groundwater monitoring program. The Executive Secretary believes that incorporating these parameters into Table 1C (Ground Water Protection Levels - Universal for all 11e.(2) Wells) of the Permit will provide a performance based list that is more protective of groundwater.

Approved Engineering Design Drawings for Waste/Wastewater Related Facilities, Part I.D.12, Table 5 - all of the engineering design drawings described below have been reviewed and subsequently approved by the Executive Secretary. The following engineering design drawings have been modified to depict the current design and construction of Waste/Wastewater Related Facilities:

1. Rail Car Wash Facility on Track No. 2 - -n October 27, 2011 the Permittee informed the Executive Secretary that they had removed the Track No. 2 Railcar Decontamination Pad. The Rail Car Wash Facility on Track No. 2 had been idle for a number of years and its demolition had been anticipated by the DRC. The DRC evaluated the removal of the Rail Car Wash Facility on Track No. 2 in a

memorandum dated November 21, 2011. Because there is no longer a Track 2 Railcar Decontamination Pad, there is no longer a potential discharge to groundwater from this facility, the Executive Secretary approved the removal of the facility in a November 23, 2011 DRC letter. This item is removed from Table 5 of the Permit.

2. Large Component Area Class A North Embankment - in a letter dated June 27, 2011 the Permittee requested a minor modification to the approved design for the Large Component area in the Class A North Embankment. The Permittee wanted to reconfigure the stormwater collection area, provide for the placement of large components, and other minor modification within the pad area. The Executive Secretary approved the construction plan in a DRC letter dated August 4, 2011. On September 8, 2011 the Permittee submitted an As-Built Report for the Large Component Pad Area modification. The Large Component Pad Area modification was approved by the Executive Secretary on September 13, 2011 and drawing 04080-C05 is updated here.

3. Rotary Dump Wash Facility - in a letter dated April 28, 2011 the Permittee requested a minor modification to the engineered design plans for the Rotary Dump Wash Facility. The Permittee was proposing the construction of a stair access system to improve safety for personnel access/egress to and from railcars. The Executive Secretary conditionally approved the construction of the ladder system in a DRC letter dated May 10, 2011. On November 10, 2011 the Permittee submitted the final As-Built Report for the modification to the Rotary Dump Wash Facility. The DRC inspected and evaluated the footings, floor, and seals to assure groundwater protection in a memorandum dated November 21, 2011. The Executive Secretary approved the As-Built Report as a minor modification to the Rotary Dump Wash Facility in a DRC letter dated November 22, 2011, and drawing 056006-C3 and 05006-F5 are updated here.

4. North West Corner Pond - in a letter dated May 6, 2011 the Executive Secretary directed the Permittee to submit new engineered design plans for a permanent water transfer facility for the North West Corner Pond. The Permittee responded to the request from the Executive Secretary on June 9, 2011 with plans for the Water Transfer Facility for the North West Corner Pond (NWCP). The new NWCP Water Transfer facility was part of enhanced stormwater management at the Clive facility. The Permittee proposed, associated with this Plan, to removal one drawing, 06021-G1, Rev 3, to be consistent with the other drawing sets in Table 5; and the modification of two drawing, 06021-C1, Rev 3 and, 06021-C2, Rev 6; and the addition of two new drawing, 06021-C10, Rev 0 and 06021-C11, Rev 0. The Executive Secretary granted permission to construct the Northwest Corner Evaporation Pond water Transfer Facility on June 21, 2011, and final approval of the facility on November 23, 2011. So, the approved engineering design drawings for the Northwest Corner Evaporation Pond are updated.

General Stormwater Management Requirements, Part I.E.7 - in a letter dated December 12, 2011 the Permittee requested a minor Permit modification that clarifies requirements and provides operational flexibility for stormwater management at their Clive facility (stormwater is precipitation from rain and snow events that reaches the ground surface). The reason for the request was to allow more efficiency in the use of all water removal equipment during stormwater events, and to improve overall stormwater management. The more efficient use of water removal equipment, and improved stormwater management efficiency at the Clive facility would increase groundwater protection.

Because the Clive facility is located in an arid region, where evaporation exceeds precipitation, the importance of stormwater as a contaminant release mechanism is most likely at times when there is standing water on the ground surface. Stormwater that has come in contact with waste, or any waste handling areas is contact stormwater. Stormwater accumulates on the ground surface in any low or bermed areas of the Clive facility, since surface soils generally have low hydraulic conductivity at the site. Contact stormwater may contain contaminates that could negatively impact water quality, and has to be managed by the Permittee to prevent it from infiltrating to groundwater. Thus, the Executive Secretary considers stormwater an important medium for the mobilization of contamination from an embankment, and makes stormwater management a high priority at the Clive facility.

Part I.E.7 of the Permit specifies the requirements and priorities for managing and disposing of stormwater, and requires the removal of stormwater in a specified sequence. However, the history of stormwater management activities at the Clive facility has indicate meeting stormwater requirements can be problematic, and conditions in the past have caused the non-use of water management equipment, due to the equipment's inability or ineffectiveness in removing stormwater from higher priory areas. The proposed Permit language maintains the removal of contact stormwater, from higher priority locations; however, the proposed changes would allow non-contact stormwater, and wastewater (wash water) removal to occur simultaneously with the removal of contact stormwater, provided the equipment used does not interrupt timely removal of contact stormwater at higher priory locations. The flexibility to use equipment that is not being used during storm water management would be an advantage in stormwater management at the Clive facility. This would lead to more efficient water removal, reducing the residence time of water without increasing the time required to remove higher priority stormwater; thus, enhancing environmental protection and operational safety of the facility by facilitating quicker overall recovery from storm events.

The Permittee also requested in the December 12, 2011 letter to use contact stormwater for dust control purposes at the Shredder Facility. The Shredder Facility is designed to provide free drainage of any water on its concrete pad (bulk waste is placed on the concrete pad) to seven catchbasins that drain to a manhole with a submersible pump connected to a pipeline that conveys water to storage tanks located on the concrete pad. Bulk waste at the Shredder Facility requires water for dust suppression, using contact stormwater will reduce the volume of non-contact water needed for this purpose. Once water contacts waste on the concrete pad of the Shredder Facility, even non-contact water, it becomes contact water, and the system is designed to handle contact water. The facility is inspected daily to ensure free drainage of water from the concrete pad to the catchbasins. The Shredder Facility is designed, operated, and inspected to minimize the potential for contact water discharge to groundwater.

The Executive Secretary has reasoned that the proposed language does not harm the protection of groundwater, and agrees with the Permittee that allowing operational flexibility for non-contact and contact stormwater, and wastewater management by removal of these simultaneously under certain conditions will facilitate quicker overall recovery from storm events, and thus provide more overall protection to groundwater. The proposed language also acknowledges that contact stormwater and wastewater needs to be removed simultaneously at the waste handling facilities. These changes would give the Permittee the ability to use equipment as necessary, as long as it does not interrupt timely removal of contact stormwater at higher priority locations, allowing the facility to use all equipment available on site for removal of stormwater. Additionally, the priority schedule for the removal of an accumulation of contact stormwater is now given in Appendix J, BAT Performance Monitoring Plan and does not need to be duplicated in Part I.E.7 of the Permit. The Executive Secretary has also concluded that the request to use contact stormwater for dust control at the Shredder Facility seems reasonable and poses no additional concerns to facility workers, or the environment. Groundwater protection is not compromised by allowing the uses of contact stormwater for dust control, given the pad is designed and built for contact stormwater and there is a daily inspection requirement to verify free drainage conditions. Part I.E.7 is changed to reflect the above proposals.

Wastewater Management Requirements, Part I.E.14.a.5 - the Permittee has proposed and the Executive Secretary accepted the use of ancillary equipment at the approved evaporation ponds. The ancillary equipment is intended to reduce the volume of water in the evaporation ponds by enhancing evaporation during the summer months. The removal of water from the evaporation ponds will aid in stormwater management at the Clive facility and improve overall groundwater protection, with minimal risk to the environment. This was approved by the Executive Secretary in a DRC letter dated September 12, 2011.

Wastewater Management Requirements, Part I.E.14.c - the Permittee informed the Executive Secretary on October 27, 2011 they had removed the Track No. 2 Rail Car Wash facility. The DRC evaluated the removal of the Rail Car Wash Facility on Track No. 2 in a memorandum dated November 21, 2011. The Executive Secretary approved the removal of the facility in a November 23, 2011 DRC letter. The old Rail Car Wash Facility on Track No. 2 is removed from this condition of the Permit.

Mixed Waste Leachate Monitoring, Part I.F.15 - the Permittee is required to collect representative samples of leachate from the Mixed Waste embankment leachate collection system on an annual basis. However, there is not always leachate in the Mixed Waste embankment leachate collection system. The Water Monitoring Quality Assurance Plan (Appendix B of the Permit) does not require the Permittee to take a sample if no leachate is present during the sampling event. Part I.F.15 is changed for clarity, and to be consistent with Appendix B, Water Monitoring Quality Assurance Plan of the Permit.

Rail Car Wash Facility Monitoring, Part I.F.18 - the Permittee informed the Executive Secretary on October 27, 2011 they had removed the Track No. 2 Rail Car Wash Facility. The DRC evaluated the removal of the Rail Car Wash facility on Track No. 2 in a memorandum dated November 21, 2011. The Executive Secretary approved the removal of the facility in a November 23, 2011 DRC letter. The Track No. 2 Rail Car Wash Facility is removed from this condition of the Permit.

Stormwater Monitoring, Part I.F.24 - in a letter dated December 12, 2011 the Permittee requested a minor typographical correction, to make the meaning of the text clearer. This minor typographical correction is made to the text for clarification.

Revision of the Water Monitoring Quality Assurance Plan (QAP), Part I.I.2 - the Water Monitoring Quality Assurance Plan (QAP), Appendix B of the Permit is used to monitor the effectiveness of sampling and analytical protocols, verify that parameters of concern are actually detected, and ensure the results of laboratory analyses of water samples are accurate and precise, so that sampling results can be relied upon for decision-making. To more effectively assess data usability, this compliance schedule item required the existing data evaluation protocols in the QAP be revised to maintain the defensibility of the data collected. Since this Plan has been submitted under a cover letter dated March 1, 2010 by the Permittee; subsequently reviewed by the DRC in memorandums dated July, 28, 2011 and September 13, 2011; and approved by the Executive Secretary in a DRC letter dated October 6, 2011, this compliance item is no longer necessary. Therefore, Part I.I.2 has been removed from the Permit.

Water Monitoring Quality Assurance Plan, Appendix B - the DRC reviewed the required submittal, corresponding to Part I.I.2 of the Permit, in memorandums dated July 28, 2011 and September 13, 2011. The revisions to the Water Monitoring Quality Assurance Plan were approved by the Executive Secretary in an October 6, 2011 DRC letter. The primary change approved in this revision was the updating of procedures to correspond to the annual sampling frequency which was subjected to public comments in a 2009 Permit modification. The remaining revisions strengthened requirements, or were editorial in nature. The date of the approved EnergySolutions document is now August 30, 2011.

Construction Quality Assurance Plan for Collection Lysimeter Construction and Operation, Maintenance, and Closure Plans for Collection Lysimeters and Related Approvals, Appendix C - in a letter dated June 6, 2011 the Permittee requested a minor modification to Appendix C, Construction Quality Assurance Plan for Collection Lysimeter Construction; and Operation, Maintenance, and Closure Plans for Collection Lysimeters and Related Approvals.

Changes proposed to the existing text, the prior Appendix C was dated January 9, 2004, for the Operation, Maintenance, and Closure Plans for Collection Lysimeters of Appendix C by the Permittee were: (1) the monitoring schedule was clarified; and an allowance was added for

monitoring to go to monthly two years after initial waste placement; (2) a note addressing standing water that collects in lysimeter transfer pipes was added; (3) the DRC approved evaporation ponds that were added as a disposal option for water removed from a collection lysimeter, in excess of that needed for sampling; (4) the DRC approved priority for analytical parameters analysis was added to the plan, and the volume of fluid needed was updated; and (5) the closure plan was revised and now includes additional details and requirements for abandonment of a collection lysimeter at a location that will have waste placement over a former manhole location in the future.

Changes proposed for the Construction Quality Assurance Plan for Collection Lysimeter Construction of Appendix C were also minor. Changes consisted of (1) updated personnel titles in the definitions, so titles reflect current duties; (2) corrected and updated ASTM references; (3) updated titles in responsibilities section; (4) a changed in responsibility for notification to the DRC, from Construction Quality Engineer to the Project Manager; (5) some forms duplicated in the LLRW and 11e.(2) CQA/QC Manual were removed from Appendix C; (6) updated some facility procedures with current procedures; (7) a drawing that is internal to Appendix C (not listed in the Permit) was updated; and (8) added Construction Certification Report requirements.

The DRC reviewed the proposed revised Construction Quality Assurance Plan for Collection Lysimeter Construction; and the Operation, Maintenance, and Closure Plans for Collection Lysimeters; Appendix C of the Ground Water Quality Discharge Permit, No. UGW450005, in a memorandum dated June 6, 2011 and found changes to Appendix C acceptable, with some minor modifications. The changes to the document are associated with minor operational and procedural changes that have occurred at the facility since the document was last updated. The revised Appendix C will continue to provide collection lysimeter monitoring that meets the original intent of the collection lysimeter systems. The revisions to the Construction Quality Assurance Plan for Collection Lysimeter Construction and Operation, Maintenance, and Closure Plans for Collection Lysimeters and Related Approvals, Appendix C of the Permit were approved by the Executive Secretary in a June 27, 2011 DRC Letter. The date of the approved Permittee document is now June 27, 2011.

BAT Performance Monitoring Plan and BAT Contingency Plan, Appendix J and K - these appendices reflect the daily inspection requirements at the Clive facility, and have been updated several times since the last Permit modification. These revisions included:

> Incorporated revisions to BAT criteria and contingency actions are for Ancillary Equipment at Evaporation Ponds; removal of Evaporation Pond alarm inspections; and the removal of waste on the floor of the Rotary Dump Building, if water is above the sediment basin grate. The Permittee originally proposed the revisions for Ancillary Equipment at the Evaporation Ponds, and removal of Evaporation Pond alarm inspections to Appendix J and K in a June 8, 2011 letter, and subsequently resubmitted them in an August 23, 2011 letter. The DRC evaluated these revisions in the August 23, 2011 letter, and also considered the removal of waste already on the floor of the Rotary Dump Building, if

water moves above the sediment basin grate in a memorandum dated September 6, 2011. The Executive Secretary approved the request in a DRC letter dated September 12, 2011. The approved Appendix J and K, with these requirements, were dated September 7, 2011.

Incorporated revisions to BAT criteria and contingency actions are for the operations of the Northwest Corner Evaporation Pond Water Transfer facility, a stair/catwalk system in the Rotary Wash Building of the Rotary Dump facility, and the removal of the Rail Car Wash Facility on Track No. 2. The Permittee requested in a June 9, 2011 letter to construct the Water Transfer facility for the Northwest Corner Pond. The Executive Secretary gave conditional approval for the request to construct the facility; one of the conditions placed on the approval was that Appendix J and K be revised for best available practices procedures. In a letter dated October 24, 2011 the Permittee provided a revised Appendix J and K for the Northwest Corner Pond Water Transfer facility. The DRC reviewed the revised Appendix J and K in a memorandum dated November 21, 2011. The Executive Secretary approved the Appendix J and K changes for the Northwest Corner Evaporation Pond Water Transfer facility in a DRC letter dated November 21, 2011.

The Permittee requested a minor modification to construct a stair system in the Rotary Dump Wash Building in a letter dated April 28, 2011. The Executive Secretary gave conditional approval for the request to construct the stair system to improve safety in a May 10, 2011 letter; one of the conditions placed on the approval was that Appendix J and K be revised. The Permittee provided revised Appendix J and K in a November 15, 2011 email. The DRC reviewed the revised Appendix J and K in a memorandum dated November 21, 2011. The Executive Secretary approved the Appendix J and K changes for the stair system in the Rotary Dump Wash Building in a DRC letter dated November 21, 2011.

The Permittee informed the Executive Secretary on October 27, 2011 that the Rail Car Wash Facility on Track No. 2 and associated BAT inspection points had been demolished and removed. The Permittee also provided revised Appendix J and K for the removal of the Rail Car Wash Facility on Track No. 2 with the October 27, 2011 letter. The DRC reviewed the revised Appendix J and K in a memorandum dated November 21, 2011. The Executive Secretary approved the Appendix J and K changes for the removal of the Rail Car Wash Facility on Track No. 2 in a DRC letter dated November 21, 2011. The approved Appendix J and K, with these requirements, were dated November 14, 2011.

An additional revision to BAT criteria in Appendix J, BAT Performance Monitoring Plan, was made for the incorporation of stormwater management as discussed in this Statement of Basis and proposed by the Permittee in a letter dated December 12, 2011. The proposal added the definitions of contact and non-contact stormwater to the definitions list; and stormwater management as a BAT Performance Monitoring, and inspection requirement at the Clive facility including requirements and priorities for stormwater management, schedule for stormwater removal, and flexibility in equipment utilization to facilitate efficient stormwater management. The DRC evaluated this proposal as part of this Statement of Basis, and approval of this Permit modification will also provide approval of Appendix J, dated December 12, 2011, incorporating stormwater management

requirements. Appendix K required no revision.

Therefore, the revision date for Appendix J, upon this Permit modification approval, is December 12, 2011, and the current revision date for Appendix K is November 14, 2011. The above BAT changes were considered adequate to protect, or not to have an effect on ground water.

References

EnergySolutions, June 3, 2010, Radioactive Materials License UT 2300478 - Amendment Request to Consolidate 11e.(2) Embankment Groundwater Monitoring requirements with the Requirements listed in the Ground Water Quality Discharge Permit (UGW 450005): letter from Sean McCandless of EnergySolutions to Dane Finerfrock of the DRC.

DRC, May 10, 2011, April 28, 2011 Ground Water Quality Discharge Permit (GWDP) N0. UGW450005: Request for Minor Modification of Rotary Dump Facility Wash Building - Conditional Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

DRC, May 26, 2011, Request for Extension of January 5, 2010 Variance that allowed EnergySolutions to Discharge Contact Stormwater directly into the North West Corner Pond - Conditional Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

EnergySolutions, June 6, 2011, Ground Water Quality Discharge Permit #UGW450005; Request for Modification to Appendix C, Collection Lysimeter: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

DRC, June 6, 2011, Request to Consolidate 11e.(2) Embankment's Ground Water Monitoring Requirements, 11e.(2) License UT2300478, Amendment #6, with the Ground Water Quality Discharge Permit, UGW 450005: DRC Memorandum from Charles Bishop to John Hultquist/Loren Morton.

EnergySolutions, June 8, 2011, Ground Water Quality Discharge Permit No. UGW450005 - Submittal of Appendix J and K Revisions for Ancillary Equipment Use at Evaporation Ponds: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

EnergySolutions, June 9, 2011, Ground Water Quality Discharge Permit #UGW450005, Request tor minor modification to Table 5 and Authorization to Construct the Water Transfer Facility for the Northwest Corner Pond: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

DRC, June 15, 2011, June 6, 2011, EnergySolutions request for Modification of Appendix C, Construction Quality Assurance Plan for Collection Lysimeter Construction; and Operation, Maintenance, and Closure Plans for Collection Lysimeters, Ground Water Quality Discharge Permit No UGW450005: DRC Memorandum from Charles Bishop to John Hultquist.

DRC, June 21, 2011, June 9, 2011 Northwest Corner Evaporation Pond Water Transfer Facility - request to construct the "Northwest Corner Evaporation Pond Water Transfer Facility: Conditional Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

DRC, June 27, 2011, June 6, 2011, Request for Modification to Appendix C, "Construction Quality Assurance Plan for Collection Lysimeters Construction" and: "Collection Lysimeter Operation, Maintenance and Closure Plan" Ground Water Quality Discharge Permit No. UGW450005: Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

EnergySolutions, June 27, 2011, Ground Water Quality Discharge Permit #UGW450005; Request for Modification to Table 5, Class A North Large Component Area: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

DRC, July 28, 2011, DRC review of Water Monitoring Quality Assurance Plan, submitted by EnergySolutions in accordance with Part I.I 2 of Ground Water Quality Discharge Permit, UGW450005: DRC Memorandum from Charles Bishop to John Hultquist.

EnergySolutions, August 23, 2011, Ground Water Quality Discharge Permit No. UGW450005 - Revised Submittal of Appendix J and K Revisions for Ancillary Equipment use at Evaporation Ponds: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

DRC, September 6, 2011, Review of August 23, 2011 request to revise Appendix J and K for the addition of Evaporation Ponds Ancillary Equipment; removal of the ponds alarm inspection; and to allow the removal of waste, if water is above the sediment basin grate, in the Rotary Dump Building: DRC Memorandum from Charles Bishop to John Hultquist.

DRC, September 8, 2011, EnergySolutions request to amend Radioactive Material License UT 2300478, consolidating the 11e.(2) embankment's Ground Water Monitoring Requirements into the Ground Water Quality Discharge Permit, UGW450005: Division of Radiation Control Request for Information: letter from Charles Bishop of the DRC to Sean McCandless of

EnergySolutions.

EnergySolutions, September 8, 2011, Ground Water Quality Discharge Permit No. UGW450005 - Large Component Area Minor Modification - As-Built Report: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

DRC, September 12, 2011, revisions to Appendices J and K, Ground Water Quality Discharge Permit No. UGW450005: Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

DRC, September 13, 2011, EnergySolutions' August 30, 2011 response to the Division of Radiation Control request for information and additional revisions to the Water Monitoring Quality Assurance Plan submitted by EnergySolutions in accordance with Part I.I.2 of Ground Water Quality Discharge Permit, UGW 450005: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

DRC, September 13 2011, September 8, 2011 ES Ground Water Quality Discharge Permit No. UGW450005: Large Component Area Minor Modification - As-Built Report: Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

DRC, October 6, 2011, Revised Water Monitoring Quality Assurance Plan, Appendix B of Ground Water Quality Discharge Permit, UGW450005, Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

EnergySolutions, October 11, 2011, Response to Division of Radiation Control Request for Information - Radioactive Material License UT 2300478 - Amendment Request to Consolidated 11e.(2) Embankment Ground Water Monitoring Requirements with the requirements listed in Ground Water Quality Discharge Permit UGW450005: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

EnergySolutions, October 24, 2011, Ground Water Quality Discharge Permit No. UGW450005 - Minor modification request and submittal of As-built report, revised Appendix J and K, and Surety Review for the Northwest Corner Evaporation Ponds Transfer Facility: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

EnergySolutions, November 10, 2011, Ground Water Quality Discharge Permit No, UGW450005: Rotary Wash Facility Minor Modification - Partial As-Built Report and Request to Resume Decontamination Operations: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

EnergySolutions, November 15, 2011, Permit Modification: email from Sean McCandless of EnergySolutions to Charles Bishop of the DRC.

DRC, November 21, 2011, Modification request to revise Appendix J and K: DRC Memorandum from Charles Bishop to John Hultquist.

DRC, November 21, 2011, Request letters dated October 24, and 27; and November 10, 2011 to Revised BAT Performance Monitoring Plan, and BAT Contingency Plan, Appendix J and K of Ground Water Quality Discharge Permit, UGW450005: Partial Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

DEC, November 22, 2011, August 30, 2011 and November 10, 2011 ES Ground Water Quality Discharge Permit No. UGW 450006: Rotary Wash Facility Minor Modification - Partial and Final As-Built Report and Request to Resume Decontamination Operations. Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

DRC, November 23, 2011, EnergySolutions Radioactive Material License No. UR2300249: Northwest Corner Evaporation Pond - Final As-Built Report "Northwest Corner Evaporation Pond Water Transfer Facility" Approval: letter from Rusty Lundberg of the DRC to Sean McCandless of EnergySolutions.

DRC, November 29, 2011, EnergySolutions' Response to the Division of Radiation Control Request for Information regarding the Consolidation of 11e.(2) Embankment's Groundwater Monitoring Requirements, 11e.(2) License UT2300478, Amendment #6, with the Ground Water Quality Discharge Permit, UGW 450005: Memorandum from Charles Bishop to John Hultquist.

EnergySolutions, December 12, 2011, Ground Water Quality Discharge Permit No. UGW450005 - Request for minor modification and approval of revised Appendix J, BAT Performance Monitoring Plan: letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

Appendix A
Revisions to the Ground Water Quality Discharge Permit
(Redline/Strikout version of Permit)

Permit No. UGW450005

STATE OF UTAH
DIVISION OF WATER QUALITY
UTAH WATER QUALITY BOARD
P.O. BOX 16690
SALT LAKE CITY, UTAH 84116-0690

Ground Water Quality Discharge Permit

In compliance with the provisions of the
Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended,

EnergySolutions, LLC
423 West 300 South, Suite 200
Salt Lake City, Utah 84101

hereafter referred to as the "Permittee", is granted a Ground Water Quality Discharge Permit for a Low-Level Radioactive Waste and 11e.(2) Waste Disposal Facility in accordance with conditions set forth herein. This facility currently consists of five separate operable units: a Low-Activity Radioactive Waste (LARW) cell, an 11e.(2) Cell, a Mixed Waste cell, a Class A cell, and a Class A North cell, which are located at approximately latitude 40° 41' 18" North, longitude 113° 06' 54" West.

This modified Ground Water Quality Discharge Permit amends and supersedes all other Ground Water Discharge permits for this facility issued previously.

This modified permit shall become effective on ~~May 16, 2011~~
This permit and the authorization to operate shall expire at midnight, **June 8, 2013.**

Co-Executive Secretary
Water Quality Board

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PART I. SPECIFIC PERMIT CONDITIONS

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Formatte

A. Ground Water Classification

Based on ground water quality data submitted by the permit applicant, ground water in the vicinity of the site is defined as Class IV, saline ground water.

B. Background Ground Water Quality

1. Background Quality from Existing Monitoring Wells

Based on ground water quality samples collected through June 2006, the upper boundary of background ground water quality is defined as the mean concentration plus the second standard deviation for any contaminant in any individual well as determined by the Executive Secretary.

2. Determination and Revision of Background Ground Water Quality

After submittal of additional ground water quality data, background ground water quality values may be revised by the Executive Secretary.

C. Ground Water Protection Levels

1. Ground Water Protection Levels, LARW Cell, Class A Cell, and Class A North Cell

Based on the types of wastes to be received for disposal in the low-activity radioactive waste (LARW) facility, which include naturally occurring radioactive materials (NORM) and Class A low-level radioactive waste (LLRW), an evaluation of indicator isotopes and their mobility, and the Ground Water Quality Standards (GWQS); ground water protection levels (GWPL) are defined as either the GWQS or the Background Concentration, whichever is greater, as listed in Tables 1A and 1B of this Permit. In all cases, ground water quality in any compliance monitoring well at the LARW cell, Class A cell, and Class A North cell shall comply with the GWPLs found in Table 1A, unless other GWPLs have been cited on a well and contaminant-specific basis in Table 1B, below.

2 Ground Water Protection Levels, 11e.(2) Cell

Based on the types of waste to be disposed of in the 11e.(2) cells, an evaluation of the Ground Water Quality Standards; GWPLs for inorganic, dissolved metals, and organic parameters are defined as either the GWQS or the Background Concentration, whichever is greater, as listed in Tables 1C and 1D of this Permit. In all cases, ground water quality in any compliance monitoring well at the 11e.(2) Disposal cells shall comply with the GWPLs found in Table 1C, unless other GWPLs have been cited on a well and contaminant-specific basis in Table 1D, below.

3. Ground Water Protection Levels for Radiologic Parameters, Mixed Waste Cell

Based on the type of waste to be disposed of in the Mixed Waste Cell, which includes low-level radioactive waste, an evaluation of indicater isotopes, and the Ground Water Quality Standards (GWQS); ground water protection levels (GWPL) defined as either the GWQS or the Background Concentration, whichever is greater as listed in Table 1E and 1F of this Permit. In all cases, ground water quality in any compliance monitoring well at the Mixed Waste Cell shall comply with the GWPLs found in Table 1E, unless other GWPLs have been cited on a well and radiologic parameter-specific basis in Table 1F, below.

4 Revision of Ground Water Protection Levels

After submittal of additional ground water quality data, the ground water protection levels may be revised by the Executive Secretary.

Table 1A: Ground Water Protection Levels (GWPL) – Universal to All LARW, Class A, Class A North, and Evaporation Pond Wells

Parameter	GWPL [1]	Parameter	GWPL [1]
Field and Inorganic Parameters (mg/l)		*Radiologic Parameters – Alpha Emitters [9] (pCi/l)*	
Cyanide	0.2		
Fluoride	4.0	Neptunium-237 [10]	7
Total Nitrate/Nitrite (as N)	10.0	Strontium-90	42
pH (units)	6.5 – 8.5	Thorium-230	83
Dissolved Metals (mg/l)		Thorium-232	92
Antimony	0.006	Uranium-233	26
Arsenic	NA [2]	Uranium-234	26
Barium	2.0	Uranium-235	27
Beryllium [3]	0.004	Uranium-236	27
Cadmium	0.005	Uranium-238	26
Chromium	0.1		
Copper	1.3	*Radiologic Parameters – Beta/Gamma Emitters [12] (pCi/l)*	
Lead	0.015	Carbon-14	3,200
Mercury	0.002	Iodine-129 [12]	21
Molybdenum	NA [2]	Technetium-99	3,790
Nickel [3]	0.10	Tritium	60,900
Selenium	0.05		
Silver	0.1	*Combined Radiologic Parameters (pCi/l)*	
Thallium	0.002		
Uranium – total [4]	0.03	Radium-226 + Radium-228 [13]	5
Zinc	5.0		
Organic Parameters (mg/l)			
Acetone [5]	0.7	1,2-Dichloroethane	0.005

Parameter	GWPL [1]	Parameter	GWPL [1]
2-Butanone [14]	4.0	Methylene Chloride [7]	0.005
Carbon Disulfide [5]	0.7	1,1,2-Trichloroethane [8]	0.005
Chloroform [6]	0.08	Vinyl Chloride	0.002

1. All ground water protection levels (GWPLs) derived from Ground Water Quality Standards (GWQS, see UAC R317-6-2), except as noted.
2. Due to naturally elevated concentrations of arsenic and molybdenum in the Class IV saline aquifer at Clive, Utah, these constituents are poor indicators of cell leakage and therefore will not be used as compliance parameters with ground water protection levels. However, the Permittee will continue to sample, analyze, and report arsenic and molybdenum data in all compliance monitoring wells at Permit and License renewal as a best management practice.
3. Beryllium and Nickel GWQS derived from EPA drinking water Maximum Contaminant Levels (MCL), as published in the July 17, 1992 Federal Register, Vol. 57, No. 138, pp. 31776 – 31849, Table 1.
4. Total uranium GWQS of 0.03 mg/l from EPA final MCL in National Primary Drinking Water Regulations Final Rule for Radionuclides (December 7, 2000 Federal Register, Vol. 65, No. 236, p. 76708).
5. GWQS for acetone, and carbon disulfide determined by DWQ staff from reference doses available in the technical literature, see August 8, 1994 DWQ Staff Report: Ground Water Quality Conditions and Proposed Revision to Ground Water Protection Levels, Envirocare of Utah Inc., Low-Level Radioactive Waste and 11e.(2) Waste Disposal Facility, near Clive, Tooele County, Utah, p. 3.
6. GWQS for chloroform derived from a 1998 EPA final drinking water MCL for total trihalomethane compounds in "Drinking Water Standards and Health Advisories", EPA 822-B-00-001, Summer 2000.
7. GWQS for methylene chloride derived from EPA drinking water MCL (ibid.).
8. GWQS for 1,1, 2-Trichloroethane from final EPA MCL in "Drinking Water Regulations and Health Advisories", EPA 822-B-96-002, October 1996.
9. All GWPL values for alpha-emitting radionuclides based on 1E-4 lifetime cancer mortality risk concentration levels provided in 1991 EPA draft MCL values for drinking water (July 18, 1991 Federal Register, Vol. 56, No. 138, pp. 33078-9, 33100-3, and Appendix C).
10. Neptunium-237, as determined by Total Radioactive Neptunium, EPA Method 907.0.
11. All GWPL values for beta/gamma emitting radionuclide parameters based on a 4 millirem/year equivalent dosage, as per 1991 EPA draft MCL values for drinking water (July 18, 1991 Federal Register, Vol. 56, No. 138, pp. 33078, 33103, and Appendix B).
12. Iodine-129, as determined by Total Radioactive Iodine, EPA Method 902.0.
13. GWQS of 5 pCi/l for combined radium-226 + radium-228 from final EPA MCL in National Primary Drinking Water Regulations Final Rule for Radionuclides (December 7, 2000 Federal Register, Vol. 65, No. 236, p. 76708).
14. GWQS for 2-Butanone (methyl ethyl ketone) derived from Life-time health advisory value in "2006 Edition of the Drinking Water Standards and Health Advisories", EPA 822-R-06-013, August 2006.

Table 1B: Ground Water Protection Level Exceptions[1] – LARW, Class A, Class A North, and Evaporation Pond Wells

Well ID	Parameter	GWPL [2]	Well ID	Parameter	GWPL [2]
Inorganic/Metal Parameters (mg/l)					
GW-94	Uranium – total	0.035	GW-105	Selenium	0.095
GW-95	Uranium – total	0.0320			
GW-100	Uranium – total	0.117	P3-95 SWC	Uranium – total	0.180
GW-24	Selenium	0.058			
Radiologic Parameters (pCi/l)					
GW-20	Ra-226+Ra-228	5.49	GW-100	Uranium-234	68.6
				Uranium-238	43.0
GW-24	Ra-226+Ra-228	5.81			
			GW-105	Ra-226+Ra-228	6.03
GW-29	Ra-226+Ra-228	5.59			
			GW-58	Uranium-234	31.2
GW-56R	Ra-226+Ra-228	5.31			
			GW-36	Uranium-234	36.4
GW-64	Ra-226+Ra-228	5.63			
			GW-112	Ra-226+Ra-228	6.72
GW-77	Ra-226+Ra-228	5.46			
			P3-95 SWC	Uranium-234	48
GW-84	Ra-226+Ra-228	6.01		Uranium-238	79
				Ra-226+Ra-228	7.63
GW-85	Ra-226+Ra-228	7.77			
			GW-66R	Ra-226 + Ra-228	5.47
GW-86	Ra-226+Ra-228	6.19			
GW-88	Ra-226+Ra-228	5.04			
GW-89	Ra-226+Ra-228	5.04			
GW-90	Ra-226+Ra-228	5.85			
GW-91	Ra-226+Ra-228	5.92			
GW-93	Ra-226+Ra-228	5.54			

1. Table 1B exceptions constitute specific wells and parameters determined to have natural background ground water quality concentrations above GWQS, or as otherwise specified below. Background concentration is defined as the mean concentration plus the second standard deviation for any contaminant in any individual well.
2. The number of significant figures used for all GWPLs determined by laboratory results previously reported by the Permittee.

Table 1C: Ground Water Protection Levels – Universal for all 11e.(2) Wells

Parameter	GWPL [1]	Parameter	GWPL [1]
Field and Inorganic Parameters [2] (mg/l)		*Organic Parameters – Specific to 11e.(2) (mg/l)*	
Cyanide	0.2	Acetone [5]	0.7
Fluoride	4.0	2-Butanone [11]	4.0
Total Nitrate/Nitrite (as N)	10.0	Carbon Disulfide [5]	0.7
pH (units)	6.5 – 8.5	Chloroform [6]	0.08
Dissolved Metals [2] (mg/l)		1,2-Dichloroethane	0.005
Antimony	0.006	Methylene Chloride [7]	0.005
Arsenic	NA [3]	Naphthalene [8]	0.02
Barium	2.0	Diethyl Phthalate [9]	5.0
Beryllium [4]	0.004	2-Methylnaphthalene [10]	0.004
Cadmium	0.005	Benzo(a)anthrancene	0.01
Chromium	0.1	Benzo(a)pyrene	0.01
Copper	1.3	Benzo(k)fluoranthene	0.01
Lead	0.015	Chlordane	0.002
Mercury	0.002	Chrysene	0.01
Molybdenum	NA [3]		
Nickel [4]	0.10		
Selenium	0.05		
Silver	0.1		
Thallium	0.002		
Uranium – total	0.03		
Zinc	5.0		
Combined Radiologic Parameters (pC/l)			
Radium-226+radium-228	5		
Radiologic Parameters (pC/l)			
Thorium-230	83		
Thorium-232	92		

1. All field, inorganic, dissolved metals, and organic indicator organic parameters and corresponding GWPLs for the 11e.(2) wells are equivalent to those for the LARW wells in Table 1A, above.
2. All ground water protection levels (GWPL) derived from Ground Water Quality Standards (GWQS, see UAC R317-6-2), except as noted.
3. Due to naturally elevated concentrations of arsenic and molybdenum in the Class IV saline aquifer at Clive, Utah, these constituents are poor indicators of cell leakage and therefore will not be used as compliance parameters with ground water protection levels. However, the Permittee will continue to sample, analyze, and report arsenic and molybdenum data in all compliance monitoring wells at Permit and License renewal as a best management practice.
4. Beryllium and Nickel GWQS derived from EPA drinking water Maximum Contaminant Levels (MCL), as published in the July 17, 1992 Federal Register, Vol. 57, No. 138, pp. 31776 – 31849, Table 1.
5. GWQS for acetone, and carbon disulfide determined by DWQ staff from reference doses available in the technical literature, see August 8, 1994 DWQ Staff Report: Ground Water Quality Conditions and Proposed Revision to Ground Water Protection Levels, Envirocare of Utah Inc., Low-Level Radioactive Waste and 11e.(2) Waste Disposal Facility, near Clive, Tooele County, Utah, p. 3.
6. GWQS for chloroform derived from a 1998 EPA final drinking water MCL for total trihalomethane compounds in “Drinking Water Standards and Health Advisories”, EPA 822-B-00-001, Summer 2000.
7. GWQS for methylene chloride derived from EPA drinking water MCL (ibid.).

8. Naphthalene GWQS derived from final EPA drinking water LHA (ibid.).
9. GWQS for diethyl phthalate based on draft EPA drinking water LHA (ibid.).
10. GWQS for 2-methylnaphthalene could not be located or determined, thanks to a lack of reference dosage information in the technical literature. Consequently, a detection monitoring approach has been taken and the GWPL set equal to the minimum achievable detection limit for the compound as a result of matrix interferences from high TDS content of Clive ground water. As health-based risk or other reference dosage information becomes available, the Executive Secretary may modify the Permit and set a GWQS for 2-methlynaphthalene.
11. GWQS for 2-Butanone (methyl ethyl ketone) derived from Life-time health advisory value in "2006 Edition of the Drinking Water Standards and Health Advisories", EPA 822-R-06-013, August 2006

Table 1D: Ground Water Protection Level Exceptions [(1)] – 11e.(2) Wells

Well ID	Parameter	GWPL [(2)]	Well ID	Parameter	GWPL [(2)]
Inorganic/Metal Parameters (mg/l)					
GW-19A	Cadmium	0.0074	GW-27	Uranium – total	0.039
	Selenium	0.077	GW-36	Uranium – total	0.058
GW-25	Uranium – total	0.146	GW-58	Uranium – total	0.046
GW-26	Uranium – total	0.037			

1. Table 1D exceptions constitute specific wells and parameters determined to have natural background ground water quality concentrations above GWQS, or as otherwise specified below. Background concentration is defined as the mean concentration plus the second standard deviation for any contaminant in any individual well.
2. The number of significant figures used for all GWPLs determined by data evaluation and review of analytical method sensitivity.

Table 1E: Ground Water Protection Levels Universal to All Mixed Waste Wells

Parameter	GWPL	Parameter	GWPL
Dissolved Metals (mg/l)			
Uranium – total [(1)]	0.03		
Radiologic Parameters (pCi/l)			
Alpha Emitters [(2)]		*Beta/Gamma Emitters* [(4)]	
		Carbon-14	3,200
Neptunium-237 [(3)]	7	Iodine-129 [(5)]	21
Strontium-90	42	Technetium-99	3,790
Thorium-230	83	Tritium	60,900
Thorium-232	92		
Uranium-233	26		
Uranium-234	26	*Combined Radiologic Parameters (pCi/l)*	
Uranium-235	27	Radium-226 + Radium-228 [(6)]	5
Uranium-236	27		
Uranium-238	26		

1. Total uranium GWQS of 0.03 mg/l from EPA final MCL in National Primary Drinking Water Regulations Final Rule for Radionuclides (December 7, 2000 Federal Register, Vol. 65, No. 236, p. 76708).
2. All GWPL values for alpha-emitting radionuclides based on 1E-4 lifetime cancer mortality risk concentration levels provided in 1991 EPA draft MCL values for drinking water (July 18, 1991 Federal Register, Vol. 56, No. 138, pp. 33078-9, 33100-3, and Appendix C).
3. Neptunium-237, as determined by Total Radioactive Neptunium, EPA Method 907.0.
4. All GWPL values for beta/gamma emitting radionuclide parameters based on a 4 millirem/year equivalent dosage, as per 1991 EPA draft MCL values for drinking water (July 18, 1991 Federal Register, Vol. 56, No. 138, pp. 33078, 33103, and Appendix B).
5. Iodine-129, as determined by Total Radioactive Iodine, EPA Method 902.0.
6. GWQS of 5 pCi/l for combined radium-226 + radium-228 from final EPA MCL in National Primary Drinking Water Regulations Final Rule for Radionuclides (December 7, 2000 Federal Register, Vol. 65, No.236,p.76708).

Table 1F: Ground Water Protection Level Exceptions [(1)] – Mixed Waste Wells

Well ID	Parameter	GWPL [(2)]	Well ID	Parameter	GWPL [(2)]

1. Table 1F exceptions constitute specific wells and parameters determined to have natural background ground water quality concentrations above GWQS, or as otherwise specified below. Background concentration is defined as the mean concentration plus the second standard deviation for any contaminant in any individual well.
2. The number of significant figures used for all GWPLs determined by laboratory results previously reported by the Permittee.

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D. Best Available Technology (BAT) Design Standard

1. Discharge Technology Performance Criteria

Best available technology for the facility will incorporate discharge technology based on the use of earthen materials in both the bottom liner and final cover. However, under no circumstances shall the facility cause ground water at the compliance monitoring wells (Part I.F.1) to exceed the ground water protection levels in Part I.C for the following minimum periods of time:

Disposal Cell	Contaminant Group	Performance Standard*
LARW, Class A, and Class A North	Heavy metals Inorganics Organics Mobile and non-mobile Radionuclides	200 years 200 years 200 years 500 years
11e.(2)	Heavy metals Inorganics Organics	200 years 200 years 200 years
Mixed Waste	Mobile and non-mobile	500 years

* Said performance standards shall be measured from the following initial startup dates: 1988 [LARW Cell], 1992 [Mixed Waste Cell], 1994 [11e.(2) Cells], 2000 [Class A Cell], and 2005 [Class A North Cell]

If after review of any environmental monitoring data collected at the facility, the Executive Secretary determines that the ground water protection levels in Part I.C of the Permit may be exceeded at the compliance monitoring wells before completion of the above-minimum time periods, said potential shall constitute a violation of the Best Available Technology requirements of this Permit.

2. Authorized LARW Cell Engineering Design and Specifications

The best available technology design standard shall be defined by, and construction of the LARW facilities shall conform to the engineering plans summarized in Table 2A, below, and the specifications listed in the approved LLRW and 11e.(2) Construction Quality Assurance/Quality Control (CQA/QC) Plan (Radioactive Materials License No. 2300249 (the License), Condition 44):

For the LARW cell, this engineering design includes, but is not limited to, the following elements:

a) Cover System – shall include the following materials or as specified by the approved LLRW and 11e.(2) CQA/QC Plan (Radioactive Materials License, Condition 44), from the top down:

1) An 18-inch thick erosion barrier consisting of a 1.25-inch, or greater, average diameter rock material over the top-slope area, and a 4.5-inch, or greater average diameter rock material over the side-slope area, as specified on the approved engineering drawing number 9407-4,

2) A 6-inch thick upper filter zone consisting of sandy gravel material,

3) A 12-inch compacted thickness of sacrificial soil with a minimum Residual Moisture Content of 3.5% (by weight). Such Residual Moisture Content shall be the asymptotic value measured by ASTM Methods D-3152 and D-2325 at soil tensions above 15 bars. If the fines content (#200 sieve) of the sacrificial soil is greater than or equal to 15%, residual moisture content testing is not required,

4) A 6-inch lower filter zone consisting of sandy gravel material with a minimum permeability of 3.5 cm/sec,

5) A 2-foot thick clay radon barrier measured perpendicular to the slope. Said radon barrier will be divided into two layers:

   i. An upper layer, 1 foot thick, with a field hydraulic conductivity of 5.0E-8 cm/sec or less, and

   ii. A lower layer, 1 foot thick with a field hydraulic conductivity of 1.0E-6 cm/sec or less.

Top slope of the embankment shall be between 2% and 4%, as specified on the approved engineering drawings, and side slopes shall be no steeper than approximately 5:1. The outside toe of the clay radon barrier/liner shall extend outward and beyond the outermost edge of the waste layer and shall merge with the bottom clay liner.

b) Waste Layer – the waste layer shall not exceed a final thickness of 43 feet above the top of the bottom clay liner.

c) Clay Bottom Liner – the bottom clay liner shall be constructed below natural grade on slopes no greater than 0.12% north to south and 0.2% east to west. Final grade and elevation for the base of the clay liner will comply with the approved engineering design (Table 2A). This liner will be constructed after excavation of the site to the total design depth, followed by placement of imported clay materials, which meet the approved specifications for material and construction. The new clay liner shall be graded to prevent the accumulation of leachate over the existing 1-foot thick clay liner. The clay liner shall be a minimum of 2 feet thick, measured perpendicular to the slope, constructed in accordance with the approved LLRW and 11e.(2) CQA/QC Plan (Radioactive Materials License, Condition 44), and have a field hydraulic conductivity of 1.0E-6 cm/sec or less.

Table 2A: Approved LARW Cell Engineering Design Drawings

Drawing	Last Revision Date	Subject
9407-2, Rev. E	July 28, 1998	LARW Disposal Cell – Cell Location and Excavation Limits
9407-4, Rev. V	February 1, 2005	LARW Disposal Cell – LARW Cell Closure
9407-4A, Rev. L	May 16, 2003	LARW Disposal Cell – LARW Cell Closure
9407-4B, Rev. J	May 16, 2003	LARW Disposal Cell – LARW Cell Closure
9407-5, Rev. I	February 4, 1999	LARW Disposal Cell – Site Layout
9407-6, Rev. E	July 28, 1998	LARW Disposal Cell – Site Layout
9407-7, Rev. A	June 27, 1994	Drainage Plan – Plan View
9407-7A, Rev. A	June 27, 1994	Drainage Plan – Details
9407-8, Rev. C	October 16, 1998	LARW Disposal Cell Wedge Expansion Cross Section
03046-VO1, Rev. 0	May 16, 2003	LARW Disposal Cell – Radon Barrier Design Sections and Details
03046A-VO1 Rev. -	August 1, 2003	LARW Disposal Cell Closure – Plan and Details
03046A-VO2 Rev. 1	August 1, 2005	LARW Disposal Cell Closure – Sections and Details

Table 2A: Approved LARW Cell Engineering Design Drawings

Drawing	Last Revision Date	Subject
03046A-VO3 Rev. -	August 1, 2003	LARW Disposal Cell – Radon Barrier Redesign Sections and Details
03046A-VO4 Rev. -	August 1, 2003	LARW Disposal Cell – Radon Barrier Redesign Sections and Details
03046A-VO5 Rev. -	August 1, 2003	LARW Disposal Cell – Radon Barrier Redesign Section and Details
L9	July 21, 1993	Fence Details

3. 11e.(2) Disposal Cell Design

The best available technology design standard shall be defined by, and construction of the 11e.(2) cell shall conform to the approved engineering design summarized in Table 2B, below, and the specifications listed in the currently approved LLRW and 11e.(2) CQA/QC Plan

Table 2B: Approved 11e.(2) Cell Engineering Design Drawings

Drawing	Last Revision Date	Subject
9420-4, Rev. F	March 4, 2002	11e.(2) Disposal Cell, Layout
9420-5, Rev. D	February 21, 2002	11e.(2) Disposal Cell, Cross Sections
9420-6, Rev. D	December 21, 2002	11e.(2) Disposal Cell, Ditch Cross Sections

Said 11e.(2) cell engineering design shall include, but is not limited to, the following elements:

a) <u>Cover System – shall include the following materials, as described from the top down:</u>

1) Top-slope Area – the top-slope shall consist of the following materials, from the top down:

i) Riprap Erosion Barrier – a 12-inch thick layer of rock armor material with a particle size ranging from 0.75 to 4.50 inches in diameter with an average diameter between 1.125 and 3.0 inches.

ii) Filter Zone – a single 12-inch thick layer of granular material with a particle size ranging from 0.3125 to 3.0 inches in diameter (coarse sand to fine cobble) and a minimum hydraulic conductivity of 42 cm/sec.

iii) Upper Radon Barrier – a layer of clay material at least 12 inches thick with a field hydraulic conductivity of 5.0E-8 cm/sec or less.

iv) Lower Radon Barrier – a layer of clay material at least 3 feet thick with a field hydraulic conductivity of 1.0E-6 cm/sec or less.

The minimum slope for top-slope areas shall be 2.1%.

2) Side-slope Area – the side-slope area shall consist of the following materials, from the top down:

~~1.~~A. Riprap Erosion Barrier – an 18-inch thick layer of rock armor material with a particle size ranging from 2.0 to 16.0 inches in diameter with an average diameter between 4.5 and 8.0 inches.

~~2.~~B. Filter Zone – a single 12-inch thick layer of granular material with a particle size ranging from 0.3125 to 3.0 inches in diameter (coarse sand to fine cobble) and a minimum hydraulic conductivity of 42 cm/sec.

~~3.~~C. Upper Radon Barrier – a layer of clay material at least 12 inches thick with a field hydraulic conductivity of 5.0E-8 cm/sec or less.

~~A.~~D. Lower Radon Barrier – a layer of clay material at least 2.5 feet thick with a field hydraulic conductivity of 1.0E-6 cm/sec or less.

The slope for side-slope areas shall be approximately 20%.

b) 11e.(2) Waste Layer – the 11e.(2) waste shall not exceed a final thickness of 47 feet above the bottom clay liner.

c) Bottom Clay Liner – the clay liner will be constructed only after excavation of the site to the total design depth, followed by placement of imported clay materials which meet the approved specifications for material and construction. The clay liner shall be a minimum of 2 feet thick, measured perpendicular to the slope, and have a field hydraulic conductivity of 1.0E-6 cm/sec or less.

4. Final Authorized Class A and Class A North Cell Engineering Design and Specifications

The best available technology design standard shall be defined by, and construction of the Class A and Class A North facilities shall conform to the engineering plans summarized in Table 2C, below, and the specifications listed in the approved LLRW and 11e.(2) Construction Quality Assurance/Quality Control (CQA/QC) Plan (Radioactive Materials License, Condition 44):

For the Class A and Class A North cells, this engineering design includes, but is not limited to, the following elements:

a) Cover System – top-slope and side-slope areas shall include the following materials or as specified by the approved LLRW and 11e.(2) CQA/QC Plan (Radioactive Materials License, Condition 44), from the top down:

1) An 18-inch thick erosion barrier consisting of a 1.25-inch, or greater, average diameter rock material over the top-slope area, and a 4.5-inch, or greater average diameter rock material over the side-slope area, as specified on the approved engineering drawing number 9821-01,

2) A 6-inch thick upper (Type A) filter zone consisting of sandy gravel material,

3) A 12-inch compacted thickness of sacrificial soil with a minimum Residual Moisture Content of 3.5 % (by weight). Such Residual Moisture Content shall be the asymptotic value measured by ASTM Methods D-3152 and D-2325 at soil tensions above 15 bars, If the fines content (#200 sieve) of the sacrificial soil is greater than or equal to 15%, residual moisture content testing is not required,

4) A 6-inch lower (Type B) filter zone consisting of sandy gravel material with a minimum permeability of 3.5 cm/sec,

5) A 2-foot thick clay radon barrier measured perpendicular to the slope. Said radon barrier will be divided into two layers:

i. an upper layer, 1 foot thick, with a field hydraulic conductivity of 5.0E-8 cm/sec or less, and

ii. a lower layer, 1 foot thick with a field hydraulic conductivity of 1.0E-6 cm/sec or less.

Top slope of the embankment shall be between 2% and 4%, as specified on the approved engineering drawings, and side slopes shall be no steeper than approximately 5:1. The outside toe of the clay radon barrier/liner shall extend outward and beyond the outermost edge of the waste layer and shall merge with the bottom clay liner.

b) **Waste Layer – the waste layer shall not exceed a final thickness of 54 feet above the top of the bottom clay liner.**

c) **Clay Bottom Liner – the bottom clay liner shall be constructed below natural grade. Final grade and elevation for the base of the clay liner will comply with the approved engineering design (Table 2C). This liner will be constructed after excavation of the site to the total design depth, followed by placement of imported clay materials, which meet the approved specifications for material and construction. The clay liner shall be a minimum of 2 feet thick, measured perpendicular to the slope, constructed in accordance with the approved LLRW and 11e.(2) CQA/QC Plan (Radioactive Materials License, Condition 44), and have a field hydraulic conductivity of 1.0E-6 cm/sec or less.**

Table 2C: Approved Class A and Class A North Cell Engineering Design Drawings

Drawing	Last Revision	Subject
Class A Disposal Embankment		
9821-01, Rev. .J	2/9/09	Class A Disposal Cell – Layout Plan and Cover Details
9821-02, Rev. D	2/9/09	Class A Disposal Cell – Cross Sections
9821-03, Rev. D	7/8/09	Class A Disposal Cell – Ditch Details
9821-04, Rev. A	7/25/00	Class A Disposal Cell – Updated Drainage System
Class A North Disposal Embankment		
04080-C01 Rev. 3	2/9/09	Class A North Disposal Cell – Layout Plan and Cover Details

Table 2C: Approved Class A and Class A North Cell Engineering Design Drawings

04080-C02 Rev.4	7/8/09	Class A North Disposal Cell – Cross Sections
04080-C03 Rev. 3	7/8/09	Class A North Disposal Cell – Ditch Details
04080-C04, Rev 3	10/26/09	Class A North Embankment Proposed CWF & LC Area, Area & Haul Road Layout
08080-C06, Rev. 4	10/26/09	Class A North Embankment Proposed CWF Area, CWF Area Plan and Details
08080-C06A	10/29/09	Class A North Embankment Proposed CWF area, CWF Area Plan and Details

5. Disposal Cell Location Restrictions

The LARW, 11e.(2), Class A, and Class A North disposal cells shall be restricted to the following locations in Section 32, Township 1 South, Range 11 West, SLBM, as specified on the currently approved engineering plans, drawings, and the approximate Latitude and Longitude Coordinates provided in Table 3 below:

Table 3: Authorized LARW, 11e.(2), Class A, and Class A North Disposal Cell Locations

Disposal Cell	Edge of Waste Position	Coordinates	
		Latitude	Longitude
LARW	NW Corner	40° 41' 11.382" N	113° 06' 51.318" W
	SW Corner	40° 40' 52. 908" N	113° 06' 51. 203" W
	SE Corner	40° 40' 52. 960" N	113° 06' 36. 734" W
	NE Corner	40° 41' 11.434" N	113° 06' 36. 848" W
11e.(2)	NW Corner	40° 41' 12. 590" N	113° 07' 24. 545" W
	SW Corner	40° 40' 55. 055" N	113° 07' 24. 761" W
	SE Corner	40° 40' 54. 845" N	113° 06' 55. 564" W
	NE Corner	40° 41'12.380" N	113° 06' 55.346" W
Class A	NW Corner	40° 41' 28. 061" N	113° 07' 24.735" W
	SW Corner	40° 41' 14. 230" N	113° 07' 24. 702" W
	SE Corner	40° 41' 14.191" N	113° 06' 55.369" W
	NE Corner	40° 41' 28.022" N	113° 06' 55.403" W
Class A North	NW Corner	40° 41' 38. 509" N	113° 07' 24. 752" W
	SW Corner	40° 41' 30. 527" N	113° 07' 24. 740" W
	SE Corner	40° 41' 30.550" N	113° 06' 57.211" W
	NE Corner	40° 41' 38. 532" N	113° 06' 57.222" W

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This description does not include the Mixed Waste facility, located east of the LARW Cell, which is authorized under a separate State-issued Part B Permit from the Utah Division of Solid and Hazardous Waste.

6. Definition of LARW Waste

For purposes of this Permit, Low-Activity Radioactive Waste (LARW) is defined as radioactive wastes, which meet the definition of Class A Low-Level Radioactive Waste (LLRW) under the Utah Radiation Control Rules, UAC R313-15-1008, or are defined as Naturally Occurring and Accelerator Produced Radioactive Materials under the Utah Radiation Control Rules, UAC R313-12-3.

7. Definition of Mobile Waste

Any waste containing any of the following isotopes shall be considered a mobile waste and subject to special provisions or requirements under this Permit: aluminum-26, berkelium-247, calcium-41, californium-249, californium-250, carbon-14, chlorine-36, iodine-129, neptunium-237, rhenium-187, sodium-22, technetium-99, terbium-157, terbium-158, or tritium.

8. Definition of PCB/Radioactive Waste

For purposes of this Permit, PCB/Radioactive Waste to be accepted for disposal shall meet the criteria specified in R315-315-7(2)(a) or (3)(b)(i-vi) of the rules designated for disposal in a municipal or non-municipal non-hazardous landfill.

9. Definition of 11e.(2) Waste

For purposes of this Permit, 11e.(2) Waste is defined as "... tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content", as defined in Section 11e.(2) of the U.S. Atomic Energy Act of 1954, as amended.

10. Collection Lysimeters for Future Construction at the Class A and Class A North Cells

Future construction of the clay bottom liner of Class A and Class A North Cells shall include the installation of collection lysimeters below the bottom clay liner, in accordance with the CQA Plan for Collection Lysimeter Construction currently approved by the Executive Secretary and included herein as Appendix C. The Permittee shall also comply with the currently approved Operation, Maintenance and Closure Plan for Collection Lysimeters, also included herein as Appendix C. In addition, the Permittee shall comply with the following requirements:

a) **Collection Lysimeter "As-Built" Report – within 30 days of completion of the construction of each lysimeter, the Permittee shall submit an "As-Built" Report for Executive Secretary approval.**

b) **Future Collection Lysimeter Construction Notification – the Permittee shall submit a notice of construction of additional lysimeters in the Class A and Class A North Cells. Said notice shall be submitted at least one week prior to construction in order to allow the Executive Secretary to inspect lysimeter construction.**

c) **Future Collection Lysimeter Construction – in addition to any design or construction requirements found in the currently approved Appendix C, the Permittee shall construct all future collection lysimeters in a manner that will allow the lysimeter to be operated in compliance with all performance standards mandated by Part I.E.11 or monitoring requirements dictated by Part I.F.6 of this Permit. Any changes to the approved design or construction specifications in Appendix C shall require prior Executive Secretary approval.**

11. Future Modification of Disposal Cell Engineering Design or Specifications

Any change in the approved engineering design or specifications which causes a significant adverse effect to the infiltration performance of a disposal cell shall require prior submittal and Executive Secretary approval of infiltration and contaminant transport analysis of the proposed change. Said changes must be submitted to the Executive Secretary as a written request with the revised engineering drawings, specifications, ground water flow and contaminant transport models, or any other documentation deemed necessary by the Executive Secretary, at least 180 days prior to the effective date desired by the Permittee.

12. Final Authorized Engineering Design and Specifications for Waste and Wastewater Related Facilities

Best available technology design standards for related facilities at the disposal site shall be defined by, and construction conform to the engineering plans and specifications summarized in Table 5, below:

Table 5: Approved Engineering Design Drawings for Waste/Wastewater Related Facilities

Related Facility	Drawing No.	Last Revision	Subject / Title
~~Track 2 Railcar Decontamination Pad~~	~~9513-1, Rev. B~~	~~May 26, 1996~~	~~Plan, Section, and Details~~
Track 4 Railcar Decontamination Pad	T-100, Rev. 3	Aug. 14, 1999	Foundation
	T-101, Rev. 3	Aug. 16, 1999	Foundation Details
	9906-02, Rev. H	Feb 26, 2007	Wash Water System As-Built
	9906-02A, Rev. H	Feb. 26, 2007	Wash Water System As-Built
Class A North Containerized Waste Facility and Large Component Area Evaporation Basin	04080-C05, Rev. ~~. 35~~	~~July 14, 2008~~ September 8, 2011	Plan and Section
	04080-C06, Rev. 4	October 26, 2009	Class A North Embankment Proposed CWF Area, CWF Area Plan & Details
	08080-C06A, Rev. 1	October 26, 2009	Class A North Embankment Proposed CWF Area, CWF Area Plan & Details
1995 Evaporation Pond	9718-1, Rev. C	March 13, 2007	Facility Layout
	9504-3, Rev. E	Oct. 28, 1999	Storage Pond
	9504-3A, Rev. A	Oct. 28, 1999	Leak Detection System Details, As-Built
	9504-4, Rev. E	Oct. 28, 1999	Facility Details
	9718-4, Rev. A	Aug. 17, 1998	Piping Diagrams and Pump Station
	08007-C01, Rev. 1	June 26, 2008	1995 Evaporation Pond HDPE Repairs, New 60 mil HDPE Liner
1997 Evaporation Pond	9718-1, Rev. C	March 13, 2007	Facility Layout
	9718-2, Rev. D	Feb. 25, 1999	Evaporation and Storage Pond
	9718-2a, Rev. B	Feb. 25, 1999	Leak Detection System Details, As-Built
	9718-3, Rev. -	Sept. 17, 1997	Details
	9718-4, Rev. A	Aug. 17, 1998	Piping Diagrams and Pump Station
2000 Evaporation Pond	0009-00, Rev. A	July 10, 2000	Site Plan and Facility Layout
	0009-01, Rev.E	Feb. 22, 2008	Plan View

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Table 5: Approved Engineering Design Drawings for Waste/Wastewater Related Facilities

Related Facility	Drawing No.	Last Revision	Subject / Title
	0009-02, Rev. A	Jan. 29, 2001	Cross Sections
	0009-03, Rev. B	Jan. 29, 2001	Details
	0009-04, Rev. A	Jan. 29, 2001	Sump/Side Slope Cross-Section
	0009-05, Rev. A	Jan. 29, 2001	Leak Detection Details
	0009-06, Rev. A	Feb. 22, 2008	Water Transfer Piping Details
Mixed Waste Evaporation Pond	9802-1, Rev. D	Dec. 22, 1999	Facility Layout
	9802-2, Rev. F	Dec. 22, 1999	Water Storage Facility
	9802-3, Rev. D	Dec. 22, 1999	Facility Details As-Built
	9802-4, Rev. B	Dec. 4, 1998	Water Storage Facility
	9802-5, Rev. A	Dec. 22, 1999	Leak Detection System Details, As-Built
	9803-2, Rev. -	Feb. 11, 1998	Storage Pad Drain Line As-Built
Box Washing Facility	9621-1, Rev. C	July 20, 1998	Site Plan As-Built Drawing
	9621-2, Rev. B	July 20, 1998	Foundation Plan As-Built Drawing
	9621-3, Rev. B	July 20, 1998	Elevation Views As-Built Drawing
	9621-4, Rev. B	July 20, 1998	Elevation Views As-Built Drawing
	9621-5, Rev. B	July 20, 1998	Wall Detail As-Built Drawing
Intermodal Unloading Facility	9705-1, Rev. A	July 31, 1998	Plan View
	9705-2, Rev. A	July 31, 1998	Cross Section Drawings
	9813-01, Rev. B	March 13, 2007	Layout
	9813-02, Rev. A	July 31, 1998	Layout (and Details)
	0701-G03, Rev. 1	June 8, 2007	Site Layout and Facility Legend
Railcar Rollover Facility	0221-01	March 26, 2002	Site Layout and Drain Line
	0221-02	March 26, 2002	Fabric Cover Frame Layout
	0221-03	March 26, 2002	Rollover Cover South Elevation
	0221-04, Rev. A	April 24, 2002	Cover Run-off Collection and Drainage
	07013-C0, Rev 0	March 31, 2008	Drainage repair plan
Rail Digging Facility	0107-01, Rev. B	April 25, 2002	Site Layout
	0107-02, Rev. B	April 19, 2002	Digging Track Plan
	0107-03, Rev. B	April 12, 2002	Track and Pad Details
	0107-04A, Rev. A	April 25, 2002	Excavator Ramp
Container Storage Pad	9514-1, Rev. C	March 13, 2007	Plan, Sections and Details
East Truck Unloading Facility	05023-C104, Rev. 9	April 26, 2007	New Site Layout
	05023-C301, Rev. 4	Sept. 22, 2005	Cross Sections
	05023-C401, Rev. 5	Dec. 12, 2005	Truck Unloading Area Plan View
	05023-C402, Rev. 5	De. 12, 2005	Truck Unloading Dock Plan View
	05023-C403, Rev. 7	April 26, 2007	Enlarged Dock Plan View
	05023-C501, Rev. 5	Dec. 12, 2005	Truck Unloading Area Details
	05023-C502, Rev. 4	Dec. 12, 2005	Truck Dock Details
	05023-C503, Rev. 4	Dec. 12, 2005	Truck Dock Details
	05023-S1, Rev. 1	Sept. 22, 2005	Concrete Container Holding Pad Safety Protection
Shredder Facility	05056-F13, Rev._	09/30/06	Shredder Facility; Outfeed Pad Plan and Pad Details (As-Constructed)
	05056-F13A, Rev._	09/30/06	Shredder Facility; Shredder Pad Plan (As-Constructed)
	05056-F13B, Rev._	09/30/06	Shredder Facility; Shredder Pad Details (As-Constructed)
	05056-L1, Rev. 6	09/06	Shredder Facility; Site Layout Plan (As-Built)

Table 5: Approved Engineering Design Drawings for Waste/Wastewater Related Facilities

Related Facility	Drawing No.	Last Revision	Subject / Title
	05056-L2, Rev. 2	08/06	Shredder Facility; Containment Pad Water Management Layout Plan
	05056-C1, Rev. 10	09/06	Shredding Facility; Operating Pad Layout (As-Built)
	05056-C6, Rev. 4	09/06	Shredding Facility; Operating Pad – Sections and Details (As-Built)
	05056-C7, Rev 7	9/17/07	Shredding Facility; Catch Basin and Manhole Layouts (As-Built)
	05056-C8, Rev. 2	9/17/07	Shredding Facility; Drainage System Details
	05056-F1 thru -F14	Various	Details
Rotary Dump Facility	05006-C1, Rev. 3	Oct 6, 2006	Heater Building; Plan sheet
	05006-C2, Rev. 5	Oct 6, 2006	Rotary Dump Building; Plan Sheet
	05006-C3, Rev. ~~1~~3	~~Oct 6, 2006~~ November 10, 2011	Wash Building; Plan Sheet
	05006-C5, Rev. 3	Oct 6, 2006	Rotary Dump Building; Section A-A
	05006-C6, Rev. 2	Oct 6, 2006	Rotary Dump Building; Section B-B
	05006-C12, Rev. 1	Oct 6, 2006	Heater Building; Drainage Details and Sections
	05006-C7, Rev. 1	Oct 6, 2006	Rotary Dump Building; Section C-C
	05006-C8, Rev. 1	Oct 6, 2006	Rail Car Wash Building; Section D-D
	05006-C9, Rev. -1	Oct 6, 2006	Wash Building, Drainage Plan Sheet
	05006-F1, Rev. 2	Oct 6, 2006	Rotary Dump Facility; Heater, Rotary and Wash Buildings foundation Plan and Details
	05006-F2, Rev. 3	Oct 6, 2006	Rotary Dump Facility; Heater Building Foundation Plan and Details
	05006-F10, Rev. 4	Oct 6, 2006	Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details
	05006-F13, Rev. 1	Oct 6, 2006	Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details
	05006-F25, Rev. 3	Oct 6, 2006	Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details
	05006-F26, Rev. 3	Oct 6, 2006	Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details
	05006-F27, Rev. 3	Oct 6, 2006	Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details
	05006-P103, Rev. 1	Sept. 20, 2007	Rotary to NW Corner Pond
	05006-V1, Rev. 2	Dec 1, 2006	Rotary Dump Facility; Water Supply and Waste Water Flow Diagram
	05006-SL100. Rev. 6	Oct 6, 2006	Rotary Dump Building; Sediment Basin Liner Plan
	05006-SL101. Rev. 6	Oct 6, 2006	Rotary Dump Building; Sediment Basin Liner Sections
	05006-SL102. Rev. 6	Oct 6, 2006	Rotary Dump Building; Sediment Basin Liner Section
	05006-F5, R~~r~~ev. ~~4~~	~~6/11/08~~ November 10, 2011	Wash Building Foundation Plan and Details
	05006-F9C, ~~r~~Rev. 3	6/11/08	Wash Building Foundation Details
Intermodal Container Wash	05008-G1, Rev. 4	May 19, 2006	Intermodal Container Wash Building; Map Layout and Index

Table 5: Approved Engineering Design Drawings for Waste/Wastewater Related Facilities

Related Facility	Drawing No.	Last Revision	Subject / Title
Building	05008-C100, Rev. 2	May 19, 2006	Intermodal Container Wash Building; Facility Location Map
	05008-C101, Rev. 4	September 26, 2006	Intermodal Container Wash Building; Plan Sheet
	05008-C102, Rev. 2	May 19, 2006	Intermodal Container Wash Building; Section A-A
	05008-C103, Rev. 3	May 19, 2006	Intermodal Container Wash Building; Section B-B
	05008-SL100, Rev. 5	August 23, 2006	Intermodal Container Wash Building; Sediment Basin Liner Plan
	05008-SL101, Rev. 5	August 23, 2006	Intermodal Container Wash Building; Sediment Basin Liner Section A-A
	05008-SL102, Rev. 5	August 23, 2006	Intermodal Container Wash Building; Sediment Basin Liner Section B-B
Decontamination Access Control Building	05015-G001, Rev. 1	February 23, 2006	Access Control Building; Map Layout and Index
	05015-C100, Rev. 1	February 23, 2006	Access Control Building; Facilities Location Map
	05015-C101, Rev. 2	February 23, 2006	Access Control Building; Floor Plan
	05015-C102, Rev. 2	February 23, 2006	Access Control Building; Elevations
	05015-C103, Rev. 3	February 23, 2006	Access Control Building, Typical Sections
	05015-C104, Rev. 0	February 23, 2006	Access Control Building, Site Layout and Gray Water Tank and Pipe
	05015-S100, Rev. 2	June 30, 2006	Access Control Building, 1000 Gallon Gray Water Tank
	05015-P100, Rev. 1	February 23, 2006	Access Control Building, Plumbing Plan
	05015-P101, Rev. 1	February 23, 2006	Access Control Building, Plumbing Details
East Side Drainage and Gray Water System Modifications	06007-G1, Rev. 5	2/26/07	East Side Drainage, Map Layout and Index
	06007-G2, Rev. 4	2/26/07	East Side Drainage, Notes and Specifications
	06007-C1, Rev. 5	2/26/07	East Side Drainage, General Site Plan
	06007-C2, Rev. 5	2/26/07	East Side Drainage, Storm Water Drainage Plan
	06007-C3, Rev. 7	2/1/2010	East Side Drainage, Intermodal Container Wash Facility Gray Water System Plan
	06007-C4, Rev. 6	3/12/08	East Side Drainage, Decon Access Control Gray Water System
	06007-D1, Rev. 7	6/10/09	East Side Drainage, Section and Details
	06007-P1, Rev. 4	2/26/07	East Side Drainage, Pipelines #4 and #5 Alignments and Profiles
	06007-SL1, Rev. 3	3/14/07	East Side Drainage, Storm Water Lift Sump Plan
	06007-SL2, Rev. 3	3/14/07	East Side Drainage, Storm Water Lift Sump Section
	06007-SL3, Rev. 3	3/14/07	East Side Drainage, Storm Water Lift Sump Section
	06007-V1, Rev. 3	2/26/07	East Side Drainage, Storm Water and Waste

Table 5: Approved Engineering Design Drawings for Waste/Wastewater Related Facilities

Related Facility	Drawing No.	Last Revision	Subject / Title
			Flow Diagram

Table 5: Approved Engineering Design Drawings for Waste/Wastewater Related Facilities

Related Facility	Drawing No.	Last Revision	Subject / Title
	06007-P2, Rev. 4	2/22/08	Pipeline 4A and 5A Extension into the 1997 Pond
Northwest Corner Evaporation Pond	~~06021-G1, Rev. 3~~	~~08/29/07~~	~~Northwest Corner Pond; Title Sheet~~
	06021-C1, Rev ~~3~~5	~~09/17/07~~ October 19, 2011	Northwest Corner Pond; General Site Plan and Profile
	06021-C2, Rev. ~~6~~8	~~09/17/07~~ October 19, 2011	Northwest Corner Pond; Pond Plan View
	06021-C3, Rev.5	08/29/07	Northwest Corner Pond; Sections and Details
	06021-C4, Rev. 3	08/29/07	Northwest Corner Pond; Sections and Details
	06021-C5, Rev. 3	08/29/07	Northwest Corner Pond; Sump Plan, Sections, and Details
	06021-C6, Rev. 3	08/29/07	Northwest Corner Pond; Leak Detection System Sections and Details
	06021-C7, Rev. 3	09-17-07	Northwest Corner Pond Leak Detection System Sections and Details
	06021-C10, Rev. 2	October 19, 2011	Northwest Corner Pond; Water Transfer Facility; Plan & Details
	06021-C11, Rev. 1	October 19, 2011	Northwest Corner Pond; Water Transfer Facility; Plan & Details
11e.(2) Disposal Cell Temporary Diversion Ditch	9420-7D	10/15/09	Lift Section Details
DU Storage Building	088800, sheet 1of 10	8/19/10	Anchor Bolt Plan & Details
	088800, sheet 2 of 10	8/19/10	Anchor Bolt Reactions
	088800, sheet 3 of 10	8/19/10	Rigid Frame Elevation
	088800, sheet 4 of 10	8/23/10	Roof Framing
	088800, sheet 5 of 10	8/23/10	Sidewall Framing
	088800, sheet 6 of 10	8/23/10	Sidewall Framing
	088800, sheet 7 of 10	8/19/10	Endwall Framing
	088800, sheet 8 of 10	8/19/10	Endwall Framing
	088800, sheet 9 of 10	8/19/10	Detail drawings
	088800, sheet 10 of 10	8/19/10	Detail drawings
	10008 L01	8/12/10	Building Location Map
	10008 L02	8/12/10	Building Plan & Elevations
	J10197 E1	8/24/10	Electrical Plans and Schedules
	J10197 E2	8/24/10	Electrical installation Details, Wiring Diagrams and One-Line
	J10197 E3	8/24/10	Electrical Specifications
	J10197 M1	8/24/10	Mechanical Plans and Schedules
	J10197 M3	8/24/10	Specifications
	10008 C01	9/2/10	Site Ground Plan
	10335 S1	9/2/10	Foundation Plan and Footing Schedule
	10335 S2	9/2/10	Details
	10335 S3	9/2/10	Notes

13. Authorized Mixed Waste Cell Engineering Design and Specifications

The best available technology standards for the Mixed Waste Cell shall be defined by those requirements mandated by the Utah Division of Solid and Hazardous Waste State-issued Part B Permit, issued April 4, 2003 (as amended), hereafter State-issued Part B Permit. All Mixed Waste Cell engineering design and specifications shall comply with State-issued Permit, Module V.

14. DU Storage Building

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The best available technology standards for the depleted uranium (DU) Storage Building shall be defined as the complete physical control and containment of DU within the building. For the purposes of this Permit, waste materials stored in the DU Storage Building will be exclusively limited to Savannah River Site DU material (waste stream 9021-33). The DU waste, in the DU Storage Building, is not subject to the 365-day storage requirement applicable to all other containerized waste in Part I.E.10.a.6 of this Permit.

~~B.~~E. BAT Performance and Best Management Practice Standards

1. Waste Restrictions

a) **Reserved.**

b) **11e.(2) Waste – any change effecting the non-radiologic content of the waste to be disposed of in the 11e.(2) Cell, including additional types or concentrations of non-radiologic contaminants, above and beyond those defined in Table 6 below, shall require prior approval from the Executive Secretary, after submittal of satisfactory technical justification to demonstrate that the requirements of Part I.D.1 of this Permit will be met.**

c) **Solid Waste Landfill Equivalency – PCB/Radioactive Waste shall only be disposed of as designated in the State-issued Part B Permit.**

d) **Mixed Waste, Class A, and Class A North Cells – waste to be disposed of in the Mixed Waste, Class A, and Class A North Cells shall be limited to wastes which meet the definition of Class A Low-Level Radioactive Waste (LLRW) under the Utah Radiation Control Rules, UAC R313-15-1008, or are defined as Naturally Occurring and Accelerator Produced Radioactive Materials under the Utah Radiation Control Rules, UAC R313-1**

2. Prohibited Wastes

a) **Hazardous Waste – the disposal of hazardous waste as defined by the Utah Hazardous Waste Management Rules (UAC R315-2-3) is prohibited in the Class A, Class A North, and 11e.(2) Disposal Cells. LLRW, or 11e.(2) waste that exceeds the regulatory concentration**

b) **levels of the Toxic Characteristic Leaching Procedure (TCLP) as defined in 40 CFR Part 261 Subpart C, Table 1 is prohibited, unless specifically authorized in Part I.E.5 of this Permit; Table 6, below; or with prior written approval from the Executive Secretary. Waste samples shall be collected in accordance with the currently approved Waste Characterization Plan (Radioactive Materials License, Condition 58); the Procedure for Certification of 11e.(2) Waste in the currently approved Appendix E of this Permit, and analyzed for those exclusive parameters listed in Table 6, below; or for PCB/Radioactive Waste, the currently approved State-issued Part B Permit.**

Table 6: Maximum Allowable Concentrations in 11e.(2) Waste

Parameter	TCLP Leachate Regulatory Limit (mg/l)	Total Waste Concentration (mg/kg)
Volatile Organic Compounds		
Acetone	n/a	10.0
2-Butanone	200.0	10.0
Carbon Disulfide	n/a	10.0
Chloroform	6.0	10.0
1,1-Dichloroethane	0.5	10.0
Diethyl Phthalate	n/a	80.0
Methylene Chloride	n/a	70.0
2-Methylnaphthalene	n/a	80.0
Naphthalene	n/a	80.0
1,1,2-Trichloroethane	n/a	7.27
Vinyl Chloride	0.2	0.66

c) **Liquid Waste – acceptance of liquids and liquid content of all wastes shall be in accordance with the Radioactive Materials License.**

d) **Chelating Agents – the disposal of any waste containing chelating agents shall be limited to the Mixed Waste Cell and is prohibited in the Class A, Class A North, and 11e.(2) Disposal Cells. The disposal of any waste in the Mixed Waste Cell containing chelating agents in excess of 22% by weight is prohibited.**

3. Failure to Construct as per Approval

Failure to construct any portion of the facility in compliance with the approved engineering design and specifications or in a manner inconsistent with the LLRW and 11e.(2) CQA/QC Plan (Radioactive Materials License UT 2300249, Condition 44) shall be cause for the Executive Secretary to require excavation of the materials and remedial construction, retrofit of the embankment or any other mitigative action to prevent the release of pollutants to soil or ground water.

4. Unsaturated Soil Moisture Content Monitoring

The Permittee shall conduct soil moisture content monitoring to verify performance of the engineered containment systems for the LARW, 11e.(2), Class A, and Class A North Disposal Cells in accordance with the requirements of Part 1.H.17 of this Permit and Radioactive Material License Condition 28. This monitoring shall consist of instrumentation, as approved by the Executive Secretary, installed in the Cover Test Cell.

The Permittee shall maintain and replace all soil moisture instrumentation as directed by the Executive Secretary.

The Executive Secretary reserves the right to require similar soil moisture content monitoring in the radon barrier at the 11e.(2) Cell. The Permittee shall install and make operational any soil moisture instrumentation in compliance with the schedule to be determined by the Executive Secretary.

5. Allowable Heavy Metal Waste Concentration Limits

Waste containing any of the following non-radionuclide metals: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, and Zinc can be disposed of in the Class A, Class A North, or 11e.(2) Cells at any concentrations.

6. Open Cell Time Limitation

For each open portion of any disposal cell, final cover construction shall be completed in accordance with the approved engineering plans and specifications (Part I.D.2 and 4) and the approved Construction Quality Assurance / Quality Control Plan requirements under the Radioactive Materials License on or before the end of 18 years after the date of initial placement of the first lift of any LLRW waste in that portion of the open cell. Final cover construction shall include but is not limited to completion of the following:

a. Riprap Layer
b. Type A Filter Layer
c. Sacrificial Soil Layer
d. Type B Filter Layer
e. Upper Radon Barrier Layer
f. Lower Radon Barrier Layer
g. Temporary cover layer
h. Settlement stand installation and all monitoring necessary to demonstrate waste platform is stable and ready for final cover construction.

Any modification of this 18 -year limitation shall require submittal of detailed justification including but not limited to ground water flow and contaminant transport modeling of open cell conditions or other technical information as necessary, and prior Executive Secretary approval. Said modeling report or other studies must be submitted in their entirety to the Executive Secretary 180 days

prior to the expiration date of the respective 18-year open cell time limit. Failure to secure Executive Secretary approval prior to expiration of the 18 -year deadline shall not be cause for the Permittee to postpone construction of the cover of any cell in accordance with the currently approved engineering design and specifications in Part I.D.2 or 4 of this Permit.

7. General Stormwater Management Requirements

The Permittee shall contain all stormwater runoff at the Class A, Class A North, and 11e.(2) Disposal Cells which has contacted the waste (i.e., contact stormwater). The Permittee shall not begin pumpage or removal of stormwater that falls inside the restricted area that has not contacted the waste (i.e., non-contact stormwater) before beginning removal of contact stormwater. This includes runoff from waste disposed in excavated, below grade areas of the Class A, Class A North, and 11e.(2) Disposal Cells, additionally, and:

a) **Within 24 hours of discovery of an accumulation of contact stormwater, the Permittee shall immediately begin pumpage and removal of said stormwater in accordance with the stormwater management schedule listed in Appendix J, BAT Performance Monitoring Plan.** ~~**wastewater in compliance with the following priority schedule, ranked from highest to lowest priority:**~~

~~1) Contact stormwater inside the footprint of the Class A, Class A North, and 11e.(2) Disposal Cells,~~

~~2) Contact stormwater at the Rollover and Rotary Dump Facility, and~~

~~3) Contact stormwater at the Intermodal Unloading Facility.~~

The Permittee shall pump and remove contact stormwater in an uninterrupted manner until it is completely removed from said location. The Permittee may utilize equipment, which cannot be used at higher priority locations, at lower priority locations in accordance with stormwater management in Appendix J, BAT Performance Monitoring Plan. ~~Under no circumstance will the Permittee begin pumpage and removal of contact stormwater at a lower priority location without first completing removal at all higher priority location(s).~~

b) **All contact stormwater accumulated and pumped shall be disposed of in the evaporation ponds only as explicitly approved by the Executive Secretary. However, contact stormwater from the Class A, Class A North, and 11e.(2) disposal cells may be used for minimal engineering and dust control purposes on the waste in the Class A and Class A North disposal cells and for dust suppression activities at the Shredder Facility.**

c) **Class A North Containerized Waste Facility and Large Component Evaporation Basin – precipitation that falls on the Class A North Containerized Waste Facility and Large Component Area shall be**

allowed to accumulate in an engineered evaporation basin constructed in accordance with the following conditions:

1) The evaporation basin shall be constructed in accordance with the design specifications in engineering drawings listed in Table 5 for the Class A North Embankment and the requirements of the currently approved LLRW and 11e.(2) CQA/QC Plan.

2) Fluid head in the evaporation basin shall not exceed a 1-foot level above the lowest point of the bottom clay liner of the basin. The occurrence of fluid levels above this 1-foot maximum allowable head limit shall constitute a violation of this Permit.

3) The Permittee shall ensure that the physical integrity of the clay liner is not compromised by desiccation or freeze/thaw cycles by implementing quality assurance/quality control requirements in the currently approved LLRW and 11e.(2) CQA/QC Plan.

8. 11e.(2) Waste Management Requirements

The Permittee shall manage the 11e.(2) Waste and related activities at the facility in accordance with all applicable requirements of the currently approved Radioactive Materials License, No. UT2300478, for the following activities and procedures:

a) Spill response and prevention

b) Runon and runoff containment

c) Decontamination of vehicles, equipment, and containers

d) Unloading procedures

e) Waste storage time limits

f) Stormwater/wastewater collection and disposal

g) Leaking waste shipments

In addition, the Permittee shall manage 11e.(2) waste storage and handling in compliance with the containment and spill prevention requirements of Part I.E.10.a of this Permit.

9. 11e.(2) Waste Storage

Storage of 11e.(2) waste at the facility shall be explicitly limited to areas within the confines of the 11e.(2) Disposal Cells having completed and approved clay liner.

10. LLRW Waste Management Performance Requirements

The Permittee shall operate and maintain all facilities in compliance with the following performance requirements:

a) Contaminant Containment and Spill Prevention – the Permittee shall manage all site operations to:

1) Prevent contact of wastes with the ground surface.

2) Prevent spills of wastes or liquids contained therein from any contact with the ground surface or ground water.

3) Prevent contact of surface water or stormwater run-on with the waste.

4) Control any runoff, which may have contacted the waste from subsequent contact with the ground surface or ground water by means of approved engineering containment. Any accumulations of such contact runoff or leachates shall be removed and managed in accordance with Part I.E.7.

5) Prevent wind dispersal of wastes.

6) Minimize the time any waste is held in temporary storage without disposal in a disposal cell or embankment. In no case shall any waste be in temporary storage beyond 365 days after the date of waste entry into the controlled area. Once the waste is removed from temporary storage and is in a disposal cell, the 365 day restriction is no longer relevant.

7) Identify all wastes held in storage by use of clear and legible placards, signs, or labels which identify the generator, waste stream number and dates that said waste or waste container both entered the controlled area and was placed into temporary storage.

8) Maintain all waste containers in a closed, strong tight and watertight condition.

9) All containers in storage shall be inspected daily.

10) Waste in bags shall be managed as bulk waste.

b) <u>Containerized Waste Storage Pad and Other Waste Storage Areas – the Permittee shall operate and maintain waste containers, the asphalt surface of the Containerized Waste Storage Pad, and other storage surfaces used as a waste storage area, so as to prevent the discharge of stormwater or leachate to subsurface soils or ground water, by completing the following actions, as applicable:</u>

1) Repair or otherwise seal and render impermeable any and all cracks, ruptures, damage, or porous areas found in the asphalt surface or other storage surfaces as soon as possible after discovery in accordance with the currently approved Appendix K of this Permit.

2) Fill any areas of subsidence and return the asphalt surface or other storage surfaces to its original design grade, permeability, and appearance, in order to prevent the impoundment of any storm water or leachate on the pad as soon as possible after discovery in accordance with the currently approved Appendix K of this Permit.

3) Prevent contact of waste with precipitation or stormwater by maintaining all containers in a closed and watertight condition.

4) Manage leaking containers in accordance with the Waste Characterization Plan and Radioactive Materials License.

5) Adequately operate and maintain any stormwater collection sump, pump, and pipeage to ensure containment and conveyance of stormwaters to the approved evaporation ponds.

c) Prohibition and Restrictions for Dry Active Waste Storage – dry active waste is defined as contaminated materials without soil-like texture or characteristics, and have a dry weight density of 70 pounds per cubic foot or less (e.g., contaminated paper, plastic, personal protective equipment, cloth, or other similar soft-type debris). Open-air storage of dry active waste is prohibited at the facility. All temporary storage of dry active waste shall be conducted either inside buildings or in watertight containers at the Containerized Waste Storage Pad or other approved storage areas. Dry active waste located within a disposal cell must be covered at the end of the working day with soil or soil-like waste material to prevent wind dispersal.

d) Intermodal Unloading Facility – the Permittee shall operate and maintain the LLRW Intermodal Unloading Facility to provide free draining conditions on both the unloading pad and in the stormwater drainage pipeline system.

e) Containerized Waste Management – the following locations are approved for management and storage of Class A waste received in containers (does NOT include waste received for disposal in the Containerized Class A Facility):

- Containerized Waste Storage Pad
- Intermodal Unloading Facility
- Railcar Rollover Facility
- East Truck Unloading Facility
- Decontamination Facilities (Box Wash, Rail Car Wash Track #2 and #4)
- Class A and Class A North Disposal Cells
- Shredder Facility
- Rotary Dump Facility

f) Bulk Waste Management – the following locations are approved for management and storage of bulk Class A waste:

- Intermodal Unloading Facility
- Railcar Rollover Facility
- East Truck Unloading Facility (raised dock area excluded)
- Decontamination Facilities (Box Wash, Rail Car Wash Track #2 and #4)
- Class A and Class A North Disposal Cells

- Rail Digging Facility (bulk waste transfer only, waste storage prohibited)
- Shredder Facility in accordance with the State-issued Part B Permit and the TSCA Coordinated Approval
- Rotary Dump Facility

11. LARW, Class A, Class A North Cell Collection Lysimeters: Operation, Maintenance and Annual Inspection

The Permittee shall operate and maintain all collection lysimeters in compliance with the currently approved Appendix C of this Permit. Said operation shall include at least an annual video log inspection of each collection lysimeter constructed at the LARW, Class A, and Class A North Cells. Each video inspection shall log the entire length of the drainage pipe to ensure proper operation and free drainage of each collection lysimeter. Failure to satisfactorily complete an annual video log inspection or a determination that free draining conditions no longer exist in a collection lysimeter shall constitute failure to maintain best available technology pursuant to Part I.G.4 of this Permit. Such failures shall be reported to the Executive Secretary in accordance with the requirements of Part I.H.8 of this Permit.

12. Stormwater Drainage Works Performance Criteria

All stormwater drainage works constructed and operated at the LARW, Class A, Class A North, and 11e.(2) facilities shall perform in accordance with the following criteria:

a) **Seepage Control to Prevent Ground Water Mounding – all drainage works at the facility shall be constructed of either low-permeability clay liner materials or of an impermeable man-made conveyance in order to control and prevent any alteration of local natural ground water hydraulic gradients or velocities. This infiltration control shall address seepage during periods of storm water storage in the drainage system.**

b) **Free Drainage – all stormwater drainage works shall be free draining and under gravity conditions shall convey stormwater from the contributing facilities to an off-site location, except as follows:**

1. The stormwater culvert at the southeast margin of the 11e.(2) cell, as found on the Permittee's engineering drawing 9420-7D as listed in Table 5 of this Permit. Said construction includes an engineered catch basin and lift station.

c) **Temporary Stormwater Drainage Works – plans and specifications for any temporary stormwater drainage works shall be submitted for Executive Secretary review and approval prior to installation. As-Built reports shall be submitted for Executive Secretary approval within 30 days following installation. Prior to site closure, the Permittee shall remove all temporary stormwater drainage works (e.g., drainage grates, piping, ditches, etc. not approved under Part I.D.4) as part of**

the site Decontamination and Decommissioning Plan required under Radioactive Material License, Condition 74.

13. Reserved

14. Wastewater Management Requirements

The Permittee shall operate and maintain all wastewater storage, treatment, and disposal facilities in accordance with Best Available Technology requirements approved by the Executive Secretary, as follows:

a) **1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation Ponds – the Permittee shall operate and maintain the 1995, 1997, 2000 , and Northwest Corner evaporation ponds and the Mixed Waste evaporation pond to prevent release of fluids to subsurface soils or groundwater, in accordance with the following requirements:**

1) Leak Detection System Pumping and Monitoring Equipment Continuous Operation – the Permittee shall provide continuous operation of the leak detection system pumping and monitoring equipment, including, but not limited to, the submersible pump, pump controller, head/pressure transducer, and flow meter equipment approved by the Executive Secretary. Failure of any pumping or monitoring equipment not repaired and made fully operational within 24 hours of discovery shall constitute failure of Best Available Technology and a violation of this Permit.

2) Maximum Allowable Daily Leakage Volumes – the Permittee shall measure the daily volume of all fluids pumped from the respective leak detection systems of the 1995, 1997, 2000, Mixed Waste, and Northwest Corner evaporation ponds. Under no circumstance shall the daily leak detection system flow volume, as determined pursuant to Part I.F. a.3, exceed the following limits:

i. 1995 Evaporation Pond: 162 gallons/day

ii. 1997 Evaporation Pond: 171 gallons/day

iii. Mixed Waste Evaporation Pond: 171 gallons/day

iv. 2000 Evaporation Pond: 382 gallons/day

v. Northwest Corner Evaporation Pond: 326 gallons/day

Daily leak detection system flow volumes in excess of these limits shall constitute failure of Best Available Technology and a violation of this Permit.

3) Maximum Allowable Head – the Permittee shall measure fluid head in the respective leak detection sumps of the 1995, 1997, 2000, the Mixed Waste, and Northwest Corner evaporation ponds by use of pressure transducer equipment approved by the Executive Secretary. Under no circumstance shall fluid head in the leak detection system sump exceed a 1-foot level above the lowest point in the lower flexible membrane

liner. The occurrence of leak detection system fluid levels above this 1-foot limit shall constitute failure of Best Available Technology and a violation of this Permit.

4) 2-foot Minimum Vertical Freeboard Criteria – the Permittee shall operate and maintain at least 24 inches of vertical freeboard in the 1995, 1997, 2000, Mixed Waste, and Northwest Corner evaporation ponds to ensure total containment of fluids. This vertical distance shall be determined by use of a gauging station approved by the Executive Secretary. If at any time the Permittee operates the pond with less than 24 inches of vertical freeboard, such operation shall constitute failure of Best Available Technology and a violation of this Permit.

5) **Ancillary equipment intended to facilitate evaporation shall be constructed and operated in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.**

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b) **Box-Washing Facility – the Permittee shall operate and maintain the Box-Washing Facility to ensure:**

1) Free draining conditions exist across the floor to the wastewater collection sumps.

2) The integrity of the concrete working surface to prevent discharge.

3) Water level is maintained below the collection sump grate.

4) Maintenance of a freeboard in each concrete wastewater storage tank (at or below three fourths full).

c) **Rail Car Wash Facilit~~iesy~~ – the Permittee shall operate and maintain the ~~new~~ Rail Car Wash Facility on Track No. 4 ~~and the old Rail Car Wash Facility on Track No. 2~~ in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.**

15. Filter Construction Settlement Performance Standards

Cover system filter placement shall begin only after the Permittee demonstrates that 95% of the maximum consolidation has been achieved at the upper surface of the radon barrier. Any filter construction undertaken without this demonstration and prior Executive Secretary approval shall constitute a violation of this Permit.

16. Mixed Waste Cell BAT Performance and Best Management Practice Standards

Performance and best management practice standards for waste storage, and stormwater and wastewater storage, treatment, and disposal at the Mixed Waste Cell shall be defined by requirements mandated by the State-issued Part B Permit.

17. Railcar Rollover Facility BAT Performance and Best Management Practice Standards

The Permittee shall operate and maintain the railcar rollover facility to ensure the physical integrity and the asphalt ramps and concrete bay to prevent discharge to the subsurface. Daily inspections shall be documented to ensure compliance with the stormwater management requirements in Part I.E.7.

On an annual basis during the second quarter of each year, the Permittee shall remove all waste from the facility, pressure wash all surfaces to remove all foreign material, and inspect the entire concrete bay and asphalt ramps of the rollover facility. The Permittee shall repair or otherwise seal and render impermeable any and all cracks, ruptures, damage, or porous areas prior to resuming use of the facility. The Permittee shall submit a written notice of inspection to the Executive Secretary at least one week prior to the annual inspection to allow the Executive Secretary the opportunity to have a DRC representative present.

18. Evaluation of Effect of Proposed Pumping Well(s)

The Permittee will evaluate the effect of any proposed pumping well at the facility on the local ground water flow field and ground water monitoring. This evaluation will be undertaken with the use of analytical or numeric ground water flow models, which conform to the guidance provided to the Permittee by the Bureau of Radiation Control in the November 26, 1990 Notice of Deficiency, Comment WPC-1 K. The Permittee will submit the results of this evaluation and receive Executive Secretary approval before any construction of the withdrawal well.

19. Management of 2000 Evaporation Pond Waste Material

The Permittee shall dispose of all waste material generated during the everyday use and operation of the pond in the Class A or Class A North Cell only. Waste material includes, but is not limited to: sludge, soil contaminated from spills or releases, miscellaneous debris, and material or equipment repaired or replaced such as synthetic liner, pumps, piping, cables, floats, etc. All material associated with the final demolition of the pond, including underlying contaminated soil, must be disposed of in the Class A or Class A North Cell and is expressly prohibited from disposal in the 11e.(2) cell.

20. Shredder Facility

The Permittee shall operate and maintain the Shredder Facility:

a) **In accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.**

b) **To ensure the physical integrity of all concrete surfaces to prevent discharge to subsurface soils or ground water.**

c) **On an annual basis during the second quarter of each year, the Permittee shall remove all waste from the Shredder Facility, pressure wash all surfaces to remove all foreign material, and inspect all concrete surfaces. The Permittee shall repair or otherwise seal and render impermeable any and all cracks, ruptures, damage, or porous areas prior to resuming use of the facility. At least one week prior to the annual inspection the Permittee will submit written notice to allow the Executive Secretary the opportunity to have a DRC representative present.**

d) **To ensure that free draining conditions over the entire concrete pad to each of the seven catch basins, and to ensure the water level in each catch basin is below its respective grate.**

e) **To ensure wastewater level in Manhole #1 is maintained at or below the invert to the outlet pipe, and free draining conditions exist in the conveyance pipe to the Rotary Dump Sediment Basin.**

21. Rotary Dump Facility

The Permittee shall operate and maintain the Rotary Dump Facility::

a) **In accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.**

b) **To ensure the physical integrity of all concrete surfaces to prevent discharge to subsurface soils or ground water.**

c) **On an annual basis during the second quarter of each year, the Permittee shall remove all waste from the Rotary Dump Facility and pressure wash all surfaces to remove all foreign material, and inspect all surface areas of the concrete access drives and concrete floor of the Rotary Dump Building. The Permittee shall repair or otherwise seal and render impermeable any and all cracks, ruptures, damage, or porous areas prior to resuming use of the facility. At least one week prior to the annual inspection, the Permittee shall submit written notice to allow the Executive Secretary the opportunity to have a DRC representative present.**

d) **To ensure that free draining conditions exist in all wastewater transfer pipes without release or discharge to subsurface soils or ground water.**

e) **To ensure the leak detection annulus of the sediment basin is free of fluids.**

f) **To ensure the water level in the sediment basin is below the level of the grate covering the pump sump.**

g) **The dual-walled pipe used to transfer fluids from the sediment basin is free draining, and the leak detection annulus within the secondary pipe is free of fluids.**

22. Intermodal Container Wash Building

The Permittee shall operate and maintain the Intermodal Container Wash Building:

a) **In accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.**

b) **To ensure free draining conditions exist:**

i. Within each wash bay and trench drain to the sediment basin, and

ii. From each boot wash station to the sediment basin.

c) **To ensure the integrity of all concrete surfaces to prevent discharge of waste water to subsurface soils or ground water.**

d) **To ensure the sediment basin provides a total containment system and does not cause a direct or in-direct discharge to subsurface soils or ground water.**

e) **To ensure the water level in the sediment basin is always maintained below the grate located over the pump sump.**

f) **To ensure the leak detection annulus of the sediment basin is free of liquids.**

g) **To ensure the dual-walled pipe used to transfer fluids from the sediment basin is free draining, and the leak detection annulus within the secondary pipe is free of fluids.**

23. Decontamination Access Control Building

The Permittee shall operate and maintain the Decontamination Access Control Building:

a) **In accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.**

b) **To ensure free draining conditions exist from the bootwash and all graywater lines (i.e., eyewash, emergency shower, respirator wash sink, etc.) to the underground wastewater collection tank located outside the southeast corner of the building.**

c) **To ensure the dual-walled leak detection annulus of the wastewater collection tank is maintained free of fluids.**

d) **To ensure the fluid level in the wastewater collection tank is maintained below the invert of the inlet pipe.**

e) **To ensure the dual-walled piping from the wastewater collection tank to the 1997 Evaporation Pond via the East Side Drainage System is**

free draining and the leak detection annulus within the secondary pipe remains free of fluids.

24. East Side Drainage Project

The Permittee shall operate and maintain the East Side Drainage Project:

a) **In accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively, of the Permit.**

b) **To ensure the leak detection annulus of the dual-walled piping system is always maintained free of fluids, including the drip pans found inside manholes #1 and #2.**

c) **To ensure the fluid level in the 11 stormwater catch basins is always maintained below the level of their respective outlet pipes.**

d) **To ensure the stormwater, graywater, and wastewater piping throughout the entire East Side Drainage Project remains free draining at all times.**

e) **To ensure the fluid level in the stormwater lift sump is always maintained below the level of the inlet piping.**

25. Horizontal Hydraulic Gradient Performance Standard

The Permittee shall operate the facility to prevent the shallow aquifer horizontal hydraulic gradient, based on fresh water equivalent ground water elevations, of any sub area, from exceeding the cell-specific Horizontal Hydraulic Gradient Limits specified in Part I.H.2.(d) of this Permit. Said performance standard for horizontal hydraulic gradient at the LARW Cell shall become effective after 1.5 years from the effective date of this Permit Modification.
The Permittee shall operate and maintain the stormwater culvert, catch basin, and lift station at the southeast margin of the 11e.(2) cell to transfer stormwater in an un-interrupted manner to the Southwest Pond, in accordance with a currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively, of this Permit.

26. Vertical Hydraulic Gradient Performance Standard

The Permittee shall maintain a neutral or upward hydraulic gradient in all nested or paired monitoring wells at the facility required by Part I.H.2[c] of this Permit. Said neutral hydraulic gradient is defined as equal freshwater elevation in both wells of the pair, pursuant to Part I.H.2(a) of this Permit. Upward hydraulic gradient is defined as a condition where the deeper well of the pair exhibits a higher or greater freshwater elevation than the shallow well. For well pair GW-19A and GW-19B, this performance standard shall become effective after completion of the shallow aquifer de-watering required by Part I.I.2~~3~~ of this Permit.

27. DU Storage Building Performance Standard

The Permittee shall operate and maintain the DU Storage Building:

a) In accordance with the BAT Performance Monitoring Plan and BAT Contingency Plan, Appendices J and K, referenced in Part I.I.5 of this Permit.

b) To maintain the building floor at the approved design grade, and in a sound, undamaged, water tight physical condition.

c) To prevent physical contact of any DU waste material or liquids therein with the building's asphalt floor.

d) To ensure the physical integrity of the building's asphalt floor to contain and control any waste leakage due to container damage, degradation or spills.

e) To prevent any physical contact of any precipitation, run-on, or other water with the DU waste.

f) To ensure the physical integrity of the walls and roof of the building to prevent the contact of precipitation with the DU containers and waste therein.

g) To maintain all DU containers in a closed, strong tight and water tight condition.

h) To prevent the occurrence or presence of any water on the building floor at any time.

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F. Compliance Monitoring

1. Compliance Monitoring Wells

Ground water monitoring wells used as compliance monitoring points shall meet the following requirements:

a) **LARW, Class A, Class A North, and 11e.(2) Compliance Monitoring Wells – the following wells shall be sampled and analyzed for purposes of compliance monitoring**

1) LARW Cell – existing wells GW-128, GW-16R, GW-20, GW-22, GW-23, GW-24, GW-29, GW-56R, GW-64, GW-77, GW-103, GW-104, and GW-105.

2) 11e.(2) Cell – existing wells GW-19A, GW-20, GW-24, GW-25, GW-26, GW-27, GW-28, GW-29, GW-36, GW-37*, GW-38R*, GW-57, GW-58, GW-60, GW-63, GW-126, GW-127 and piezometer PZ-1*. * Wells 37, 38R, and piezometer PZ-1 shall be monitored only for ground water elevations

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3) Class A Cell – existing wells GW-81, GW-82, GW-83, GW-84, GW-85, GW-86, GW-88, GW-89, GW-90, GW-91, GW-92, GW-93, GW-94, GW-95, GW-99, GW-100, GW-101, and GW-102.

4) Class A North Cell – existing wells GW-106, GW-107, GW-108, GW-109, GW-110, GW-111, GW-112, GW-137, GW-138, GW-139, GW-140, and GW-141.

b) Mixed Waste Cell Compliance Monitoring Wells (radiologic contaminants only) – the following wells shall be sampled and analyzed for purposes of compliance monitoring:,GW-130, GW-131, GW-132, GW-133, GW-134, GW-135, GW-136, I-1-30, and I-3-30*.

*** Well I-3-30 shall be monitored only for ground water elevations.**

c) Evaporation Pond Monitoring Wells – monitoring wells P3-95 NECR, P3-95 SWC, and P3-97 NECR shall be sampled and analyzed for purposes of compliance monitoring for the 1995 and 1997 Ponds, well GW-66R shall be sampled and analyzed for purposes of compliance monitoring for the Mixed Waste Pond, and wells GW-19A, GW-36, and GW-58 shall be sampled and analyzed for purposes of compliance monitoring for the 2000 Evaporation Pond in addition to the 11e.(2) cell. Monitoring well GW-129 shall be sampled and analyzed for purposes of compliance monitoring for the Northwest Corner Evaporation Pond.

d) Deep Aquifer Monitoring Wells– the Permittee shall monitor heads in all deep aquifer monitoring wells, including, but not limited to monitoring wells I-1-100, I-3-100, GW-19B, GW-27D, and GW-139D.

e) Well Construction Criteria – any ground water monitoring well used as a compliance monitoring point shall be:

1) Located hydrologically downgradient of waste disposal,

2) Completed exclusively in the uppermost aquifer,

3) Located as close as practicable to the waste and no more than 90 feet from edge of waste,

4) Constructed in conformance to guidelines found in the EPA RCRA Ground Water Monitoring Technical Enforcement Guidance Document, 1986, OSWER-9950.1.

f) Well Network Early Warning Requirement – any network of ground water monitoring wells used as points of compliance shall be adequately constructed, both in location and spacing, to provide early warning of a contaminant release from a waste embankment before the contaminant leaves the embankment's 100-foot wide buffer zone, as defined in Table 7, below. For purposes of this Permit, early warning shall be provided by a compliance monitoring well network with an inter-well spacing distance to be approved by the Executive Secretary.

g) Buffer-Zone Requirements– waste disposal is prohibited inside the buffer zone, as described in Tables 3 and 7 of this Permit.

Table 7: Buffer Zone Boundary Locations

Disposal Cell	Edge of Buffer Zone Position	Coordinates	
		Latitude	Longitude
LARW	NW Corner	40° 41' 12.366" N	113° 06' 52.622" W
	SW Corner	40° 40' 51.915" N	113° 06' 52.494" W
	SE Corner	40° 40' 51.976" N	113° 06' 35.429" W
	NE Corner	40° 41' 12.427" N	113° 06' 35.556" W
Class A	NW Corner	40° 41' 29.052" N	113° 07' 26.037" W
	SW Corner	40° 41' 13. 245" N	113° 07' 25. 996" W
	SE Corner	40° 41' 13.202" N	113° 06' 54.069" W
	NE Corner	40° 41' 29.008" N	113° 06' 54.109" W
Class A North	NW Corner	40° 41' 39. 496" N	113°0 7' 26.051" W
	SW Corner	40° 41' 29. 536" N	113° 07' 26.035" W
	SE Corner	40° 41' 29. 563" N	113° 06' 55.911" W
	NE Corner	40° 41' 39. 521" N	113° 06' 55.926" W
11e.(2)	NW Corner	40° 41' 13.587" N	113°0 7' 25.832" W
	SW Corner	40° 40' 54.077" N	113° 07' 26.070" W
	SE Corner	40° 40' 53.849" N	113° 06' 54.279" W
	NE Corner	40° 41' 13.359" N	113° 06' 54.037" W

h) Protection of Monitoring Network – all compliance monitoring wells must be protected from damage due to surface vehicular traffic or contamination due to surface spills. All monitoring wells shall be maintained in full operational condition for the life of this Permit.

The criteria for determining full operational condition are:

1) Accessibility – each well must be accessible for sampling and shall not be located in an area of standing water.

2) Casing Measuring Point – each well shall have a permanent surveyed reference point such as the top of the protective casing.

3) Physical Integrity – any physical disturbance to any well, which may alter the surveyed water level measuring point, is prohibited. In addition, all wells shall have an adequate surface seal around the well casing to prevent surface or storm water from entering the well.

4) Chemical Integrity – all well and sampling materials shall be constructed of inert materials to prevent the introduction of contaminants from leaching or corrosion.

5) Silt Content – if the measured water column of any well is less than 90% of the theoretical water column, the monitoring well shall be redeveloped prior to sampling.

Any well that becomes damaged beyond repair or is rendered unusable for any reason will be replaced by the Permittee within 90 days or as directed by the Executive Secretary.

i) Notification of Ground-water Monitoring Event

At least 30 calendar days prior to the annual Ground Water Monitoring event required under Part I.H.1, the Permittee will submit a written notice and schedule, with approximate dates the wells will be sampled, to the Executive Secretary to allow the DRC the opportunity to collect duplicate or split ground-water samples from the same wells at the same time as the Permittee's staff during a regularly scheduled sampling event for independent laboratory analysis.

2. BAT Compliance Monitoring Points

The Permittee shall inspect, sample, analyze, or otherwise monitor other points of compliance in order to confirm compliance with this Permit. These points or instruments shall include:

a) **East Truck Unloading Area – including monitoring of free draining conditions to the stormwater collection troughs, water level in the collection troughs, and physical condition/integrity of all exposed asphalt and concrete surfaces.**

b) **LARW, Class A, and Class A North Cell Collection Lysimeters – all collection lysimeters constructed at the LARW, Class A, and Class A North Cells in accordance with the requirements of Part I.D.10 of this Permit.**

c) **LARW Containerized Waste Storage Pad – including monitoring of water in the stormwater collection sump and physical condition of containers on the pad.**

d) **1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation ponds – including monitoring of: 1) vertical freeboard at the water level gauging stations approved by the Executive Secretary, 2) operational status and required BAT performance parameters of all leak detection pump-back system equipment, including but not limited to, leak detection system pump, head pressure transducer, and flow meters required by Part I.E.14 of this Permit and approved by the Executive Secretary.**

e) **Intermodal Unloading Facility – including monitoring of free draining conditions at both the unloading pad and throughout the length of the contact stormwater drainage discharge pipeline that discharges to the 1995 and 1997 evaporation ponds.**

f) **Box-Washing Facility – including monitoring of free draining conditions, physical condition and integrity of concrete floor and floor sumps, sump pump in floor sump is operational, free drainage is maintained through**

the pipeline discharging wastewater into the concrete holding tanks, and water level in concrete holding tanks is maintained at or below three-quarters full.

g) Track No. 4 and Track No. 2 Rail Car Wash Facilities – including monitoring of free draining conditions and physical condition and integrity of rail bay concrete floor, floor sumps, conveyance pipe, Collected Water Receiver Tank, Filtered Water Storage Tank, and concrete secondary containment vault.

h) Rail Digging Facility – including monitoring of free draining conditions to the concrete collection basins and throughout the drainage system after the collection basins, and physical integrity of the asphalt and concrete surfaces.

i) Shredder Facility – including monitoring to determine:

1) Free draining conditions throughout the concrete surfaces to the seven catch basins,

2) Physical integrity of all concrete surfaces,

3) Water level at each catch basin and manhole, and

4) Free draining conditions of all wastewater transfer piping.

j) Rotary Dump Facility – including monitoring to determine:

1) Free draining conditions, physical condition, and integrity of all concrete surfaces,

2) Presence or absence of fluids in the Sediment Basin leak detection annulus,

3) Water level in the sediment basin,

4) Free draining conditions in all wastewater transfer piping, and

5) Presence or absence of fluids in the leak detection annulus within the secondary pipe of all dual-walled wastewater transfer piping systems.

k) Intermodal Container Wash Building – including monitoring to determine:

1) Free draining conditions, physical condition, and integrity of concrete floor and floor trenches,

2) Presence or absence of fluids in the sediment basin leak detection annulus,

3) Fluid level in the sediment basin, and

4) Presence or absence of fluids in the leak detection annulus within the secondary pipe of all dual-walled wastewater transfer piping systems.

l) Decontamination Access Control Building – including monitoring to determine:

1) Free draining conditions in all wastewater transfer piping,

2) Presence or absence of fluids in the gray water collection tank leak detection annulus,

3) Water level in the gray water collection tank, and

4) Presence or absence of fluids in the leak detection annulus within the secondary pipe of all dual-walled wastewater transfer piping systems.

m) East Side Drainage Project - including monitoring to determine the presence or absence of fluids in the leak detection annulus within the secondary piping of all dual-wall wastewater transfer systems. All dual-walled pressurized pipe connected to the East Side Drainage Project, that does not gravity drain to a leak detection port, including both primary and secondary piping, shall be pressure tested annually by an independent Professional Engineer registered in the State of Utah.

3. Future Modification of Compliance Monitoring Systems or Equipment

If at any time the Executive Secretary determines that additional systems, mechanisms or instruments are necessary to monitor ground water quality or Best Available Technology compliance at the facility, the Permittee shall submit within 30 days of receipt of notification, a plan and compliance schedule to modify the compliance monitoring equipment, for Executive Secretary approval. Any failure to construct the required compliance monitoring system or equipment in accordance with the approved plan and schedule shall constitute a violation of this Permit.

4. Compliance Monitoring Period

Monitoring shall commence upon issuance of this Permit, or upon:

a) Completion of each collection lysimeter in accordance with Part I.D. 10 of this Permit and

b) Completion of the soil moisture instrumentation required by Part I.E.4.

Thereafter, compliance monitoring shall continue through the life of the Permit.

5. Monitoring Requirements and Frequency

Measurements or analysis done for monitoring will be conducted in compliance with the requirements below, and reported to the Executive Secretary as per the requirements of Part I.H.

a) Water Level Measurements – water level measurements shall be made monthly in each monitoring well and piezometer listed in Part I.F.1. Measurements made in conjunction with annual ground water sampling shall be completed prior to any collection of ground water samples in accordance with the currently approved Water Monitoring Quality Assurance Plan in Appendix B of this Permit. These measurements will be made from a permanent single reference point clearly demarcated on

the top of the well or surface casing. Measurements will be made to the nearest 0.01 feet.

b) Specific Gravity Measurements – ground water-specific gravity measurements shall be made annually in each monitoring well and piezometer in conjunction with each annual ground water quality sampling event.

c) Ground Water and Pore Water Quality Sampling and Analysis – except for arsenic and molybdenum, grab samples of ground water from compliance monitoring wells and pore water from lysimeters (as available) will be collected for chemical analysis on an annual basis, in conformance with Part II.A and B and the currently approved Water Monitoring Quality Assurance Plan in Appendix B of this Permit.

1) Ground/Pore Water Analytical Methods – methods used to analyze ground water samples must comply with the following:

i. Are methods cited in UAC R317-6-6.3A(13) or have been approved by the Executive Secretary in the currently approved Water Monitoring Quality Assurance Plan, Appendix B of this Permit, and

ii. Have detection limits which do not exceed the Ground Water Quality Standards or Protection Levels listed in Tables 1A and 1C of this Permit.

2) Analysis Parameters – the following analyses will be conducted on all samples collected for ground water monitoring:

i. Field Parameters – dissolved oxygen, pH, temperature, specific gravity, and specific conductance.

ii Laboratory Parameters – including:

- General Inorganic Parameters: Chloride, Sulfate, Carbonate, Bicarbonate, Sodium, Potassium, Magnesium, Calcium, bromide, iron, and total anions and cations
- General Radiologic Parameters: potassium-40, gross beta
- All Protection Level Parameters – individual analysis for all parameters found in Part I.C, Tables 1A, 1B, 1C, 1D, 1E, and 1F of this Permit

3) Arsenic and Molybdenum – arsenic and molybdenum samples will be collected for chemical analysis at the time of Permit renewal and reported with the application for Permit Renewal.

6. Collection Lysimeter Sampling

Collection lysimeter sampling shall be conducted in compliance with the currently approved Water Monitoring Quality Assurance Plan approved by the Executive Secretary, as provided in Appendix B of this Permit. Sample analysis shall conform to the requirements of Part I.F.5(c) of this Permit.

Water quality samples shall be collected within 24 hours of initial discovery of fluid. The priority of sample parameters shall conform to the currently approved Appendix C of this Permit, with special emphasis on selection of mobile and predominant contaminants found within the capture area of the lysimeter.

7. Modification of Monitoring or Analysis Parameters

If at any time the Executive Secretary determines the monitoring or analysis parameters to be inadequate, the Permittee shall modify all required monitoring parameters immediately after receipt of written notification from the Executive Secretary. Upon any change in the currently approved waste parameters defined in Conditions 6, 7, and 8 of the Utah Radioactive Material License UT 2300249, the Permittee shall revise the currently approved Water Monitoring Quality Assurance Plan in Appendix B.

8. Waste Characterization Monitoring

a) **Class A Waste – all Class A waste received by the Permittee shall be fully characterized to determine its chemical and radiological constituents and the presence and concentration of any chelating agents both before shipment and emplacement for disposal, in accordance with the requirements of the currently approved Waste Characterization Plan in the Radioactive Material License UT 2300249, Condition 58 and for PCB/Radioactive Waste, in the currently approved State-issued Part B Permit . Said waste characterization shall include sampling and analysis of all contaminants authorized by Part I.E.1 and of those prohibited by Part I.E.2 of this Permit.**

b) **11e.(2) Waste – all 11e(2) Waste received by the Permittee shall be fully characterized both before shipment and after arrival at the facility to identify any new non-radiologic contaminants not authorized by this Permit by Parts I.E.2 and I.E.5. Said waste characterization shall include sampling and analysis of all non-radiologic contaminants prohibited by Part I.E.2 of this Permit.**

The Permittee shall maintain records of all Class A, and 11e.(2) Waste sampling and analysis on site.

9. Waste Liquid Content Monitoring

All wastes received shall be tested for liquids in accordance with the currently approved LLRW Waste Characterization Plan in the Radioactive Material License, Condition 58. In accordance with UAC R313-15-1008(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 1% of the volume of the waste. In the event that solid waste is received or observed to contain free liquids in excess of 1% by volume, the Licensee/Permittee shall immediately notify the Division of Radiation Control that the shipment(s) failed the requirements for acceptance.

10. Post-Closure Monitoring

Post-closure monitoring shall conform to the requirements of the currently approved Post-Closure Monitoring Plan in Appendix F of this Permit.

11. On-Site Meteorological Monitoring

The Permittee shall provide continuous monitoring of the following minimum meteorological parameters, in accordance with the currently approved Weather Station Monitoring Plan found in Appendix G of this Permit:

a) Wind direction and speed

b) Temperature

c) Daily Precipitation

d) Pan evaporation

The Permittee shall maintain records of this monitoring on site. The Permittee shall submit an annual meteorological report for the facility in compliance with the requirements of Part I.H.10 of this Permit.

12. Containerized Waste Storage Areas: Leakage/Spill Monitoring and BAT Status

The Permittee shall conduct daily inspections of the containerized waste storage areas in order to remediate any container leakage or spillage in accordance with the currently approved BAT Performance Monitoring Plan in Appendix J of this Permit . Said inspections shall also evaluate compliance with the Best Available Technology requirements of Part I.E.10 of this Permit. The Permittee shall maintain a written record of these inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

13. Evaporation Ponds Monitoring

a) 1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation Pond Daily Monitoring – the Permittee shall conduct daily inspections of the 1995, 1997, 2000, Mixed Waste, and Northwest Corner evaporation ponds to determine compliance with the Best Available Technology requirements of Part I.E.14.a of this Permit, including:

1) Visual observation of pond water level, relative to pond spillway centerline, to evaluate pond freeboard compliance against BAT performance criteria.

2) Determination of operational status of leak detection system pump, pump controller, head/pressure transducer, and flow meter equipment.

3) Measurement of daily leak detection system flow volume. For BAT compliance monitoring purposes for the 1995, 1997, 2000, Mixed Waste, and Northwest Corner evaporation ponds, the Permittee shall calculate an average daily leakage volume across a consecutive 7-day period. The Permittee shall perform this calculation for each evaporation pond weekly.

4) Measurement of daily leak detection system head. For BAT compliance monitoring purposes for the 1995, 1997, 2000, Mixed Waste, and Northwest Corner evaporation ponds, the Permittee shall determine the maximum head limit to be measured by the approved head/pressure transducer construction that complies with the 1-foot BAT head performance standard of Part I.E.14.a.3. On a daily basis, the Permittee shall compare the daily measured head against the maximum head limit for each evaporation pond.

The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

b) **1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation Pond Leak Detection System Pump Tests – the Permittee shall conduct a pump test of the evaporation pond's leak detection sump within 5 days of discovery that the average daily leak detection system flow volume (Part 1.F.2.d)exceeds the following limits:**

1)	1995 Evaporation Pond:	155 gallons/day
2)	1997 Evaporation Pond:	160 gallons/day
3)	Mixed Waste Evaporation Pond:	160 gallons/day
4)	2000 Evaporation Pond:	355 gallons/day
5)	Northwest Corner Evaporation Pond:	300 gallons/day

Said pump test shall comply with the currently approved BAT Contingency Plan in Appendix K of this Permit.

c) **Annual Monitoring – on an annual basis, the Permittee shall:**

1) Collect water quality samples from fluids stored in the approved evaporation ponds.

2) Analyze said water samples for all ground water quality protection level parameters defined in Part I.F.5.c.2, above, including a complete gamma spectroscopic analysis.

Sampling and analyses at all evaporation ponds shall comply with the currently approved Water Monitoring Quality Assurance Plan in Appendix B of this Permit.

d) **Annual Pump Inspection – on an annual basis, the Permittee shall remove the submersible pump from the leak detection system of the 1995, 1997, 2000, Mixed Waste, and Northwest Corner evaporation ponds and check both the winding resistance and insulation resistance. If either the winding resistance or insulation resistance is outside of the manufacturer specifications, the pump will be replaced and/or repaired with a pump that satisfies all manufacturer specifications within 24 hours. Within 30 days of completing the annual pump inspection, a bor-**

o-scope video inspection shall be performed to ensure the pump was correctly reinstalled.

14. Confined Aquifer Head Monitoring

The Permittee shall conduct monthly monitoring of water levels and annual specific gravity measurements in all wells completed in the deep confined aquifer, including, but not limited to: I-1-100, I-3-100, GW-19B, GW-139D, and GW-27D. Annual water levels and specific gravity measurements shall be made in conjunction with the annual ground water quality sampling event.

15. Mixed Waste Leachate Monitoring

On an annual basis, the Permittee shall collect representative samples of leachate from the Mixed Waste Cell leachate collection system (upper leachate collection access pipe) and analyze for radioactive contaminants. If no leachate is present during the annual sampling event, no sample is required. Said radioactive contaminants shall include:

a) All Ground Water Protection Level Parameters found in Tables 1E and 1F of this Permit

b) A complete gamma spectroscopic analysis to determine all other gamma-emitting radioisotopes that may be present

16. Intermodal Unloading Facility Monitoring

The Permittee shall conduct daily monitoring of the Intermodal Unloading Facility to determine and ensure free draining conditions exist both on the unloading pad and across the contact stormwater drainage pipeline that discharges to the 1995 and 1997 evaporation ponds. The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

17. Box-Washing Facility Monitoring

The Permittee shall conduct daily monitoring of the Box-Washing facility to demonstrate compliance with the Best Available Technology requirements of Part I.E.14.b of this Permit, including:

a) Free draining conditions

b) Physical integrity of concrete surfaces

c) Wastewater catch basin (sump) water level

d) Water level in wastewater storage tanks

e) Absence of discharge to the ground or ground water

The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

18. Rail Car Wash Facility Monitoring

The Permittee shall conduct daily monitoring of the Track No. 4 ~~and Track No. 2 Rail Car Wash~~ facility~~ies~~ to demonstrate compliance with the Best Available Technology requirements of Part I.E.14.d of this Permit in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.

The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

19. Railcar Rollover Facility Monitoring

The Permittee shall conduct daily monitoring of the Railcar Rollover Facility to demonstrate compliance with the BAT Performance and Best Management Practice Standards of Parts I.E.7 and I.E.17 of the Permit in accordance with the currently approved BAT Performance Monitoring Plan and Contingency Plan in Appendices J and K, respectively, of this Permit.

20. Open Cell Time Limit Monitoring

The Permittee shall demonstrate compliance with the open cell time limitation requirements of Part I.E.6 of this Permit by observing and recording the following dates of completion for each working area in the Class A and Class A North cells:

a) Initial placement of waste on the first lift on the clay liner

b) Completion of construction of the clay radon barrier

The Permittee shall maintain written records of this monitoring on site. All monitoring records shall comply with the requirements of Part II.G of this Permit.

21. Reserved

22. BAT Performance Monitoring Plan

The Permittee shall demonstrate compliance with the BAT requirements and performance standards and Best Management Practices in Parts I.D and I.E of this Permit by implementing the most current BAT Performance Monitoring Plan approved by the Executive Secretary and provided in Appendix J of this Permit.

23. BAT Contingency Plan

In the event that BAT failure occurs at any facility, the Permittee shall implement the most current BAT Contingency Plan approved by the Executive Secretary and provided in Appendix K of this Permit to regain the BAT requirements and performance standards and Best Management Practices specified in Parts I.D and I.E of this Permit.

24. Stormwater Monitoring

The Permittee shall demonstrate compliance with stormwater removal requirements of Part I.E.7 of this Permit by maintaining daily written records for ~~the following~~ stormwater management activities:

a) **Date, time, and location of discovery of stormwater accumulation**

b) **Date and time when stormwater removal activities were initiated at each location**

c) **Date and time when stormwater removal was completed at each location**

d) **First and last name(s) of all personnel involved with stormwater removal activities**

e) **Unique identity of locations of where stormwater was removed**

f) **Type of stormwater removed: contact or non-contact stormwater**

g) **Identify equipment used to remove contact and non-contact stormwater**

h) **Volumes of stormwater removed at each location**

i) **Location(s) where stormwater was disposed**

25. Shredder Facility

The Permittee shall conduct daily monitoring of the Shredder Facility to demonstrate compliance with the Best Available Technology requirements of Part I.E.20 of this Permit in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K of this Permit, respectively, including:

a) **Free draining conditions**

b) **Physical integrity of concrete surfaces**

c) **Absence of discharge to the ground or ground water**

The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

26. Rotary Dump Facility

The Permittee shall conduct daily monitoring of the Rotary Dump Facility to demonstrate compliance with the Best Available Technology requirements of Part I.E.21 of this Permit in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K of this Permit, respectively, including:

a) **Free draining conditions**

b) **Physical integrity of concrete surfaces**

c) **Water level in Sediment Basin sump**

d) **Presence of fluids in the Sediment Basin leak detection system**

e) **Absence of discharge to the ground or ground water**

f) Absence of fluid in annular space between the primary and secondary pipes of the leak detection system for pressurized pipes

The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

27. Intermodal Container Wash Building

The Permittee shall conduct daily monitoring of the Intermodal Container Wash Building to demonstrate compliance with the Best Available Technology requirements of Part I.E.22 of this Permit in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit, including:

a) Free draining conditions,

b) Physical integrity of concrete surfaces,

c) Water level in Settlement Basin,

d) Presence of fluids in the settlement basin leak detection system, and

e) Absence of discharge to the ground or ground water.

The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

28. Decontamination Access Control Building

The Permittee shall conduct daily monitoring of the Decontamination Access Control Building to demonstrate compliance with the Best Available Technology requirements of Part I.E.23 of this Permit in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit, including:

a) Free draining conditions in all wastewater transfer piping,

b) Water level in the gray water collection tank,

c) Presence of fluids in the gray water collection tank leak detection annulus, and

d) Absence of discharge to the ground or ground water.

The Permittee shall maintain written records of the findings of these daily inspections on site. All daily inspection records shall comply with the requirements of Part II.G of this Permit.

29. East Side Drainage Project

The Permittee shall conduct daily monitoring of the East Side Drainage Project to demonstrate compliance with the Best Available Technology requirements of Part I.E.24 of this Permit in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit, including:

a) Free draining conditions in all wastewater transfer piping

b) Absence of fluids in the leak detection annulus within the secondary pipe of the dual-walled piping system, and

c) Absence of discharge to the ground or ground water.

30. DU Storage Building Monitoring

The Permittee shall conduct weekly visual monitoring of the DU Storage Building to determine compliance with the BAT performance standards defined in Part I.E.27. This shall include, but is not limited to:

a) Verification of the physical integrity of the building floor, walls, and roof.
b) Determination of physical integrity of each DU waste container.
c) Verification of the lack of any water in the building.

In addition, if the Permittee discovers any failure of a waste container, or the DU Storage Building to meet the requirements in Parts I.E.27 or I.F.30, of this Permit, the Permittee shall:

a) Complete all corrective actions needed to repair and abate the problem within 24-hours of discovery, and

b) Determine the root cause of the problem(s) and complete all necessary action to prevent future occurrences of said problem(s) within 5 calendar days of said discovery.

The Permittee shall maintain written records of all visual findings and corrective actions of this weekly inspection on site. All weekly inspection and corrective action records shall comply with the requirements of Part II.G of this Permit.

G. Non-Compliance Status. Ground Water Monitoring and Best Available Technology

1. Noncompliance with the Ground Water Protection Levels

Noncompliance with the ground water protection levels in Part I.C, Tables 1A, 1B, 1C, 1D, 1E, and 1F as applied to the compliance monitoring wells defined in Part I.F.1 of this Permit shall be defined as follows:

a) Monitoring for probable out-of-compliance shall be defined as any one sample in excess of the protection level in Tables 1A, 1B, 1C, 1D, 1E, or 1F of this Permit for any parameter from the same compliance monitoring well.

b) Out-of-Compliance Status –defined as two (2) consecutive samples in excess of the protection level in Tables 1A, 1B, 1C, 1D, 1E, or 1F of this Permit for any parameter from the same compliance monitoring well.

c) Other Methods to Determine Ground Water Quality Compliance Status – at the discretion of the Executive Secretary, other methods may be employed to determine the compliance status of the facility with respect to ground water quality data, including: 1) Trend and/or Spatial Analysis – analysis of any contaminant concentration trend through time in a single compliance monitoring point, and /or spatial analysis of the same from any group of compliance monitoring points.

2) EPA RCRA Statistical Methods – other applicable statistical methods may be used to determine out-of-compliance status, as defined in the EPA document "Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities", February 1989, or as amended.

2. Requirements for Ground Water Monitoring for Probable Out-of-Compliance Status

The Permittee shall evaluate the results of each round of ground water sampling and analysis to determine existence of probable out-of-compliance status as defined in Part I.G.1(a) of this Permit. Upon any determination that probable out-of-compliance status exists, the Permittee shall:

a) Notify the Executive Secretary of the probable out-of-compliance (POOC) status within 30 days of the initial detection.

b) Immediately implement a schedule of quarterly ground water sampling and analysis for the well(s)/parameter(s) of concern, consistent with the requirements Part I.F.5(b) and the currently approved Water Monitoring Quality Assurance Plan, Appendix B of this Permit. This quarterly sampling will continue until the compliance status can be determined by the Executive Secretary.

3. Requirements for Ground Water Out-of-Compliance Status

a) Notification and Accelerated Monitoring – the Permittee shall evaluate the results of each round of ground water sampling and analysis to determine existence of out-of-compliance status as defined in Part I.G.1(b) of this Permit. Upon any determination that an out-of-compliance status exists the Permittee shall:

1) Verbally notify the Executive Secretary of the out-of-compliance status within 24 hours, and provide written notice within 5 days of the detection and

2) Immediately implement an accelerated schedule of monthly ground water monitoring of the monitoring wells of concern for the parameters in question. This monitoring shall continue for at least 2 months or until the facility is brought into compliance, as determined by the Executive Secretary. At the discretion of the Executive Secretary, the Permittee may be required to sample and analyze for

additional inorganic, organic, or radiochemical parameters in order to determine the compliance status of the facility.

b) Source and Contamination Assessment Study Plan – within 30 days of the verbal notice to the Executive Secretary required in Part I.G.3(a) of this Permit, the Permittee shall submit for Executive Secretary approval an assessment study plan and compliance schedule for:

1) Assessment of the source or cause of the contamination and determination of steps necessary to correct the source.

2) Assessment of the extent of the ground water contamination and any potential dispersion.

3) Evaluation of potential remedial actions to restore and maintain ground water quality and ensure that the ground water standards will not be exceeded at the compliance monitoring wells, and best available technology will be reestablished.

c) Contingency Plan – in the event that Out-of-Compliance status is determined as per Part I.G.1(b) or (c), and upon written notification from the Executive Secretary, the Permittee shall immediately implement the currently approved Contingency Plan in Appendix A of this Permit.

4. Definition and Requirements for Failure to Maintain Best Available Technology

a) Definition of Failure to Maintain Best Available Technology (BAT) Requirements – any violation of the BAT Design Standards in Part I.D, including design, design specifications, or construction requirements shall constitute failure to meet the best available technology requirements of this Permit. Any violation of the BAT Performance Standards in Parts I.D.1 or I.E shall also constitute failure to meet the best available technology requirements of this Permit

b) Requirements for Failure to Maintain Best Available Technology – in the event that the Permittee fails to maintain best available technology in accordance with Parts I.D and I.E, above, the Permittee shall:

1) Notify the Executive Secretary verbally within 24 hours of discovery of the BAT failure, and provide written notice within 5 days of discovery.

2) Submit within 5 days of discovery a complete written description of:

i. The cause of the BAT failure,

ii. Any measures taken by the Permittee to mitigate the BAT failure,

iii. Time frame of the discovery of the BAT failure and any mitigation measures were implemented, and

iv. Evidence to demonstrate that any discharge or potential discharge caused by the BAT failure did not and will not result in a violation of UAC 19-5-107.

c) BAT Contingency Plan – in the event that Out-of-Compliance status is determined as per Part I.G.4(a) or by daily implementation of the currently approved BAT Performance Monitoring Plan in Appendix J of this Permit, the Permittee shall immediately implement the currently approved BAT Contingency Plan in Appendix K of this Permit.

5. Affirmative Defense Relevant to Best Available Technology Failures

In the event that a compliance action is initiated against the Permittee for violation of Permit conditions relating to best available technology, the Permittee may affirmatively defend against that action by demonstrating the following:

a) The Permittee submitted notification according to UAC R317-6-6.13,

b) The failure was not intentional or caused by the Permittee's negligence, either in action or in failure to act,

c) The Permittee has taken adequate measures to meet permit conditions in a timely manner or has submitted to the Executive Secretary, for Executive Secretary approval, an adequate plan and schedule for meeting permit conditions, and

d) The provisions of UAC 19-5-107 have not been violated.

H. Reporting Requirements

Notwithstanding any other environmental monitoring and reporting required by the Radioactive Material License, the Permittee shall submit the following reporting information.

1. Ground-Water Monitoring

Monitoring required in Part I.F of this Permit, shall be reported according to the following schedule, unless modified by the Executive Secretary:

a) Routine Annual Monitoring

Time Period	Report Due By
January 1 thru December 31	March 1

b) Accelerated Monitoring

Monitoring required in Part I.G.2 and Part I.G.3 of this Permit, shall be reported on a semi-annual schedule according to the following schedule, unless modified by the Executive Secretary:

Time Period	Report Due By
1st (January thru June)	September 1
2nd (July thru December)	March 1

The Permittee shall include within the written report a summary table of wells, sampling dates, analytes, and any other constructive information concerning all wells in accelerated monitoring. A more detailed discussion of each analyte and associated well will also be provided in the report.

2. Water Level Measurements

The Permittee shall comply with the following ground water level reporting requirements:

a) **General Requirements – monthly water level measurements from all ground water monitoring wells will be reported annually in both measured depth to ground water and saline ground water elevations above mean sea level. In addition, annual freshwater equivalent head elevations will be reported for each well and will be derived from annual ground water specific gravity measurements made in that well during each annual sampling event.**

b) **Maps and Diagrams Format – distribution of freshwater equivalent head shall be summarized on an annual basis in the form of monthly potentiometric maps of the uppermost aquifer for each water level measurement event, and shall be submitted with the annual monitoring report required by Part I.H.1**

c) **Vertical Hydraulic Gradient Reporting – on a monthly basis the Permittee shall calculate and provide summaries of head data for each intermediate / shallow aquifer nested well group, including but not limited to: I-1-30 / I-1-100, I-3-30 / I-3-100, GW-19A / GW-19B, GW-27/GW-27D, and GW-139/GW-139D. Said summaries shall include measured water level depth, calculations of ground water level elevations, both saline and fresh water equivalents, in both the shallow and confined aquifers for each water level measurement event and include calculations of both the saline and fresh water equivalent vertical gradients (ft/ft) for each nested well group. These summaries shall be submitted with the annual monitoring report as required by Part I.H.1.**

d) Horizontal Hydraulic Gradient Reporting – on a monthly basis the Permittee shall calculate the following and provide within the annual monitoring report as required by Part I.H.1:

1) A site-wide summary of maximum, minimum, and average horizontal hydraulic gradient for all wells located in Section 32 based on saline and fresh water equivalent ground water elevations and

2) Individual disposal cell summary of maximum, minimum, and average horizontal hydraulic gradient based on saline and fresh water equivalent ground water elevations for the Class A, Class A North LARW, 11e.(2), and Mixed Waste disposal facilities. Determination of these individual hydraulic gradients shall be made after division of each disposal cell into smaller sub-areas for purposes of hydraulic gradient comparisons through time, as approved by the Executive Secretary. On an individual cell basis, the Permittee shall identify the cell sub-areas where the monthly maximum, minimum, and average hydraulic gradients occurred, as summarized in the August 31, 2004 letter response from Envirocare of Utah Inc. to DRC comments regarding the 2003 2nd Semi-Annual Ground Water Report.

In the event that the average fresh water equivalent horizontal hydraulic gradient of any sub-area exceeds the cell-specific Permit limit listed below, the Permittee shall report and identify the sub-area in which the exceeded limit occurred within the annual ground water monitoring report required by Part I.H.1 of this Permit.

Disposal Cell	Fresh Water Equivalent Horizontal Hydraulic Gradient Limit
Class A	1.00E-3
Class A North	1.00E-3
LARW	9.67E-4
Mixed Waste	9.67E-4
11e.(2)	3.29E-3

3. Ground Water and Pore Water Quality Sampling

Reporting will include:

a) Field Data Sheets – or copies thereof, including the field measurements, required in Part I.F.5(c)(2) of this Permit, and other pertinent field data, such as:

1) Ground Water Monitoring – well name/number, date and time, names of sampling crew, type of sampling pump or bail, measured casing volume, volume of water purged before sampling, volume of water collected for analysis.

b) **Results of Ground Water, Pore Water, and Surface Water Analysis – including date sampled, date received; and the results of analysis for each parameter, including: value or concentration, units of measurement, reporting limit (minimum detection limit for the examination), analytical method, the date of the analysis, counting error for each radiochemical analysis, and total anions and cations for each inorganic analysis.**

c) **Quality Assurance Evaluation – with every sampling report the Permittee shall include a quality assurance evaluation of the reported ground water and pore water data. Said report shall evaluate the sample collection techniques, sample handling and preservation, and analytical methods used in sampling with the objective of verifying the accuracy of the compliance monitoring results.**

d) **Electronic Data Files and Format – in addition to written results required for every sampling report, the Permittee shall provide an electronic copy of all laboratory results for ground water, pore water, and surface water quality sampling. Said electronic files shall consist of a Comma Separated Values (CSV) file format, or as otherwise approved by the Executive Secretary.**

4. Spill Reporting

The Permittee shall report as per UAC 19-5-114, any spill or leakage of waste or waste liquids which come in contact with native soil or ground water in compliance with Part II.I of this Permit. For spills of solid waste greater than 100 kg, the spill must be reported to the Division of Radiation Control within 7 calendar days of discovery.

5. Post-Closure Monitoring

Reporting of post-closure monitoring shall comply with the requirements of the currently approved Post-Closure Monitoring Plan in Appendix F of this Permit.

6. Annual "As-Built" Report

The Permittee shall submit an annual "As-Built" Report to document interim construction of the Class A, Class A North, and 11e.(2) Disposal cells in compliance with the currently approved design and specifications and LLRW and 11e.(2) Construction Quality Assurance/Quality Control Plan (Radioactive Materials License, Condition 44). These reports will be submitted for the Executive Secretary's approval on or before December 1of each calendar year and will be prepared in accordance with the LLRW and 11e.(2) Construction Quality Assurance/Quality Control Plan..

7. Waste Characterization Reporting

In the event that a new contaminant is detected in any waste at the facility, which has not been authorized by Part I.E.1, or if concentrations of approved contaminants are detected above the limits established in Part I.E.2 of this Permit, the Permittee shall notify the Executive Secretary in writing within 7 calendar days from the date of discovery.

8. Collection Lysimeter Reporting

The Permittee shall provide a verbal report to the Executive Secretary within 24 hours of discovery of the presence of any fluid in the standpipe of the collection lysimeters. The Permittee shall provide a written report of the incident to the Executive Secretary within 7 calendar days of discovery. The Permittee shall provide a report of the annual video log survey of the lysimeter's drainpipe, as required by the currently approved Appendix C of this Permit, on or before December 31 of each calendar year.

9. Reporting of Mechanical Problems or Discharge System Failures

The Permittee shall verbally notify the Executive Secretary within 24 hours of initial discovery of any mechanical or discharge system failure that could affect the chemical characteristics or volume of the discharge. The Permittee shall submit a written report of the failure within 7 calendar days of said failure.

10. Meteorological Reporting

On or before March 1 of each calendar year, the Permittee shall submit an annual meteorological report for the previous meteorological year (January 1 to December 31) for Executive Secretary approval.

The objective of this report shall be to show that the meteorological assumptions made in the infiltration and unsaturated zone modeling used to support issuance of the Permit were conservative or representative of the actual conditions at the site. In addition, and in conjunction with an application for permit renewal, 180 days before expiration of the Permit, the Permittee shall submit a summary report of all meteorological data collected since issuance of the last Permit (minimum of 4 years of data). Said report shall compare the data observed against regional normal values, as available, and provide summary statistics of all meteorological data collected.

11. Containerized Waste Storage Area Reporting

The Permittee shall report the following events in accordance with the requirements of Part I.E.10:

a) **Failure of sump pump or other equipment to provide removal of stormwater and free and uninterrupted drainage of the pad, and**

b) **Any container spill or leakage that may have caused a release to the subsurface soils or ground water via cracks or other damage to the asphalt surface.**

12. Evaporation Ponds Reporting

a) **Annual Water Quality Sampling –annual water quality samples collected and analyzed shall be reported in conjunction with the ground water quality monitoring report required by Part I.H.1 of this Permit.**

b) **1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation Pond Daily Monitoring – the Permittee shall report results of daily**

monitoring for the 1995, 1997, 2000, Mixed Waste, and Northwest Corner evaporation ponds as follows:

1) BAT Failure Reporting – the Permittee shall report the following monitoring requirements pursuant to Part I.G.4.b:

a) Failure to maintain the 24-inch vertical freeboard requirement of Part I.E.14.a.4,

b) Failure of operational status for leak detection system pump, pump controller, head/pressure transducer, and/or flow meter equipment, pursuant to Part I.E.14.a.1,

c) Daily average leak detection pumpage volumes in excess of the volume monitoring thresholds established in Part I.F.14.b, or the BAT performance standards listed in Part I.E.14.a.2, and

d) Daily leak detection sump head values in excess of the BAT performance standards established pursuant to Part I.E.14.a.3.

2) Leak Detection System Pump Test Reporting – within 15 calendar days of completion of any leak detection system pump test required by Part I.F.13.b of this Permit, the Permittee shall submit a written report for Executive Secretary approval to document equipment, methods, and results of said pump test.

c) Annual Pump Inspection – results of the annual pump inspection and bor-o-scope video inspection conducted in accordance with Part I.F.13.d shall be submitted for the Executive Secretary's approval as part of the 1st Semi-annual BAT Monitoring Report.

13. Annual Ground Water Usage Report

On or before March 1 of each calendar year the Permittee shall survey and report the location of all ground water withdrawals within at least a 1-mile radius of the facility boundary. The purpose of this report will be to locate all points near the facility where ground water is pumped or otherwise removed for any consumptive use, including domestic, agricultural, or industrial purposes. This report shall include a survey of water right appropriations found in the area of interest, identify the owners thereof, and disclose the physical location and depths of all such ground water withdrawals.

14. Reserved

15. Mixed Waste Cell Leachate Reporting

The Permittee shall report the results of Mixed Waste Leachate water quality sampling and analysis required by Part I.F.15 of this Permit with the annual ground water monitoring reports required by Parts I.H.1 and I.H.3.

16. BAT Non-Compliance Reporting Requirements

For all facilities subject to requirements under the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan (Appendix J and K,

respectively) the Permittee shall provide verbal notification to the Executive Secretary of any BAT failures that are not corrected within 24 hours. All such verbal notifications shall be followed-up with a written notification within 7 calendar days.

17. Annual Cover Test Cell Report

On or before March 1 of each calendar year the Permittee shall submit an annual report for Executive Secretary approval. The annual report shall detail the Permittee's progress in implementing the corrective action plan required under Radioactive Material License Condition 28, 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.

18. Reserved

19. Railcar Rollover Facility Reporting

The Permittee shall submit the daily inspection results required in Part I.E.7c.2 with each Semi-annual BAT Monitoring Report. The annual inspection and repair activities required under Part I.E.17 shall be submitted with the First Semi-annual BAT Monitoring Report of each calendar year. The annual inspection report shall document all inspection and repair activities including photographs of the condition of the surfaces both before and after repairs.

20. BAT Semi-annual Monitoring Report

The Permittee shall submit a semi-annual BAT monitoring report to document compliance with the BAT performance standards mandated by Part I.E of this Permit. The report shall provide results, calculations, and evaluations of daily BAT monitoring data required in Part I.F of this Permit, including but not limited to the following:

a) <u>1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation Ponds – the Semi-annual BAT monitoring report shall:</u>

1) Include a quality assurance evaluation of all daily leak detection system flow volume and head data collected,

2) Include results of daily flow and head monitoring of the leak detection sump at each pond,

3) Include results of weekly calculation of daily average flow volumes from the leak detection sump at each pond, pursuant to Part I.F.13.a.3 of this Permit,

4) Evaluate any apparent trends in daily flow and head monitoring with respect to the pond's ability to comply with the BAT performance standards mandated by Part I.E.14 of this Permit.

b) Stormwater Management – the BAT Semi-annual report shall include daily stormwater monitoring records generated pursuant to Part I.F.24.

c) Reporting Schedule – the BAT Semi-annual Monitoring Report shall be submitted for Executive Secretary approval in accordance with the following schedule:

Half	Report Due On
1st (January –June)	September 1
2nd (July-December)	March 1

*The Second Half Report shall include results of the required annual pressure tests for dual-walled pipe as identified in Part I.F.2.m.

21. Manifest Radioisotope Inventory Report

180 days prior to Permit expiration, the Permittee shall submit for Executive Secretary approval a summary report of activities for radioisotopes including, but not limited to Aluminum-26, Berkelium-247, Calcium-41, Californium 250, Chlorine-36, Rhenium-187, Terbium-157, and Terbium-158; as listed in the current Radioactive Materials License (UT#2300249) Condition 29.E. Said report will be generated from the Clive facility Manifest Inventory (Permittee's EWIS database). The report shall provide a comprehensive, inclusive, and systematic evaluation of all manifest inventory data available for these radioisotopes disposed at the LARW, Class A, Class A North, 11e.(2), Mixed Waste, and any other embankment (excluding the Vitro Embankment) at the Clive facility. The report shall consist of a table of these and all other radioisotopes, which have been disposed at the Permittee's Clive facility to date, and will include, but is not limited to: (1) total of individual radioisotopes activity (mCi), (2) radioisotope half-life (years, days, minutes, etc.), (3) distributions coefficients for each radioisotope (L/kg), and (4) the current overall average activity concentration of each radioisotope, determined by dividing each isotope's total individual inventoried activity disposed by the mass of the current waste (pCi/.gm) found in all embankments listed at the facility.

22. Comprehensive Ground Water Quality Evaluation Report

180 days prior to Permit expiration, the Permittee shall submit for Executive Secretary approval a comprehensive ground water quality evaluation report for the site. In submittal of this report, the Permittee shall present a complete and thorough evaluation of all ground water and vadose zone water quality data available for the LARW, Class A, Class A North, 11e.(2), and Mixed Waste facilities. Said report shall be similar to the September 1, 2004 Comprehensive Ground Water Quality Evaluation Report and shall include but not be limited to:

a) Graphs of temporal concentration trends for all compliance monitoring parameters and wells across the entire period of record, and an evaluation of parameter temporal relationships,

b) Number of water quality data available for each compliance parameter for each well,

c) **Statistical tests of normality for each compliance parameter water quality data population, including univariate tests or equivalent,**

d) **Calculation of mean concentration and standard deviation on direct concentration values; for water quality parameter populations that fail the normality test, provide mean concentrations and standard deviations on transformed values that are normally distributed,**

e) **Calculation of mean concentration plus the second standard deviation for comparison with existing ground water protection levels to identify parameters that warrant an evaluation for ground water protection level adjustments based on natural variations in background concentrations, and**

f) **Isoconcentration maps of spatial concentration trends across Section 32 and an evaluation of facies and spatial relationships of water quality parameters that warrant an evaluation for ground water protection level adjustments based on section e) above.**

~~2.~~23. Reserved

24. Revised Hydrogeologic Report

180 days prior to Permit expiration, the Permittee shall submit for Executive Secretary approval a revised hydrogeologic report for the disposal facility and surrounding area. In submittal of this report the Permittee shall provide a comprehensive and thorough description of hydrogeologic conditions at the facility current through the time of report submittal. This report will include, but is not limited to an evaluation of:

a) Ground-water hydraulics, including ground-water flow directions, velocities, and hydraulic gradients, in both the horizontal and vertical directions, and will include equipotential maps, cross-sections, and related calculations, and

b) An updated evaluation and reinterpretation of the site hydrogeology using all available data including new or additional data acquired since Executive

c) Secretary approval of the last revised hydrogeologic report dated September 1, 2004.

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I. Compliance Schedule

1. Ground Water Institutional Control Plan

The Permittee shall submit a ground water institutional control plan for Executive Secretary approval at the time the site Decontamination and Decommissioning Plan required under Radioactive Materials License Condition 74 is submitted. In submittal of this plan the Permittee shall eliminate future inadvertent intrusion into potentially contaminated ground water at the disposal facilities and subsequent routes of exposure to the public and the environment. Said plan shall include at least one of the options listed in the July 27, 1998 Utah Division of Radiation Control Request for Information.

~~2. Revision of the Water Monitoring Quality Assurance Plan (QAP).~~

~~By the time of and in conjunction with the annual Ground Water Monitoring Report for 2009 (due on March 1, 2010) the Permittee shall submit for Executive Secretary review a redline-strikeout version, and for approval, a final version of the Water Monitoring Quality Assurance Plan (QAP), Appendix B of the Permit. This version of the QAP will reflect the annual sampling frequency to ensure sufficient, reliable, acceptable and quality data are generated in water monitoring at the site.~~

2~~3~~. Groundwater Mound Dewatering Near Wells GW-19A/GW-19B

On or before January 15, 2010, the Permittee will submit a plan and schedule for Executive Secretary review and approval for long-term pumping of the shallow aquifer at or near monitoring well GW-19A. The purpose of this pumping is to eliminate any downward hydraulic gradient from the shallow to the intermediate aquifer at or near well GW-19A. If after review of the plan and schedule, the Executive Secretary determines that additional information is required, the Permittee shall provide all requested information and resolve all issues identified within a timeframe agreed to by the Executive Secretary and the Permittee. Within 60 days of Executive Secretary approval of said plan and schedule, the Permittee shall implement the approved plan and schedule.

PART II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling

Samples taken in compliance with the monitoring requirements established under Part I shall be representative of the monitored activity. Failure by the Permittee to conduct all ground water and pore water sampling in compliance with the currently approved Water Monitoring Quality Assurance Plan in Appendix B of this Permit shall be considered a failure to monitor and may subject the Permittee to enforcement action.

B. Analytical Procedures

Water sample analysis must be conducted according to test procedures specified under UAC R317-6-6.3(L), unless other test procedures have been specified in this Permit. All sample analysis shall be performed by laboratories certified by the State Health Laboratory, or otherwise after prior written approval by the Executive Secretary.

C. Penalties for Tampering

The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this Permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. Reporting of Monitoring Results

Monitoring results obtained during each reporting period specified in the Permit, shall be submitted to the Executive Secretary, at the following address:

Utah Department of Environmental Quality
Division of Radiation Control
195 North 1950 West
P.O. Box 144850
Salt Lake City, Utah 84114-4850
Attention: Ground Water Quality Program

E. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this Permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this Permit, using approved test procedures as specified in this Permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.

G. Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements,
2. The individual(s) who performed the sampling or measurements,
3. The date(s) and time(s) analyses were performed,

4. The individual(s) who performed the analyses,
5. The analytical techniques or methods used, and
6. The results of such analyses.

H. Retention of Records

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this Permit, and records of all data used to complete the application for this Permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Executive Secretary at any time.

I. Twenty-Four Hour Notice of Noncompliance Reporting

1. The Permittee shall verbally report any noncompliance which may endanger public health or the environment as soon as possible, but no later than 24 hours from the time the Permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24-hour number, (801) 536-4123, or to the Division of Water Quality, Ground Water Protection Section at (801) 538-6146, during normal business hours (8:00 am – 5:00 pm Mountain Time).
2. A written submission shall also be provided to the Executive Secretary within 5 days of the time that the Permittee becomes aware of the circumstances. The written submission shall contain:
   a) A description of the noncompliance and its cause,
   b) The period of noncompliance, including exact dates and times,
   c) The estimated time noncompliance is expected to continue if it has not been corrected, and
   d) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
3. Reports shall be submitted to the addresses in Part II.D, Reporting of Monitoring Results.

J. Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D are submitted.

K. Inspection and Entry

The Permittee shall allow the Executive Secretary or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

~~4.~~1. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the Permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

L. Monitoring Well "As-Built" Reports

In the event that additional ground water monitoring wells are required by the Executive Secretary, diagrams and description describing the final completion of the monitoring wells shall be submitted within 60 days of construction of each well. These reports will include:

~~5.~~2. Casing: depth, diameter, type of material, type of joints.

2. Screen: length, depth interval, diameter, material type, slot size.

3. Sand Pack: depth interval, material type and grain size.

4. Annular Seals: depth interval, material type.

5. Surface Casing(s) and Cap: depth, diameter, material type.

6. Survey Coordinates and Elevation: ground surface and elevation of water level measuring point in feet above mean sea level, measured to 0.01 of a foot. Said coordinates and elevation shall be conducted and certified by a Utah Licensed Land Surveyor.

7. Results of slug tests to determine local aquifer permeability in the vicinity of the well. Said tests shall conform with ASTM Method 4044-91. Test results and data analysis thereof shall be submitted for Executive Secretary approval.

M. Plugging and Abandonment Reports

Within 30 days of completion of plugging and abandonment of any environmental measurement system or instrument, including but not limited to ground water monitoring wells, piezometers, soil tensiometers or moisture instrumentation, or any other stationary device to make environmental measurements, the Permittee shall submit an "As-Plugged" report for Executive Secretary approval. Failure to comply with any condition of said approval shall constitute a violation of this Permit.

PART III. COMPLIANCE RESPONSIBILITIES

Forma

A. Duty to Comply

The Permittee must comply with all conditions of this Permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The Permittee shall give advance notice to the Executive Secretary of the Water Quality Board of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to a fine not exceeding $25,000 per day of violation. Any person convicted under Section 19-5-115(2) of the Act a second time shall be punished by a fine not exceeding $50,000 per day. Nothing in this Permit shall be construed to relieve the Permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit.

D. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this Permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Failure to maintain all treatment and control systems in fully functional operating order or condition at the facility is a violation of this Permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of the Permit.

PART IV. GENERAL REQUIREMENTS

A. Prior Approval

Pursuant to UAC R317-6-6.1.A, the Permittee may not construct, install, or operate waste or wastewater storage, treatment, or disposal facilities, or any other facility that discharges or may discharge pollutants that may move directly or indirectly into ground water without a ground water discharge permit from the Executive Secretary. Pursuant to UAC R317-6-6.3.J, the Permittee shall submit engineering plans, specifications, and plans for operation and maintenance of a proposed facility prior to Executive Secretary approval.

B. Planned Changes

The Permittee shall give notice to the Executive Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.

C. Modification of Approved Engineering Design, Specifications, or Construction

Any modification to the approved engineering design, specifications, or construction of the facility cited in this Permit shall require prior Executive Secretary approval. Said facilities shall include, but are not limited to:

1. Waste and Wastewater Disposal and Containment Facilities – including all related engineering containment such as liner, cover, and drainage systems,
2. Waste and Wastewater Handling and Storage Facilities – used to handle, manage or store wastes prior to permanent disposal,
3. Decontamination Facilities – used to decontaminate equipment used in the transportation or disposal of waste, and
4. Environmental Monitoring Systems and Equipment – including ground water monitoring wells, piezometers, meteorological monitoring equipment, soil moisture and lysimeter instrumentation, or any other permanent system, mechanism, or instrument to make environmental measurements required by this Permit.

D. Anticipated Noncompliance

The Permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

E. Permit Actions

This Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

F. Duty to Reapply

If the Permittee wishes to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittee must apply for and obtain a permit renewal or extension. The application should be submitted at least 180 days before the expiration date of this Permit.

G. Duty to Provide Information

The Permittee shall furnish to the Executive Secretary, within a reasonable time, any information which the Executive Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Executive Secretary, upon request, copies of records required to be kept by this Permit.

H. Other Information

When the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Executive Secretary, it shall promptly submit such facts or information.

I. Signatory Requirements

All applications, reports or information submitted to the Executive Secretary shall be signed and certified.

1. All permit applications shall be signed as follows:

a) For a corporation: by a responsible corporate officer.

b) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

c) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2) All reports required by the permit and other information requested by the Executive Secretary shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a) The authorization is made in writing by a person described above and submitted to the Executive Secretary, and,

b) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3) Changes to Authorization. If an authorization under Part IV.I.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.I.2 must

submitted to the Executive Secretary prior to or together with any reports, information, or applications to be signed by an authorized representative.

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

J. Penalties for Falsification of Reports

The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

K. Availability of Reports

Except for data determined to be confidential by the Permittee, all reports prepared in accordance with the terms of this Permit shall be available for public inspection at the offices of the Executive Secretary. As required by the Act, permit applications, permits, effluent data, and ground water quality data shall not be considered confidential.

L. Property Rights

The issuance of this Permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

M. Severability

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Permit, shall not be affected thereby.

N. Transfers

This Permit may be automatically transferred to a new Permittee if:

1. The current Permittee notifies the Executive Secretary at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new Permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

3. The Executive Secretary does not notify the existing Permittee and the proposed new Permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

O. State Laws

Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-117 of the Act.

P. Reopener Provision

This Permit may be reopened and modified, following proper administrative procedures, to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occur:

1. If new ground water standards are adopted by the Board, the Permit may be reopened and modified to extend the terms of the Permit or to include pollutants covered by new standards. The Permittee may apply for a variance under the conditions outlined in R317-6.4(D)
2. Changes have been determined in background ground water quality.
3. Determination by the Executive Secretary that changes are necessary in either the Permit or the facility to protect human health or the environment.

APPENDIX A:

Contingency Plan
for
Exceedances of Ground Water Protection Levels

SUBMITTED: August 5, 1991

APPROVED: September 24, 1991

RETITLED: June 30, 1999

APPENDIX B:

Water Monitoring Quality Assurance Plan

APPROVED: December 5, 1991

LATEST REVISION: ~~February 14, 2005~~August 30, 2011

APPENDIX C:

Construction Quality Assurance Plan
for
Collection Lysimeter Construction
and Operation, Maintenance, and Closure Plans
for
Collection Lysimeters and Related Approvals

SUBMITTED: September 16, 1992 and October 21, 1992, respectively

APPROVED: September 21, 1992 and November 27, 1992, respectively

REVISED: ~~January 9, 2004~~June 27, 2011

APPENDIX D:

Reserved

APPENDIX E:

Procedure
for
Certification of 11e.(2) Material

REVISED: March 1994

APPENDIX F:

Post-Closure Monitoring Plan for LARW and 11e.(2) Disposal Cells

APPROVED: September 13, 1994

REVISED: January 18, 2000

APPENDIX G:

Weather Station Monitoring Plan

APPROVED: September 14, 1994

REVISED: October 31, 2008

APPENDIX H:

Reserved

APPENDIX I:

Reserved

APPENDIX J:

Best Available Technology (BAT) Performance Monitoring Plan

LATEST REVISION: ~~October 12, 2010~~ December 12, 2011

APPENDIX K:

Best Available Technology (BAT) Contingency Plan

LATEST REVISION: ~~October 12, 2010~~ November 14, 2011

June 6, 2011 and November 29, 2011 Memorandums
concerning
Ground Water Protection levels – Universal for all11e.(2) Wells, Part I.C.2, Table 1C

M E M O R A N D U M

TO: John Hultquist/Loren Morton

FROM: Charles Bishop, PG Hydrogeologist

DATE: June 6, 2011

SUBJECT: Request to Consolidate 11e.(2) Embankment's Ground-Water Monitoring Requirements, 11e.(2) License UT2300478, Amendment #6, with the Ground Water Quality Discharge Permit, UGW 450005.

EnergySolutions is licensed by the State of Utah through the Utah Division of Radiation Control (hereafter, DRC) to receive and dispose of 11e.(2) byproduct materials. 11e.(2) byproduct material is defined as tailings or waste resulting from milling, or ore processing activities for the extraction or concentration of uranium or thorium source materials, as defined in Section 11e.(2) of the U.S. Atomic Energy Act of 1954, as amended. The DRC enforces requirements promulgated by the State of Utah dealing with 11e.(2) waste. Regulation are found in Utah Radiation Control Rules sections of the Utah Administrative Code (UAC) R313-12, *General Provisions*; R313-18, *Notices, Instruction, and Reports to Workers by Licenses or Registrants*; R313-19, *Requirements to General Applicability to Licensing of Radioactive Materials*; R313-24, *Uranium Mills and Source Materials Mill Tailings Disposal Facility Requirements*; and other sections of the Utah Radiation Control Rules. In addition, the DRC also enforces water quality standards. Water Quality regulations are found in Utah Administrative Codes for Water Quality, UAC R317 sections R317-1-2 *General Requirements*; and R317-6, *Ground Water Quality Protection*.

EnergySolutions operates a disposal embankment at its Clive facility; Section 32, Township 1 South, Range 11 West; specifically licensed and designed to manage and dispose of 11e.(2) byproduct wastes. The 11e.(2) embankment has a potential for ground-water contamination because the sources of ground-water contamination are many, and contaminators numerous in the embankment. EnergySolutions (formerly, Envirocare of Utah) had an 11e.(2) Materials License (SMC-1559, Amendment No. 49) issued by the U.S. Nuclear Regulatory Commission (hereafter NRC). This NRC license specified ground-water monitoring and reporting requirements to comply with NRC and EPA regulations that prevent waste from coming into contact with the natural soil, and/or ground water at the facility. On August 16, 2004 the NRC transferred the administrative and regulatory responsibility for their 11e.(2) Materials License to the DRC, and the DRC issued Radioactive Materials License UT 2300478 (hereafter 11e.(2) License). Ground-water monitoring, protection, and reporting requirements of the NRC's 11e.(2) License, was maintained within the DRC's 11e.(2) License. Additionally, EnergySolutions' operations are also subject to the provisions of a Ground Water Quality Discharge Permit, No. UGW 450005, (hereafter Permit), issued by the DRC, which deals with ground-water classification, water quality, and ground-water monitoring, protection, and reporting. The Permit specifies Clive facility design standards, construction, management, and ground-water protection for radioactive constituents, which must be met for no fewer than 500 years after closure. From time to time, the DRC's 11e.(2) License has been modified to address EnergySolutions' requests, and the public interest. This memorandum summarizes a recent staff review regarding a request to modify ground water monitoring requirements in the current EnergySolultions' 11e.(2) license. This request is inline with on-going DRC and EnergySolutions attempts to consolidate ground-water protection requirements into the Permit for clarity, and consistence.

Request

In a letter dated June 3, 2010 (their letter #CD10-0167) EnergySolutions requested a modification of their 11e.(2) License. Specifically, EnergySolutions is requesting to modify Condition 11.1 of the 11e.(2) License; and Section 5, Groundwater Protection, of the 11e.(2) License Application. Additionally, EnergySolutions wants to remove Appendix Z, Groundwater Protection Plan of the License Application. According to EnergySolutions the

consolidation of 11e.(2) ground-water protection requirements into the Permit will streamline ground-water monitoring requirements, and eliminate conflicts between the 11e.(2) License and the Permit.

Background

EnergySolutions had previously indicated conflicts exist between ground-water monitoring requirements in the 11e.(2) License and Permit. EnergySolutions made similar requests, basically to modify 11e.(2) License Condition 11; and revise Section 5, and remove Appendix Z of the License application, in September of 2004 (their letter #CD04-0418), and November of 2004 (their letter #CD04-0511). EnergySolutions indicated in the September 2004 letter that where conflicts exist, they will follow the Permit, and the DRC has acknowledged this.

In the September 2004 letter, EnergySolutions requested to amend License Condition 11.1 to read:

> *The Licensee shall fulfill and maintain compliance with all conditions and shall meet all compliance schedules stipulated in the Ground Water Discharge Permit, No. UGW450005, issued by the Executive Secretary of the Utah Water Quality Board.*

EnergySolutions also requested removal of sections 11.1 (a), 11.1(b), and Table S-1 of the 11e.(2) license; and revise of Section 5, and deletion of Appendix Z of the license application. According to EnergySoultions these requested changes were necessary, because requirements in the 11e.(2) Materials License conflicted with the Permit, and this were consistent with consolidating ground-water program within the Permit.

In the November 2004 letter, EnergySolutions made reference to the September 2004 letter and requested that license Conditions 11.1 and Appendix Z of the License Application be deleted, and Section 5 of the License Application be revised. These changes were deemed consistent with consolidating ground water monitoring and protection programs within the Permit by the DRC. However, radiological analysis requirements for the 11e.(2) Point-of- Compliance (POC) wells were not in the Permit at that time. The Permit needed to be revised so that radiological analysis listed within License Condition 11.1 would be incorporated into the Permit. The DRC noted a need to include GWPLs for Radium 226+228, Thorium-230, and Thorium-232, to clarify various Permit conditions in a 2009 Permit modification, and EnergySolutions had requested that Thorium-230, Thorium-232, Radium-226, and Radium-228 be added to Table 1C in a March 3, 2008 letter (their letter CD08-0069). Table 1C of the Permit was modified accordingly in 2009, to reflect these changes.

In the March 3, 2008 letter, EnergySolutions requested the removal of Condition 11.1 of the 11e.(2) License, revision of Section 5 of the License Application, and a modification of Tables 1C and 1D of the Ground Water Quality Discharge Permit. These requests were partly instigated by a URS Interrogatory for the 11e.(2) License renewal; in 2005, Envirocare submitted to the DRC an application to renew its 11e.(2) License. The interrogatory concerning the 11e.(2) License renewal indicated certain organic constituents found in 11e.(2) waste, disposed at the Clive site, were not included in Table 1C of the Permit (URS Corporation, October 2007, interrogatory ES-11E2-R317-6-1/2). It was EnergySolutions position, after evaluating these issues, that most of the listed organic parameters in existing Table 1C of the Permit added little to the 11e.(2) embankment's ground-water protection program because: (1) they are present in very low concentration, (2) they have relatively high sorption coefficients values (k_ds), and (3) the low dissolved oxygen and Eh of the shallow ground water at the site combined with the shallow ground water's slow movement allows organics to degrade, making them poor indicator parameters. The NRC's Uranium Recovery field office determined what hazardous constituents would likely be found in uranium mill tailings by conducting an extensive characterization of uranium mill tailing impoundments, located in the Western U.S; based on the findings of that investigation the constituents in Table 1C of the Permit were determined. EnergySolutions proposed an analyte list of selected constituents as being more diagnostic of release from the 11e.(2) embankment (EnergySolutions, March 3, 2008).

The DRC evaluated the March 3, 2008 request in relation to modification of Tables 1C and 1D of the Permit in a Statement of Basis dated September 2009, for a December 23, 2009 Permit modification; only as the request affected the tables in the Permit. EnergySolutions argued for removal of various parameters listed in Table 1C of the Permit by reference to past correspondence with the NRC (and finding in Amendment 38 of Materials License Number SMC-1559, effective June 15, 2002). EnergySolutions implied this new request was similar to the one already

approved by the NRC, as justification that this request should be approved. The DRC has consistently declared in response to similar statements offered in support of previous requests, EnergySolutions needed to provide specific information as justification, and supporting analyses. The DRC questioned this methodology, because it implies: (1) that conditions from 2002 have not changed from date of correspondence with NRC, (2) parameters listed in the EnergySolutions' proposed Table 1C, were for the most part semi-volatile organic compounds, and (3) no data provided on how GWPLs were determined for each constituent. Therefore, the DRC did alter Table 1C in 2009, with the addition of the radiological parameters, but did not add any other parameters due to the March 3, 2008 request.

Staff Review

The 11e.(2) License, and Permit provide for

- Ground-water monitoring from point of compliance (POC) wells
- Chemical parameters to be monitored
- Parameter exceptions
- Sampling and analysis techniques/procedures (Quality Assurance Plans)
- Intern compliance criteria
- Procedure to evaluate monitoring data
- Methodology to determine final compliance criteria
- Corrective action

Information and requirements in the 11e.(2) License are sometimes found in the Permit, and the requirements in the 11e.(2) License sometimes conflict with requirements in the Permit. Consolidation of ground-water monitoring and protection requirements within the Permit would be a benefit to ground-water protection, and remove duplication of requirements, and potential conflicts between the 11e.(2) License and Permit.

License Condition Section 11 – Inspection, Monitoring, and Recording Requirements

License Condition Section 11 provides guidance, procedures, and criteria for ground-water protection. Some ground-water monitoring requirements of Section 11 are also specified in License Condition 9.3 of the 11e.(2) License Application and supporting documents, and the approved Environmental Monitoring Plan. License Condition 9.6(a) required EnergySolutions to establish and implement standard operating procedures, including environmental monitoring. Proposed changes to the 11e.(2) License involved the subjected removal of Sections 11.1(a) and 11.1(b) of License Condition Section 11. Section 11.1(a) of the 11e.(2) License required monitoring at POC wells, and the implementation of a ground-water monitoring program, which is required within Part I.F, Compliance Monitoring, and Part I.H, Reporting Requirements of the Permit. Section 11.1(b) of 11e.(2) License required parameters, and detection monitoring for constituents listed in License Condition Section 11.1(b), or any added through amendment in accordance with License Condition Section 10.2(a). Compliance monitoring requirements in Part I.F.5 of the Permit requires analyses be performed for the constituents listed in Table 1C. Both the 11e.(2) License, and Permit require EnergySolutions to assess the concentration of certain constituents in ground-water as necessary in establishing a detection monitoring program.

The 11e.(2) License, and Permit have constituent lists and ground water protection levels, which set specific concentration limits on water quality applied to specific POC wells. Monitored parameters listed in 11e.(2) License Condition Section 11 consists of some general and non-specific indicators of water quality, and site specific analytical parameters used to determine if chemical contaminants are present. Ground-water monitoring at the Clive facility is accomplished when the results are compared to some useful reference concentration analyte value, and Section 11.1(b) provides for the reference concentration levels in its constituent concentration list. Detection monitoring relies on noting changing analyte values concentration (trends), excessive concentrations, or comparing incremental effects of the potential release to decide if ground water is being impacted. License Condition Section 11 required EnergySolutions to sample, and analyze representative samples from POC well locations defined in the 11e.(2) License; these are the same as the POC wells defined in the Permit. Parameters listed for compliance monitoring of the 11e.(2) Embankment in License Condition 11.1(b) are:

Constituents	Concentration*
Metals	*mg/L*
Beryllium	0.005
Cadmium	0.004
Copper	0.037 - 0.07
Silver	0.005
Uranium	0.0051 - 0.04
Radiologics	*pCi/L*
Radium-226+ Radium-228	3.28 ±0.6 - 6.15±0.6
Thorium-230	4.62±1.2 – 3.28±1.0
Thorium-232	0.0±1.0
Volatiles	*µg/L*
Benzo(a)anthracene	100
Benzo(b)floranthene	100
Benzo(k)floranthene	100
Benzo(a)pyrene	100
2-Butanone	20
Carbon Disulfide	5
Chlordane	10
Chloroform	5
Chrysene	100
Dibenz(a,h)anthracene	100
1,2-Dichloroethane	5
Acetone	20
Methylene Chloride	5
	10.0
Naphthalene	10.0
1,1,2-Trichloroethane	50
Vinyl Chloride	50
Semi Volatiles	*µg/L*
Diethylphthalate	10.0
2-Methylnaphthalene	10.0

* constituent concentrations are assigned on the POC well bases, which is why some constituent concentrations have a range of concentrations. .

This list was developed through the analysis of sit characteristics, facility design, known surface and subsurface conditions, and assessment of site specific data. Constituent concentrations in the 11e.(2) License are well specific, and some concentrations vary because some wells have different concentration levels. Parameters listed for compliance monitoring of the 11e.(2) embankment in Table 1C of the Permit are:

Parameter	GWPL [1]
Field and Inorganic Parameters [2] (mg/l)	
Cyanide	0.2
Fluoride	4.0
Total Nitrate/Nitrite (as N)	10.0
pH (units)	6.5 – 8.5
Dissolved Metals [2] (mg/l)	
Antimony	0.006
Arsenic	NA [3]
Barium	2.0
Beryllium [4]	0.004
Cadmium	0.005
Chromium	0.1
Copper	1.3
Lead	0.015
Mercury	0.002
Molybdenum	NA [3]
Nickel [4]	0.10
Selenium	0.05
Silver	0.1
Thallium	0.002
Uranium – total	0.03
Zinc	5.0
Combined Radiologic Parameters (pC/l)	
Radium-226+radium-228	5
Radiologic Parameters (pC/l)	
Thorium-230	83
Thorium-232	92
Organic Parameters – Specific to 11e.(2) (mg/l)	
Acetone [5]	0.7
2-Butanone [11]	4.0
Carbon Disulfide [5]	0.7
Chloroform [6]	0.08
1,2-Dichloroethane	0.005
Methylene Chloride [7]	0.005
Naphthalene [8]	0.02
Diethyl Phthalate [9]	5.0
2-Methylnaphthalene [10]	0.004

1. All field, inorganic, dissolved metals, and organic indicator organic parameters and corresponding GWPLs for the 11e.(2) wells are equivalent to those for the LARW wells in Table 1A, above.
2. All ground water protection levels (GWPL) derived from Ground Water Quality Standards (GWQS, see UAC R317-6-2), except as noted.
3. Due to naturally elevated concentrations of arsenic and molybdenum in the Class IV saline aquifer at Clive, Utah, these constituents are poor indicators of cell leakage and therefore will not be used as compliance parameters with ground water protection levels. However, the Permittee will continue to sample, analyze, and report arsenic and molybdenum data in all compliance monitoring wells at Permit and License renewal as a best management practice.

4. Beryllium and Nickel GWQS derived from EPA drinking water Maximum Contaminant Levels (MCL), as published in the July 17, 1992 Federal Register, Vol. 57, No. 138, pp. 31776 – 31849, Table 1.
5. GWQS for acetone, and carbon disulfide determined by DWQ staff from reference doses available in the technical literature, see August 8, 1994 DWQ Staff Report: Ground Water Quality Conditions and Proposed Revision to Ground Water Protection Levels, Envirocare of Utah Inc., Low-Level Radioactive Waste and 11e.(2) Waste Disposal Facility, near Clive, Tooele County, Utah, p. 3.
6. GWQS for chloroform derived from a 1998 EPA final drinking water MCL for total trihalomethane compounds in "Drinking Water Standards and Health Advisories", EPA 822-B-00-001, Summer 2000.
7. GWQS for methylene chloride derived from EPA drinking water MCL (ibid.).
8. Naphthalene GWQS derived from final EPA drinking water LHA (ibid.).
9. GWQS for diethyl phthalate based on draft EPA drinking water LHA (ibid.).
10. GWQS for 2-methylnaphthalene could not be located or determined, thanks to a lack of reference dosage information in the technical literature. Consequently, a detection monitoring approach has been taken and the GWPL set equal to the minimum achievable detection limit for the compound as a result of matrix interferences from high TDS content of Clive ground water. As health-based risk or other reference dosage information becomes available, the Executive Secretary may modify the Permit and set a GWQS for 2-methlynaphthalene.
11. GWQS for 2-Butanone (methyl ethyl ketone) derived from Life-time health advisory value in "2006 Edition of the Drinking Water Standards and Health Advisories", EPA 822-R-06-013, August 2006

Some parameters/constituents listed in the 11e.(2) License are not found in the Permit; however, a conflict exist between some constituent concentration levels, listed in the 11e.(2) License, and protection levels listed in the Permit. The parameters listed in License Condition 11.1(b) that are not listed in Table 1C of the Permit are organic parameters, which are:

- Benzo(a)anthrancene,
- Benzo(h)floranthene,
- Benzo(K)floranthene,
- Benzo(a)pyrene,
- Cldordane,
- Chrysene,
- Dibenz(a,b)anthrancene,
- Naphthalene,
- 1,1,2 trichloroethane,
- Vinyl Chloride.

The DRC's ground-water monitoring objective at the Clive facility is to achieve meaningful results in identifying contaminant concentration. To this end, the DRC used the March 2008 EnergySolutions letter that showed some parameter listed in the 11e.(2) License had a higher probability of being found in ground water; EnergySolutions characterizes all incoming 11e.(2) waste, and identifies all constituents at their Clive facility (License Condition 10.2(a)). The constituents listed in the EnergySolutions' March 3, 2008 letter had been generated as a result of an EnergySolutions evaluation that used generator waste profiles. Using parameters with a higher probability of being found would allow the analyses of constituents in ground water to directly relate to the11e.(2) waste, and parameters considered representative of the 11e.(2) waste would provide more useful data. This analysis was used to eliminate some parameters from the above analytical list, because of their actual low concentrations in 11e.(2) waste. Parameters identified by EnergySolutions as significant to the 11e.(2) waste, in their March 2008 letter, and listed in License Condition 11.1(b) are,

- Benzo(a)anthrancene,
- Benzo(a)pyrene,
- Benzo(K)floranthene,
- Cldordane,
- Chrysene,

Incorporating the above five parameters into Table 1C of the Permit will provide a more performance based list, which is more protective of ground water. Selecting and implementing concentration levels to which the site must be maintained, based on regulatory standards or an assessment will be necessary. EnergySolutions should provide protection levels, and justification for protection levels for each of these new parameters.

License Condition 11 provides for the protection of ground water by requiring monitoring of listed parameters/constituents at POC wells, as does the Permit. Changes to 11e.(2) License Condition 11 will require EnergySolutions to compile with the Permit. The Permit has a just as rigorous monitoring program, and constituent list. Permit parameters are thoughtfully reviewed and debated consistently for their effectiveness, and appropriateness and are modified as needed; the 11e.(2) License parameters have not been modified in some time. Constituents listed in the 11e.(2) License, and Permit includes metals, volatile organic compounds, and radiological parameters. The Permit's parameter list was developed using the water quality standards, and further evaluation of parameters to give an overview of ground-water quality at the Clive facility. this allow the DRC to determine whether or not the operation of the facility is resulting in contamination of ground water, whether concentrations of specific constituents are within prescribed limits, and the effectiveness of corrective action. Both the Permit and 11e.(2) License allow for new constituents, the Permit through Permit modifications, and the 11e.(2) License through amendments to the 11e.(2) License. The POC wells listed in the 11e.(2) License are the same as the POC wells listed in the Permit; however, the constituents listed in the 11e.(2) License are not the same as listed parameters in the Permit. Proposed changes to License Condition 11 reference the Permit, with EnergySolutions being required to compile with all conditions and compliance schedules in the Permit, which is a performance-based approach to promote and achieve the best environmental outcome. Changes to License Condition 11 that impose the Permit are acceptable to the DRC. The Permit should be updated with five new parameters, and EnergySolutions should evaluate and propose these new parameter ground-water protection levels.

Section 5 of the 11e.(2) License Application - Groundwater Protection.
Obviously, selecting proper parameters, and POC wells are critical to properly assessing ground-water quality at the Clive facility; however, just as critical, is to prevent the access of radioactive waste to ground water, with management, handling, and storage of the waste. Section 5 of the 11e.(2) License Application addresses design and material standards, maintenance, operations, and ground-water protection of the 11e.(2) embankment. Section 5 of the 11e.(2) License Application references Criterion 5 and 13 of Appendix A of 10 CFR 40, NRC's Domestic Licensing of Source Materials; and 40 CFR 192, Subparts D and E, Environmental Protection Agency's (EPA) Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings. Criterion 5A through 5D and 13 (Appendix A of Part 40) incorporate the basic ground-water protection standards imposed by the EPA in 40 CFR Part 192, Subparts D and E, which apply during operations and prior to the end of closure. 10 CFR 40 was incorporated into UAC R313-24, uranium mills and source material mill tailings disposal facility requirements, and Criteria 5A through 5D and 13 of Section 40 CFR Part 192, Subparts D and E were incorporated into UAC R317-6, Administrative Rules for Ground Water Quality Protection. The 11e.(2) License, and 11e.(2) License application follows the outline presented in Appendix A of 10 Code of Federal Regulations (CFR) 40, were as the Ground Water Quality Discharge Permit follows Utah Administrative Code (UAC) R313-6.

Criterion 5A(1), 5A(2), 5A(3), 5A(4), and 5A(5) referenced in Section 5 of the License Application are concerned with design and material standards. Criterion 5A(1) requires design standard to manage uranium and thorium byproduct material to prevent any migration of wastes out of an embankment and to the adjacent subsurface soil, or surface and ground water. Criterion 5A(2) requires a liner be installed to cover all surround soils likely to be in contact with waste. The liner is to be constructed of appropriate materials, and placed upon a foundation. Criterion 5A(3) requires EnergySolutions to work towards the prevention of the migration of any hazardous constituents into surface, or ground water at any future time. Criterion 5A(4) requires the design, construction, maintenance, and operation of an embankment so that it controls discharge, and protect ground water. Criterion 5A(5) requires structural integrity of an embankment. These requirements are all meet with the Permit, and the approved LLRW and 11e.(2) Construction Quality Assurance/Quality Control Manual (CQA/QC Manual), which is required by the Permit. The CQA/QC Manual is the DRC approved construction guide for the embankments at the Clive facility. Additionally, Permit BAT requirements require the application of design, equipment, work practices, and operation standards to minimize the potential of contamination.

Section 5.1 of the License Application, Introduction, briefly describes hydrogeological characteristics of the site, and procedures for ground-water protection by reference to various NRC and EPA criteria. Part I.A of the Permit describes the classification of ground water at the site, and Part I.H.24 requires a hydrogeologic report at the time of renewal (every 5 year), and the Permit provides procedures for ground-water protection. EnergySolutions is proposing in the letter dated June 3, 2010 to replace reference to Criterion 5A through 5D with reference to UAC R317-6, and the Permit. These changes are acceptable to the DRC.

Section 5.2 of the License Application, liners, addressed specifications for the liner by reference to Criteria 5A(1) through 5A(3), which provide for containment of 11e.(2) waste. Section 4 of the License Application, Design and Construction, covers the design, construction, materials, and performance of the facility, including the liner referenced in Section 5.2. Additionally, the Permit required CQA/QC Manual embraces materials, testing, and placement of the liner, and Part I.D.3 (3) of the Permit includes liner design. EnergySolutions is proposing in the letter dated June 3, 2010 to remove this section (Section 5.2) because of its redundancy with Section 4 of the License Application and the approved CQA/QC Manual. The removal of this section is acceptable to the DRC.

Section 5.3 of the License Application, Selection of Qualified Monitoring Parameter (previously Section 5.3 of the license application and will now be Section 5.2), required EnergySolutions to met protection standards in 10 CFR-40, Criterion 5B(1) and Criterion 7A, which requires EnergySolutions to maintain a detection monitoring program, and analyte list. Parameters monitoring is required within Part.I.H of the Permit and parameters are listed in Part I.C, Tables 1C and 1D of the Permit, with DRC approved background concentrations. Part G of the Permit requires EnergySolutions to confirm any exceedence of listed parameters found in the Permit. Section 5.3 of the License Application provided a list of constituents, and NRC established concentration limits for monitoring constituents according to Criterion 5B(2). The Permit requires EnergySolutions to maintain detection monitoring, and list monitoring parameters. The list of analytes for EnergySolutions' ground-water sampling program specific to the 11e.(2) embankment in Section 5.3 are:

<u>Metals</u>

- Beryllium
- Cadmium
- Copper
- Silver

<u>Volatiles</u>

- 1,2-Dichoroethane
- 2 Butanone
- Acetone
- Carbon Disulfide
- Carbon Disulfide
- Chloroform
- Methylene Chloride
- Naphtha

<u>Semi-Volatiles</u>

- 2-Methylnaphthaline
- Diethyl phthalate

<u>Radiologics</u>

- Uranium
- Ra-226

- Ra-228
- Th-230
- Th-232

This list is not consistent with License Condition 11.1(b) parameters, but all analytes will be contained within Table 1C (listed parameters) of the Permit, after the addition of the five parameters listed earlier. The new wording proposed for Section 5.3 will require EnergySolutions to maintain a detection monitoring program in compliance with the Permit. These changes are acceptable to the DRC.

Section 5.4 of the License Application, Water Uses (previously 5.4, Water Uses and will now be Section 5.3, Water Classification), sites criterion 5B(4), which required the consideration of drinking water, and EPA exempted aquifers. URC R317-6 provides for aquifer classification, and water classification is defined in the Permit. The Permit uses the State of Utah Water Quality Standards for drinking water as the standard protection level. The proposed wording in Section 5.4 states the aquifer in the area is a Class IV aquifers, as established in the Permit. These changes are acceptable to the DRC.

Section 5.5 of the License Application, Establishment of Compliance Point Concentration Standards (previously 5.5 and now Section 5.4), deals with concentration of a constituent, and established compliance point concentration standards at POC wells as required in Criterion 5B(5). The license required EnergySolutions not to exceed protection levels; i.e. the concentration of a hazardous constituent (listed Parameter) must not exceed the standard. The Permit establishes parameters/constituents, and sets protection levels for monitoring in Table 1C. Proposed wording in Section 5.5 of the License Application requires a parameter not to exceed the universal Ground Water Protection Level (GWPL) of the Permit, or the value listed as a exception, Tables 1C and 1D of the Permit. These changes are acceptable to the DRC.

Section 5.6 of the License Application, Incremental Impacts to Ground Water (previously 5.6 and now Section 5.5), referenced Criterion 5B(6), which deals with ground water protection level exceptions. Ground water protection and impacts are dealt within the Permit, and the Permit provides for ground-water protection levels exceptions in Part I.C, Table 1D. Proposed wording in Section 5.6 of the License Application reference UAC R317-6 and the Permit. These changes are acceptable to the DRC.

Section 5.7 of the License Application, Groundwater Protection Plan (previously 5.7 and now Section 5.6), referenced Criterion 5E, which requires EnergySoltuions to consider many factors in relation to ground-water protection, such as the installation of a liner, a design that uses less water, drainage of the embankment, and immobilization of hazardous material. The new wording references Best Available Technology (BAT), used in construction and operation of the facility as part of the Permit's ground water protection program (Part I.D). BAT is a requirement of the Permit and requires EnergySolutions to consider design, equipment, work practices, and operations or a combination of these to protect ground-water. These changes are acceptable to the DRC.

Section 5.8 of the License Application, Existing Seepage (previously 5.8 and now removed) referenced Criterion 5F, which requires the remediation of contamination due to leakage of a tailings impoundment. EnergySolutions indicated Criterion 5F is not directly applicable at the Clive facility because they have embankments, not tailing impoundments. However, EnergySolutions does provide ground-water protection for their embankments, with the liner, waste management, and ground-water protection program as addressed in the Permit, and LLRW & 11e.(2) CQA/QC Manual. The removal of this section is acceptable to the DRC.

Section 5.9 of the License Application, hydrologic information (previously 5.9 and now 5.7), referenced Criterion

5G, which requires the characterization of local geology, ground water, and waste disposed at the facility. Information concerning characteristics of soil and rock, particularly as they control transport of contaminants is found as a requirements of the Permit, 11e.(2) license, and License Application. The revised wording indicates hydrogeologic information is found in Section 1.4.13 and Appendix E of the License Application. EnergySolutions reference to Appendix E is probably incorrect, Appendix E of the License Application is Rock Erosion Barrier/ HEC 1 and HEC 2 Modeling; however, Appendix D is the Revised Hydrogeology Report. EnergySolutions should confirm the use of Appendix E; otherwise, these changes are acceptable to the DRC.

Section 5.10 of the License Application, Radionuclide Soil Penetration Minimization (previously 5.10 and now 5.8) referenced Criterion 5H, which requires the penetration of radionuclide into underlying soil to be minimized. The new wording reference BAT, used in the Permit as a mechanism to minimize the penetration of radionuclides or any contamination. BAT as implemented in the Permit is the application of design, equipment, work practices, and operation standards, or a combination of these to achieve the maximum reduction of pollution using available processes and methods. The Permit addresses ground-water quality protection and monitoring requirements for all waste disposal operation at the Clive facility. These changes are acceptable to the DRC.

Appendix Z of the 11e.(2) License Application, Groundwater Protection Plan
To prevent the contact of waste and ground water, the Groundwater Protection Plan outlines procedures for waste management by addressing areas of material management, spill prevention and containment, liquid content, and wind dispersal. The Groundwater Protection Plan requires EnergySolutions to use a monitoring system capable of providing an early warning, before any releases leaves the site boundary, and also describes sampling equipment, field and laboratory methods, and qualifications for ground-water sampling and detection for the11e.(2) embankment. The Groundwater Monitoring Quality Assurance Plan of Appendix Z, relates ground-water monitoring with regard to persons performing sampling, procedures in sampling, protocols used in sample handling, custody, and data quality control. Waste management at the Clive facility is an integral component of the site's environmental management and aims to prevent the introduction of waste to ground water. The Clive facility promotes best practice disposal of waste both off-site through acceptance criteria, and on-site though appropriate operations and maintenance.

The various sections of Appendix Z are outline below.

Storage Tracking Plan of Appendix Z
Appendixes Z require EnergySolutions to label and track waste. Waste tracking is also covered in Section 15 and 16 of the license application, waste manifests and tracking, and facility operation. Requirements listed in Appendix Z are duplicated in Appendix J of the Permit, and as BAT requirements within the Permit, Part I.E.8 which require EnergySolutions to manage 11e.(2) according to the 11e.(2) License. Therefore, the removal of this section of appendix Z is acceptable to the DRC.

Liquid Testing Plan of Appendix Z
Appendixes Z require EnergySolutions to test incoming waste for free liquids. Liquid chemical and radiological constituents, within incoming waste, once emplaced can collect with time, and pose a potential threat for contamination of the underlying ground water. Part I.F.8 of the Permit, Waste Characterization Monitoring, requires all incoming waste, all Class A, and 11e.(2) waste, at the EnergySolutions' Clive facility to be characterized, and the records maintain at the facility. This complies with UAC R313-15-1006 and UAC R313-25-33(8). Part I.F.9 of the Permit, Waste Liquid Content Monitoring, requires the testing for liquids. The requirement for liquid testing is also found in Section 10.6 of the 11e.(2) License, which requires EnergySolutions to not accept waste which contains liquids. 11e.(2) License conditions 58, 65, 66, and 67, which relate to the Waste Management Practices, makes similar requirements. Part I.E.1(b) of the Permit requires the acceptance of liquids and liquid content to be in accordance with the Radioactive Material License. EnergySolutions should compare procedures in Appendix Z of the License Application to various 11e.(2) License Conditions, and Part I.E.1(b) of the Permit to evaluate if these are

completely comparable. Therefore, the removal of this section is conditional on a comparison with other License Conditions, and the Permit, for comparably.

Material Management Procedures of Appendix Z
Appendix Z requires EnergySolutions to separate 11e.(2) waste into bulk, or containerized materials. Material Management procedures in Appendix Z are also found in Section 16 of the License Application, Waste Handling, interim Management, and Disposal Operations in the on-site management section, which outlines procedures for the handling 11e.(2) wastes as bulk materials or materials in containers. Part I.E.8 of the Permit, 11e.(2) Waste Management Requirements, requires EnergySolutions to manage 11e.(2) waste and related activates in accordance with the 11e.(2) license. EnergySolutions should compare procedures in Appendix Z and Section 16 of the License Application, to evaluate if completely comparable. Therefore, the removal of this section is conditional on a comparison with other License Conditions, and the Permit, for comparably.

Waste Accepted in Containers of Appendix Z
Appendix Z requires EnergySolutions to receive only certain strong, and tight Department of Transportation (DOT) approved containers. Section 16.1 of the License Application requires container to meet DOT requirement for marking, labels, and place carding; and to be compliance with DOT shipping regulations. It is not clear if other conditions adequately cover the requirements in Appendix Z should evaluate and justify removal of this requirement. Therefore, the removal of this section is conditional on a comparison with other License Conditions, and the Permit for comparably.

Container Management Practices of Appendix Z
Appendix Z requires EnergySolutions to transfer bulk material to container only on asphalt or concrete surfaces found at the Rollover and Storage Areas. Part I.E.10 of the Permit requires EnergySolutions to manage site operations to prevent contact of waste with the ground surface, and the transfer of waste can only take place at approved facilities. The Permit is updated regularly and contains references to other surfaces/areas where waste can be handled; reflecting the current operation of the Clive facility. Therefore, the removal of this section of Appendix Z is acceptable to the DRC.
Waste Accepted in Bulk of Appendix Z
Appendix Z requires EnergySolutions to manage bulk waste received by highway or rail transportation. Bulk waste can be received in gondola rail cars, or dump trucks. These can be unloaded at the rollover, or unloading ramp at rail digging track. Part I.E.10 of the Permit allows bulk waste management and storage at the intermodal Unloading facility, Railcar Rollover, East Truck Unloading facility, and other approved facilities. The Permit reflects the current operation of the Clive facility much better then Appendix Z of the 11e.(2) License. Therefore, the removal of this section of Appendix Z is acceptable to the DRC.

Run on and Run off Control of Appendix Z
Appendix Z requires EnergySolutions to construct a perimeter berm to control run on and run off of stormwater around the active portions of the embankment. In the License Application Section 4.2.1 deals with site drainage, and runoff control berms are specified in the CQA/QC Manual. Stormwater drainage criteria are specified in Part I.E.12 of the Permit, and stormwater runoff control is specified in Part I.E.7 of the Permit. Therefore, the removal of this section of Appendix Z is acceptable to the DRC.

Decontamination Procedures of Appendix Z
Appendix Z requires EnergySolutions to decontaminate containers and equipment, to specify release limits, before they are allowed to exit the controlled area. Section 16.3 of the License Application, Facility Operations, requires the monitoring, decontamination to specify levels if necessary of vehicles, packages, and equipment before leaving the restricted area. Therefore, the removal of this section of Appendix Z is acceptable to the DRC.

Plan for Controlling Wind Dispersal of Appendix Z

Appendix Z requires EnergySolutions to minimize the potential for off-site windblown dispersion of dust off of the waste, and that the operations performed to control dust be sufficient to minimize dust release to the maximum extent possible. Part I.E.10(5) of the Permit requires EnergySolutions to operate and maintain the facility in order to prevent wind dispersal of waste. EnergySolutions should evaluate and demonstrate that operation perform for dust control in the Permit meet the requirements of Appendix Z. Therefore, the removal of this section is conditional on a comparison with the Permit, for comparably.

Groundwater Monitoring Quality Assurance Plan of Appendix Z

Ground-water sampling at the Clive facility is more involved than simply removing water from a POC well and shipping the sample to an analytical laboratory. All facets of the sampling operation affect the outcome of the final analysis, possible rendering the analysis non-representative of the ground water and un-useable. Careful organizing and planning, with a quality assurance plan, can minimize the adverse effects of sampling. The Groundwater Monitoring Quality Assurance Plan (GMQAP) of Appendix Z of the License Application; and Appendix B, Water Monitoring Quality Assurance Plan (WMQAP), of the Permit provides guidance and procedures for field activities including calibration of equipment; preparation, collection, preservation, and shipment of ground-water samples; responsibilities for sampling activities; note taking; field quality assurance; chain-of-custody; analytical protocols; analytical methods; detection levels analysis; and the collection of ground-water data. The objective of the GMQAP, and WMQAP is to meet regulatory requirements, and obtain samples that are representative of the actual ground water. These plans recognized that anything done during ground-water monitoring, from sampling to analysis, affects the reliability and interpretation of the data.

The GMQAP reference Criterion 5, which incorporates the basic ground-water protection standards imposed by the EPA in 40 CFR Part 192, Subpart D and E; and Criterion 7, which established a detection monitoring program. The WMQAP is prepared following the guidance in RCRA Groundwater Monitoring Technical Enforcement Guidance Documents (TEGD). These plans are a reference for the sampling team for field procedures. The GMQAP and WMQAP provide for a systematic, efficient, and effective ground water sampling program.

The focus of the quality assurance plan is to acquire representative ground-water samples for the determination of ground-water quality. Considering the effort associated with sample collection and laboratory analysis, all necessary steps should be taken to maximize the results, and the quality of the data collected. The GMQAP of the 11e.(2) License Application references an older organization scheme, which is not in use at this time, and does not allow for sampling of the LARW, Class A, Class A North collection lysimeter, the mixed Waste, Northwest corner, and the three LLRW evaporation ponds, and the Mixed Waste Leachate collection sumps. The detection monitoring program, used to determine the presence of contamination in ground water is required semi-annually in the 11e.(2) License Application Appendix Z, and annually in the Permit. The Permit was modified in 2009 to include an annual sampling, after an extensive evaluation. The WMQAP of the Permit provides an objective sampling program, with somewhat more clarity than the GMQAP of the 11e.(2) License Application. The WMQAP addresses data quality; project responsibilities, designation of analytical laboratory; ground-water sampling protocols; sample custody; requirements for quality control samples; analytical methods, holding times, sample containers, sample preservative, data validation, and reporting; so that all steps in the investigation are understood and nothing is left for laboratory interpretation. The WMQAP of the Permit has been the defacto plan at the Clive facility when ever conflicts exists and provides for the objective investigation with regard to field and laboratory data quality. Therefore, the removal of this section of Appendix Z is acceptable to the DRC.

Conclusion

The ground-water protection programs at the Clive facility, along with ground-water inspection, monitoring, and

recording requirements are an area of significant concern to the DRC. It makes sense for the DRC to consolidate the ground-water monitoring requirements of the 11e.(2) License, and License Application with requirements listed in the Permit, to make ground-water monitoring more efficient, and eliminate conflicting requirements, i.e. some requirements in Section 11 of the 11e.(2) License, and Section 5 and Appendix Z of the License Application are redundant with the Permit. The Permit ensure compliance with all applicable ground-water quality standards, a reasonable assurance that ground-water standards will be met, and provides protect to the environment and human health from current and potential threats posed by the uncontrolled release of radioactive and hazardous waste to the natural subsurface soil and/or ground water. BAT requirements in the Permit direct facility construction, operations, and waste management as a means of ground-water protection. The DRC employs the Permit to address issues of ground-water protection, and requirements for ground-water monitoring at the Clive facility are specified in the Permit, which requires that under no circumstances shall the facility cause ground water at a compliance monitoring wells to exceed the ground water protection levels in Part I.C for a minimum periods of time (Part I.F.1). The effectiveness of EnergySolutions' ground-water monitoring and detection system for the 11e.(2) embankment is maintained in the Permit. The approach of consolidating ground-water protection requirements into the Permit is consistent with the DRC's strategic for ground-water protection, and will make ground-water monitoring more effective, efficient, and timely.

Proposed changes to Section 11 of the 11e.(2) License will require EnergySolutions to comply with the Permit, removing the Section 11 requirements for monitoring at POC wells, and its constituent list. The Permit's parameter/constituent list is basically compatible with constituents listed in Table 1S (the license approved background concentrations). However, the 11e.(2) License and Permit protection levels conflicted. The protection levels in the Permit are thoughtfully reviewed, evaluated often, and debated for use as analytes for ground-water monitoring at the facility, and are used in monitoring at the facility. POC wells listed in the 11e.(2) License and Permit are the same. The Permit is the primary mechanism used by the DRC for the protection of ground water at the Clive facility.

Changes to Section 5 of the 11e.(2) License Application replace references to various NRC and EPA criterion with reference to UAC R317-6, Administrative Rules for Ground Water Quality Protection, and the Permit. UAC R317-6 incorporates Criterion 5B(1) through Criterion 5H, Criterion 7A, and Criterion 13, and is the basic ground-water protection standards imposed by the State of Utah, which applies during operation and prior to the end of closure. The Permit is based on UAC R317, and extensive investigations triggered by concerns identified at the Clive facility. The Permit addresses requirements for facility-specific monitoring programs and address ground-water quality and monitoring at the Clive facility.

Appendix Z of the 11e.(2) License Application established waste management and sampling procedures; however, waste management procedures are established in other sections of the 11e.(2) License, in the Permit, and sampling procedures in the Permits' WMQAP and therefore do not need to be duplicated in Appendix Z of the 11e.(2) License Application. Requirements listed in Appendix Z are duplicated in the Permit in sections Part I.E.1(b), Part I.E.6, Part I.E.8, Part I.E.9, Appendix B (Water Monitoring Quality Assurance Plan), and the Permit required LLRW & 11e.(2) CQA/QC Manual. Parts I.E.8 and I.E.9 of the Permit deal specifically with 11e.(2) waste management and storage at the Clive facility. Sections of Appendix Z that may not be adequately covered in the Permit, or in other License conditions are the Liquid Testing Plan, Material Management Procedures, Waste Accepted in Containers, and Plan for Controlling Wind Dispersal.

It is proposed that five new parameters be added to the Permit and that EnergySolutions provide ground-water protection levels, and justification for those levels. New parameters that need to be added to the Permit are:

- Benzo(a)anthrancene,
- Benzo(a)pyrene,
- Benzo(K)floranthene,
- Cldordane,
- Chrysene,

Furthermore, EnergySolutions also needs to evaluate various sections of Appendix Z to see if Waste Accepted in Containers, Material Management Procedures, Liquid Testing Plan, and Plan for Controlling Wind Dispersal are adequately covered elsewhere.

The Permit references the 11e.(2) License in Part I.E.8, thus EnergySolutions should evaluate this section of the Permit to see if the reference is appropriate? Appendix Z is referenced throughout the 11e.(2) License, and License Application, such as Condition 11.1 of the License, and sections 4.1.3, 4.3, 5.1, 5.2, 5.7, 5.10, 6.7.1, 7.1, 7.3.1, 8.3, 12.5.4, 16.1.3, and 16.2.3 of the License Application. EnergySolutions needs to evaluate these sections of the 11e.(2) License and License Application to see if they are still appropriate; additionally, EnergySolutions should check the entire lle.(2) License and License application for any additional reference to Appendix Z, to see if the references can be removed.

References

Envirocare, September 9, 2004 (#CD04-0418), Request to Remove Groundwater Requirements from the 11e.(2) Materials License SMC-1559, Amendment No.49: letter from Tye Rogers of Envirocare to Dane Finerfrock of the DRC.

Envirocare, November 19, 2004 (#CD04-0511), Comments on Draft 11e.(2) Byproduct Materials License #UT2300487: letter from Tye Rogers of Envirocare to Dane Finerfrock of the DRC.

URS Corporation, October, 2007, EnergySolutions' Application for 11e.(2) Radioactive Materials License Renewal, Round 2 Interrogatories: Prepared for the Utah Division of Radiation Control.

EnergySolutions, March 3, 2008 (#CD08-0069), Radioactive Material License No. UT2300478; request to Remove License Condition 11.1, revise Section 5 of the License Application, and approve modification of Tables 1C and 1D of the Groundwater Quality Discharge Permit UGW450005: letter from Daniel Shrum of EnergySolutions to Dane Finerfrock of the DRC.

EnergySolutions, June 3, 2010 (#CD10-0167), Radioactive Material License No. UT2300478 – Amendment Request to Consolidate 11e.(2) Embankment Groundwater Monitoring Requirements with the Requirements listed in the Groundwater Quality Discharge Permit (UGW 450005): Letter from Sean McCandless of EnergySolutions to Dane Finerfrock of the DRC.

M E M O R A N D U M

TO: John Hultquist, Licensing Manager

FROM: Charles Bishop, PG Hydrogeologist

DATE: November 29, 2011

SUBJECT: EnergySolutions' Response to the Division of Radiation Control Request for Information regarding the Consolidation of 11e.(2) Embankment's Ground-Water Monitoring Requirements, 11e.(2) License UT2300478, Amendment #6, with the Ground Water Quality Discharge Permit, UGW 450005.

EnergySolutions is licensed by the State of Utah through the Utah Division of Radiation Control (hereafter, DRC) to receive and dispose of 11e.(2) byproduct materials and operates a disposal embankment at its Clive facility; Section 32, Township 1 South, Range 11 West, for that purpose. In a letter dated June 3, 2010, EnergySolutions (their letter #CD10-0167) requested a modification to Conditions 11.1a and 11.1b of the 11e.(2) License; and parts of Section 5, and Appendix Z of the 11e.(2) License Application. The DRC reviewed EnergySolutions' request in a memorandum dated June 6, 2011, and determined information and some requirements in Section 11 of the 11e.(2) License, and Section 5 and Appendix Z of the License Application are found in the Permit, and requirements in the 11e.(2) License sometimes conflict with requirements in the Permit. In a letter dated September 8, 2011 the DRC requested EnergySolutions provide protection levels for five parameters to be added to Table 1C of the Permit, and if all of Appendix Z was to be removed to provide assurance some regulations in the 11(e).2 License are maintained. This memorandum is a review of EnergySolutions response, dated October 11, 2011 (there letter #CD11-0278), to the DRC request for information (DRC, September 8, 2011).

The five new parameters to be added to Table 1C of the Permit are currently listed in 11e.(2) License condition 11.1b, and are parameters that have been identified in 11e.(2) waste at the Clive facility. Thus these five parameters should be potential indicators of a release from the 11e.(2) embankment. The five parameters to be added to the Permit are:

- Benzo(a)anthrancene,
- Benzo(a)pyrene,
- Benzo(K)floranthene,
- Cldordane,
- Chrysene

New protection levels for the five new parameters were to be based on an assessed regulatory standards, or a defensible rationale. EnergySolutions provided protection levels for the five new parameters and the rational for those levels in the October 11, 2011 letter.

The DRC also request that EnergySolutions provide assurance that some regulations in the 11(e).2 License application are maintained if their request is approved. The sections of concern form the removal of Appendix Z of the 11e.(2) License Application, were under subheadings:

- Liquid Testing Plan, which requires EnergySolutions to test incoming shipments of 11e.(2) materials for free liquids;
- Material Management, which requires EnergySolutions to classify waste into bulk material or material in containers;

- Waste Accepted in Containers, which requires container waste to arrive at the Clive facility in DOT approved containers and specifies management practices for that waste;
- Plan for Controlling Wind Dispersal, which requires activities to minimize off-site windblown dispersion of dust.

EnergySolutions responded that they did not want to remove all of Appendix Z, and that Appendix Z consisted of the Groundwater Protection Plan (Part 1 of Appendix Z) and the Ground Water Monitoring Quality Assurance Plan (Part 2 of Appendix Z); the June 3, 2010 request to remove Appendix Z was specific to the Ground Water Monitoring Quality Assurance Plan only. Thus, the request did not intend to remove the Groundwater Protection Plan (Part 1 of Appendix Z) from the 11e.(2) License, which is what the DRC had concerns about.

Conclusions

Acceptable changes to Section 11 of the 11e.(2) License will require EnergySolutions to comply with the Permit, removing the Section 11 requirements for monitoring at POC wells, and its constituent list. Removing these requirements of Section 11 of the 11e.(2) License and using the requirements of the Permit will streamline ground-water monitoring, eliminate conflicting requirements, and causes no reductions in ground-water protection. EnergySolutions provide ground-water protection levels for the five new parameters to be added to the Permit, and justification for those levels. EnergySolutions proposed ground water protection levels of the new parameters that need to be added to the Permit are:

- Benzo(a)anthrancene – 0.010 milligrams per liter (mg/L),
- Benzo(a)pyrene – 0.010 mg/L,
- Benzo(K)floranthene – 0.010 mg/L,
- Cldordane – 0.002 mg/L,
- Chrysene – 0.010 mg/L

The ground-water protection levels for Benzo(a)anthrancene, Benzo(a)pyrene, Benzo(K)floranthene, and Chrysene are the practical quantitation limits for these compounds; and are concentration limits used in the Mixed Waste embankment for its ground-water monitoring program. The Ground Water Protection Level proposed for Cldordane is the Utah Ground-water Quality Standard listed in Utah Administrative Rules (UAR) R317-6.2.

Acceptable changes to Section 5 of the 11e.(2) License Application replace references to various NRC and EPA criterion with reference to Utah Administrative Rules for Ground Water Quality Protection UAC R317-6 , and the Permit. The Permit addresses requirements for facility-specific monitoring programs and address ground-water quality and monitoring at the Clive facility.

Acceptable changes to Appendix Z of the 11e.(2) License Application involved sampling procedures. Sampling procedures in Appendix Z, and are duplicated in the Permits' Water Monitoring Quality Assurance Plan (Appendix B, WMQAP) and therefore does not need to be duplicated in Appendix Z of the 11e.(2) License Application.

The approach of utilizing ground-water protection requirements in the Permit is consistent with the DRC's strategic for ground-water protection. The DRC presently employs the Permit to address issues of ground-water protection, and requirements for ground-water monitoring at the Clive facility are specified in the Permit. The Permit provides a reasonable assurance that ground-water standards will be met, and protect the environment and human health from current and potential threats posed by the uncontrolled release of radioactive and hazardous waste to the natural subsurface soil and/or ground water. Removing duplication of requirements, alleviates potential conflicts between the 11e.(2) License and Permit making ground-water monitoring more effective, efficient, and timely at the Clive facility. The effectiveness of EnergySolutions' ground-water monitoring and detection system for the 11e.(2) embankment is maintained in the Permit.

References

EnergySolutions, June 3, 2010 (#CD10-0167), Radioactive Material License No. UT2300478 – Amendment Request to Consolidate11e.(2) Embankment Groundwater Monitoring Requirements with the Requirements listed in the

Groundwater Quality Discharge Permit (UGW 450005): Letter from Sean McCandless of EnergySolutions to Dane Finerfrock of the DRC.

DRC, June 6, 2011, Request to Consolidate11e.(2) Embankment's Groundwater Monitoring Requirements, 11e.(2) License UT2300478, Amendment #6, with the Ground Water Quality Discharge Permit, UGW450005: Memorandum from Charles Bishop to John Hultquist/Loren Morton.

DRC, September 8, 2011, EnergySolutions request to amend Radioactive Material License No. UT2300478, Consolidating the 11e.(2) embankment's Groundwater Monitoring Requirements into the Ground Water Quality Discharge Permit, UGW 450005: Division of Radiation Control Request for Information: Letter from Charles Bishop of the DRC to Sean McCandless of EnergySolutions.

EnergySolutions, October 11, 2011 (#CD11-0278), Response to Division of Radiation Control Request for Information - Radioactive Material License No. UT2300478 – Amendment Request to Consolidate 11e.(2) Embankment Groundwater Monitoring Requirements with the Requirements listed in the Groundwater Quality Discharge Permit (UGW 450005): Letter from Sean McCandless of EnergySolutions to Rusty Lundberg of the DRC.

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