

**ENERGYSOLUTIONS**

December 7, 2012

CD12-0304

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

RECEIVED

DEC 07 2012

DEPARTMENT OF  
ENVIRONMENTAL QUALITY

Re: Request to Renew Ground Water Quality Discharge Permit No. UGW450005

Dear Mr. Lundberg:

EnergySolutions, LLC hereby submits this request to renew Ground Water Quality Discharge Permit No. UGW450005 (GWQDP) for its Clive, Utah facility and requests acknowledgement of timely renewal. In accordance with GWQDP Part IV.F, this submittal has been made at least 180 days before the current expiration date of June 8, 2013.

The name and address of the applicant is as follows:

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

The legal location of the facility is as follows:

Tooele County, Section 32, Township 1 South, Range 11 West, SLBM

The name, type, and expected life of the facility:

EnergySolutions, LLC owns and operates a Class A Low-Level Radioactive Waste, 11e.(2), and Mixed Waste disposal facility near Clive, Tooele County, Utah. The expected life of the facility is 20 years.

Enclosed please find three copies of the following:

- GWQDP Parts I through IV, and Appendices A, C, F, and G in redline/strikeout.
- Justification for proposed changes to the GWQDP.

Electronic copies of the above are provided. Also provided are electronic copies of the engineering design drawings referenced in the GWQDP and the most-recent

revisions of Appendix B (August 30, 2011), Appendix J (September 7, 2012), and Appendix K (September 7, 2012).

Submittal of the Manifest Radioisotope Report, Comprehensive Groundwater Quality Evaluation Report, and Revised Hydrogeological Report has been made under separate cover.

If you have any questions or concerns regarding this submittal, please contact me at 801-649-2000.

Sincerely,

A handwritten signature in black ink that reads "Sean McCandless".

Sean McCandless  
Manager, Compliance and Permitting

Enclosures

cc: John Hultquist, DRC  
Phil Goble, DRC

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.

**Justification for Modifications to  
Groundwater Quality Discharge Permit UGW450005  
December 7, 2012**

1. **Part I.C – Modification of Compliance Parameters** – EnergySolutions proposes to remove metals, organic chemicals, cyanide, fluoride, total nitrate/nitrite, and total uranium as compliance parameters. Monitoring for these parameters is not required and not technically necessary to ensure compliance with water quality regulations.

Justification: Groundwater at the Clive facility has been routinely and thoroughly characterized for over 20 years. EnergySolutions proposes to eliminate parameters from Groundwater Quality Discharge Permit UGW45005 (GWQDP) that are not necessary to document and maintain compliance. There is no requirement contained in UAC R317-6, *Ground Water Quality Protection*, to monitor for specific parameters:

- i. GWQDP Part 1.A defines groundwater in the vicinity of the site as Class IV, saline groundwater.
- ii. R317-6-3.7 defines Class IV groundwater as having total dissolved solids (TDS) greater than 10,000 mg/L. There are no requirements linked to specific parameters or the Ground Water Quality Standards in R317-6-2, Table 1.
- iii. R317-6-4.7, *Class IV Protection Levels*, states that protection levels for Class IV groundwater will be established to protect human health and the environment. There are no requirements linked to specific parameters or the Ground Water Quality Standards in R317-6-2, Table 1.
- iv. R317-6-6.3, *Application Requirements for a Ground Water Discharge Permit*, R317-6-6.3.I .7 states that application will provide a description and justification of parameters to be monitored. There are no requirements linked to specific parameters or the Ground Water Quality Standards in R317-6-2, Table 1.

The 2012 *Comprehensive Groundwater Quality Evaluation Report*, prepared and submitted in support of the GWQDP renewal, provides comprehensive documentation of background groundwater chemistry for Clive facility compliance monitoring wells. The groundwater at Clive is classified as Class IV, saline groundwater according to UAC R317-6-3.7, with total dissolved solids (TDS) concentrations typically exceeding 30,000 milligrams per liter (mg/L). Because of the naturally poor quality and high salinity, the groundwater in the vicinity of the Clive site is not suitable for most human uses and is not potable for humans. Analysis conducted by the World Health Organization in 2003 suggested associations between TDS concentrations in drinking water and the incidence of cancer, coronary heart disease, arteriosclerotic heart disease, cardiovascular disease, and total mortality rates in studies conducted in Australia and the former Soviet Union (WHO, 2003).

For Class IV groundwater, R317-6-4.7 does not require monitoring groundwater to drinking water standards for protection of human health and the environment. Class IV groundwater is not potable. Nonetheless, EnergySolutions proposes to continue to monitor radionuclides in Clive facility groundwater and to conservatively compare the results to drinking water-based standards currently contained in the GWQDP. However, continued compliance monitoring

of other inorganics, organic chemicals, and total uranium is not necessary to maintain compliance with groundwater quality protection regulations. EnergySolutions proposes to sample and analyze the other inorganics and organic chemicals once-per-renewal cycle (GWQDP Part I.F.5.c.3). These parameters will be reported in the *Comprehensive Groundwater Quality Evaluation Report* and will be compared to the background distributions (mean plus second standard deviation) presented in the 2012 *Comprehensive Groundwater Quality Evaluation Report* as a check of variation in background conditions.

**Inorganic Parameters** – The 2012 *Comprehensive Groundwater Quality Evaluation Report* documents the presence of background levels of inorganics in facility groundwater which commonly exceed Groundwater Protection Levels (GWPLs). Naturally occurring inorganic compliance parameters have resulted in nearly continuous out-of-compliance monitoring of background conditions. The *Manifest Radioisotope Inventory Report*, also prepared and submitted in support of the GWQDP renewal, provides comprehensive documentation of the radiological content of material disposed in each embankment at the Clive facility. Radionuclides are inorganics and behave as inorganics from a fate and transport standpoint. Radionuclide analytical sensitivities are equal to or greater than that of trace inorganics; and unlike trace inorganics, background levels of some radionuclides included as compliance parameters are essentially zero. It is unreasonable to expect to detect non-radiological constituents associated with a release to groundwater without detection of radiological constituents. Trace non-radiological inorganics will not act as early warning of contamination. This is because, based on the distribution coefficient data listed in the Class A West Infiltration and Transport Modeling Report (Whetstone Associates, 2011), four radiological parameters (Sr-90, I-129, Tc-99, and tritium) are more mobile than the trace inorganic compliance parameters.

**Organic Parameters** – Similarly, it is unreasonable to expect to detect hazardous organic chemicals from a release to groundwater without detection of radiological constituents. Of the organic chemicals currently included as compliance parameters, only acetone and 2-butanone are potentially more mobile than the mobile radiological compliance parameters. Semivolatile organic compounds and the pesticide, chlordane, which are currently included as 11e.(2) compliance parameters are particularly immobile in groundwater, with distribution coefficients ranging from 69 to 1,230,000 L/kg, based on regulatory guidance values of the soil organic carbon-water partitioning coefficient ( $K_{oc}$ ), the site-specific fraction of organic matter in soil, and the fraction of organic carbon in soil organic matter provided in regulatory guidance.

**Total Uranium** – EnergySolutions proposes to eliminate total uranium as a GWQDP compliance parameter, and to add isotopic uranium to the list of radiological compliance parameters for the 11e.(2) wells. Total uranium analyses are redundant to isotopic uranium, because total uranium concentrations can be calculated from isotopic data. Also, total uranium analysis provides less information than isotopic uranium analysis. The ratio of U-234 to U-238 provides data on the source of uranium in groundwater. The U-234 to U-238 ratio of naturally occurring groundwater at the Clive facility is significantly greater than 1.0, often exceeding 2.0. This is very common for natural groundwater systems, because the alpha decay of U-238 decaying to U-234 damages locations occupied by uranium in crystal

and mineral structures, so that when leached, U-234 is preferentially removed from the solids. The U-234 to U-238 ratio of waste materials is typically one or less than one (as with depleted uranium for example). Observation of the U-234 to U-238 ratio provides additional information to indicate if uranium in groundwater is related to potential contamination, and the ratio may be more sensitive to change than trends in total uranium or isotope concentrations. An example of changes in uranium isotopic ratio related to groundwater impacts can be seen in data from well P3-95 SWC.

Table 1 compares laboratory total uranium analytical results to total uranium values calculated from isotopic uranium data for the typical range of total uranium concentrations observed in Clive facility shallow groundwater. The comparison indicates that for almost all samples, the laboratory total uranium result is within the calculated total uranium range when the isotopic counting error is included. U-234 to U-238 isotopic ratios are also shown on Table 1. All of the ratios are greater than or equal to 1.0, with the exception of the December 15, 2010 sample from Well P3-95 SWC, which had been impacted by residual contamination at the time the sample was collected.

**Table 1**  
**Comparison of Laboratory Total Uranium to Calculated Total Uranium**

Well: GW-19A		
Sample Date: 3/27/12		
	(pCi/L)	(mg/L)
Laboratory U-234	2.59 ± 0.70	4.18E-07 ± 1.13E-07
Laboratory U-235	< 0.276 ± 0.097	1.25E-04 ± 4.41E-05
Laboratory U-238	1.33 ± 0.51	4.03E-03 ± 1.55E-03
U-234:U-238 ratio 1.9	Laboratory Total U (mg/L) 0.0031	Calculated Total U (mg/L) 0.0042 ± 0.0015
Well: GW-64		
Sample Date: 4/4/12		
	(pCi/L)	(mg/L)
Laboratory U-234	9.82 ± 1.20	1.58E-06 ± 1.94E-07
Laboratory U-235	< 0.189 ± 0.14	8.59E-05 ± 6.36E-05
Laboratory U-238	3.86 ± 0.78	1.17E-02 ± 2.36E-03
U-234:U-238 ratio 2.5	Laboratory Total U (mg/L) 0.0115	Calculated Total U (mg/L) 0.0118 ± 0.0024
Well: GW-86		
Sample Date: 5/23/12		
	(pCi/L)	(mg/L)
Laboratory U-234	5.24 ± 0.87	8.45E-07 ± 1.40E-07
Laboratory U-235	< 0.174 ± 0.16	7.91E-05 ± 7.27E-05
Laboratory U-238	1.93 ± 0.53	5.85E-03 ± 1.61E-03
U-234:U-238 ratio 2.7	Laboratory Total U (mg/L) 0.0076	Calculated Total U (mg/L) 0.0059 ± 0.0016

**Table 1**  
**Comparison of Laboratory Total Uranium to Calculated Total Uranium**

Well: GW-100		
Sample Date: 5/9/12		
	(pCi/L)	(mg/L)
Laboratory U-234	54.7 ± 3.00	8.82E-06 ± 4.84E-07
Laboratory U-235	< 1.330 ± 0.46	6.05E-04 ± 2.09E-04
Laboratory U-238	29.5 ± 2.2	8.94E-02 ± 6.67E-03
U-234:U-238 ratio 1.9	Laboratory Total U (mg/L) 0.0946	Calculated Total U (mg/L) 0.0900 ± 0.0067
Well: GW-111		
Sample Date: 5/2/11		
	(pCi/L)	(mg/L)
Laboratory U-234	0.183 ± 0.11	2.95E-08 ± 1.77E-08
Laboratory U-235	< 0.095 ± 0.044	4.30E-05 ± 2.00E-05
Laboratory U-238	0.186 ± 0.11	5.64E-04 ± 3.33E-04
U-234:U-238 ratio 1.0	Laboratory Total U (mg/L) 0.0003	Calculated Total U (mg/L) 0.0006 ± 0.0003
Well: GW-112		
Sample Date: 5/2/12		
	(pCi/L)	(mg/L)
Laboratory U-234	18.4 ± 1.70	2.97E-06 ± 2.74E-07
Laboratory U-235	< 0.284 ± 0.22	1.29E-04 ± 1.00E-04
Laboratory U-238	8.98 ± 1.2	2.72E-02 ± 3.64E-03
U-234:U-238 ratio 2.0	Laboratory Total U (mg/L) 0.0269	Calculated Total U (mg/L) 0.0273 ± 0.0036
Well: GW-112 Duplicate		
Sample Date: 5/2/12		
	(pCi/L)	(mg/L)
Laboratory U-234	17 ± 1.70	2.74E-06 ± 2.74E-07
Laboratory U-235	< 0.470 ± 0.28	2.14E-04 ± 1.27E-04
Laboratory U-238	8.71 ± 1.2	2.64E-02 ± 3.64E-03
U-234:U-238 ratio 2.0	Laboratory Total U (mg/L) 0.0273	Calculated Total U (mg/L) 0.0266 ± 0.0036

**Table 1**  
**Comparison of Laboratory Total Uranium to Calculated Total Uranium**

Well: GW-136		
Sample Date: 5/17/12		
	(pCi/L)	(mg/L)
Laboratory U-234	10.3 ± 1.40	1.66E-06 ± 2.26E-07
Laboratory U-235	< 0.183 ± 0.13	8.32E-05 ± 5.91E-05
Laboratory U-238	5.03 ± 0.96	1.52E-02 ± 2.91E-03
U-234:U-238 ratio 2.0	Laboratory Total U (mg/L) 0.0122	Calculated Total U (mg/L) 0.0153 ± 0.0029
Well: GW-141		
Sample Date: 4/23/12		
	(pCi/L)	(mg/L)
Laboratory U-234	6.14 ± 0.95	9.90E-07 ± 1.53E-07
Laboratory U-235	< 0.273 ± 0.21	1.24E-04 ± 9.55E-05
Laboratory U-238	3.3 ± 0.7	1.00E-02 ± 2.12E-03
U-234:U-238 ratio 1.9	Laboratory Total U (mg/L) 0.0103	Calculated Total U (mg/L) 0.0101 ± 0.0021
Well: P3-95 SWC		
Sample Date: 12/15/10		
	(pCi/L)	(mg/L)
Laboratory U-234	119 ± 5.80	1.92E-05 ± 9.35E-07
Laboratory U-235	< 6.480 ± 1.4	2.95E-03 ± 6.36E-04
Laboratory U-238	305 ± 9.3	9.24E-01 ± 2.82E-02
U-234:U-238 ratio 0.4	Laboratory Total U (mg/L) 1.010	Calculated Total U (mg/L) 0.927 ± 0.028
Well: P3-95 SWC Duplicate		
Sample Date: 12/15/10		
	(pCi/L)	(mg/L)
Laboratory U-234	132 ± 5.90	2.13E-05 ± 9.52E-07
Laboratory U-235	< 7.920 ± 1.4	3.60E-03 ± 6.36E-04
Laboratory U-238	336 ± 9.4	1.02E+00 ± 2.85E-02
U-234:U-238 ratio 0.4	Laboratory Total U (mg/L) 1.090	Calculated Total U (mg/L) 1.022 ± 0.028

**Table 1**  
**Comparison of Laboratory Total Uranium to Calculated Total Uranium**

Well: P3-95 SWC		
Sample Date: 12/5/11		
	(pCi/L)	(mg/L)
Laboratory U-234	14 ± 1.60	2.26E-06 ± 2.58E-07
Laboratory U-235	< 0.542 ± 0.32	2.46E-04 ± 1.45E-04
Laboratory U-238	10.3 ± 1.4	3.12E-02 ± 4.24E-03
U-234:U-238 ratio	Laboratory Total U (mg/L)	Calculated Total U (mg/L)
1.4	0.0275	0.0315 ± 0.0042
Well: P3-95 SWC Duplicate		
Sample Date: 12/5/11		
	(pCi/L)	(mg/L)
Laboratory U-234	12.6 ± 1.40	2.03E-06 ± 2.26E-07
Laboratory U-235	< 0.260 ± 0.2	1.18E-04 ± 9.09E-05
Laboratory U-238	8.51 ± 1.14	2.58E-02 ± 3.45E-03
U-234:U-238 ratio	Laboratory Total U (mg/L)	Calculated Total U (mg/L)
1.5	0.0287	0.0259 ± 0.0035

2. **Part I.D.2 – LARW Cell Engineering Design and Specifications** – EnergySolutions proposes to remove LARW engineering design and specifications from the GWQDP. However, for reference, Table 2A, the list of approved LARW design documents will remain.  
Justification: Final cover construction over the entire LARW cell was completed by October 2005. There is no need for the details to be included in the GWQDP.
  
3. **Part I.D.11 – Final Authorized Engineering Design and Specifications for Waste and Wastewater Related Facilities** – EnergySolutions proposes to remove some engineering design drawings from Table 5. Other drawings have the revision number and/or date corrected to match current approved versions.  
Justification: The drawings removed do not contain information or features applicable to BAT requirements.
  
4. **Part I.E.1.a – Waste Restrictions** – EnergySolutions proposes to remove this section.  
Justification: Duplicates RML Condition 9.E. RML is incorporated by reference therefore its conditions do not need to be duplicated here.
  
5. **Part I.E.3 – Failure to Construct as per Approval** – EnergySolutions proposes to remove this section.  
Justification: The requirements are self-evident.
  
6. **Part I.E.4 – Unsaturated Soil Moisture Content Monitoring** – EnergySolutions proposes to remove some text in this section.  
Justification: The deleted text is self-evident.

7. **Part I.E.5 – Allowable Heavy Metal Waste Concentration Limits** – *EnergySolutions* proposes to delete this section.  
Justification: The requirements conflict with those of Part I.E.2.a. Also, the section is not needed, given Part I.E.2.a.
8. **Part I.E.6 – Open Cell Time Limitation** – *EnergySolutions* proposes to suspend the open-cell time limitation for non-contaminated disposal areas, i.e., the large component area and containerized waste facilities (CWF). In these areas, the limitation would only apply when bulk LLRW is first placed on the lift area. In addition, an allowance is provided so that, with prior Director approval, this time limitation may be extended by use of low permeability clay, HDPE, or other engineering methods to discourage moisture infiltration to emplaced waste.  
Justification: Contamination in CWF and large component areas is not in contact with the environment where it can be potentially leached and transported. Therefore, the limitation should not apply. Similarly, with suitable engineering controls, areas of the cell can be isolated so that contamination is not in contact with the environment and the time limit extended.
9. **Part I.E.7 – General Stormwater Management Requirements** – *EnergySolutions* proposes to delete and modify text in this section.  
Justification: The deleted text is self-evident and/or repetitious.
10. **Part I.E.8 – 11e.(2) Waste Management Requirements** – *EnergySolutions* proposes to delete text in this section.  
Justification: RML requirements do not need to be repeated here.
11. **Parts I.E.10.a and I.E.10.b – Contaminant Containment and Spill Prevention and Containerized Waste Storage Pad and Other Waste Storage Areas** – *EnergySolutions* proposes to modify text in this section.  
Justification: The deleted text is self-evident and/or repetitious.
12. **Part I.E.10.c – Prohibition and Restrictions for Dry Active Waste (DAW) Storage** – *EnergySolutions* proposes to delete this section.  
Justification: The requirements are contained in the RML and are not applicable to the GWQDP.
13. **Part I.E.11 – Collection Lysimeter Video Inspection** – *EnergySolutions* proposes to reduce the frequency of video inspection of the collection lysimeters from annual to once per GWQDP renewal cycle.  
Justification: *EnergySolutions* has performed annual video inspections of embankment lysimeters since 1994. Nineteen years of annual inspections have demonstrated that the collection lysimeters perform as designed and constructed. The design and construction are robust. Detrimental changes due to waste disposal and embankment construction have not been observed in any collection lysimeter. Based on these observations, *EnergySolutions* believes that annual video inspections are not necessary, and once per renewal cycle is

sufficient to document the integrity and performance of collection lysimeters. Deleted text at end of the part is self-evident.

14. **Part I.E.12 – Stormwater Drainage Works Performance Criteria** – Seepage Control to Prevent Ground Water Mounding – EnergySolutions modified text to clarify that the metric is the hydraulic gradient performance standards listed in Parts I.E.25 and I.E.26.  
Justification: The changes replace text contradicting other parts of the GWQDP.
15. **Part I.E.14.a.1 – Leak Detection System Pumping and Monitoring Equipment Continuous Operation** – EnergySolutions proposes to modify text in this section.  
Justification: The deleted text is self-evident and/or repeats BAT requirements listed in Appendix J.
16. **Part I.E.14.a.2 – Maximum Allowable Daily Leakage Volumes** – EnergySolutions proposes to modify text in this section.  
Justification: The deleted text is self-evident and/or repeats BAT requirements listed in Appendix J.
17. **Part I.E.14.a.3 – Maximum Allowable Head** – EnergySolutions proposes to modify text in this section.  
Justification: The deleted text is self-evident and/or repeats BAT requirements listed in Appendix J.
18. **Part I.E.14.a.4 – Two foot Minimum Vertical Freeboard Criteria** – EnergySolutions proposes to modify text in this section.  
Justification: The deleted text is self-evident and/or repeats BAT requirements listed in Appendix J.
19. **Part I.E.14.b – Box Washing Facility** – EnergySolutions proposes to delete this part.  
Justification: Repeats BAT requirements listed in Appendix J.
20. **Part I.E.15 – Filter Construction Settlement Performance Standards** – EnergySolutions proposes to delete this section.  
Justification: The CQA/QC Plan includes settlement monitoring for waste before radon barrier is built and requires that the radon barrier meets 95% compaction. CQA is referenced in cell design sections, therefore this is redundant.
21. **Part I.E.20 – Shredder Facility** – EnergySolutions proposes to modify text in this section.  
Justification: Repeats BAT requirements listed in Appendix J.
22. **Part I.E. 21 – Rotary Dump Facility** – EnergySolutions proposes to modify text in this section.  
Justification: Repeats BAT requirements listed in Appendix J.
23. **Part I.E.22 – Intermodal Container Wash Building** – EnergySolutions proposes to modify text in this section.  
Justification: Repeats BAT requirements listed in Appendix J.

24. **Part I.E.23 – Decontamination Access Control Building** – EnergySolutions proposes to modify text in this section.  
Justification: Repeats BAT requirements listed in Appendix J.
25. **Part I.E.24 – East Side Drainage Project** – EnergySolutions proposes to modify text in this section.  
Justification: Repeats BAT requirements listed in Appendix J.
26. **Part I.E. 25 – Horizontal Hydraulic Gradient Performance Standard** – EnergySolutions has submitted an updated infiltration and transport model report for the LARW Cell (CD12-0123, May 29, 2012). The updated model report provides a revised horizontal hydraulic gradient performance standard, which is included in Part 1.H.2.d. Some text was deleted.  
Justification: The deleted text is obsolete.
27. **Part I.E.27 – DU Storage Building Performance Standard** – EnergySolutions proposes to modify text in this section.  
Justification: Repeats BAT requirements listed in Appendix J.
28. **Part I.F.1.b – Mixed Waste Cell Compliance Monitoring Wells** – EnergySolutions proposes to delete well I-3-30 from the list of Mixed Waste Cell compliance monitoring wells. EnergySolutions believes this is an error, because other monitoring well changes associated with Mixed Waste Cell expansion plans have been approved and included in the GWQDP (see DRC Statement of Basis for GWQDP UGW450005, dated March 20, 2012).  
Justification: Well I-3-30 will be abandoned before approved Mixed Waste Cell expansion.
29. **Part I.F.1.i – Notification of Ground-water Monitoring Event** – EnergySolutions proposes to modify text in this section.  
Justification: Deleted text is extraneous and self-evident.
30. **Part I.F.2 – BAT Compliance Monitoring Points** – EnergySolutions proposes to delete most of this part.  
Justification: Repeats BAT requirements listed in Appendix J.
31. **Part I.F.3 – Future Modification of Compliance Monitoring Systems or Equipment** – EnergySolutions proposes to delete this section.  
Justification: The requirements of this section are self-evident. Also, there is no similar such condition in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.
32. **Part I.F.4 – Compliance Monitoring Period** – EnergySolutions proposes to delete this section.  
Justification: The requirements of this section are self-evident. Also, there is no similar such condition in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.

**33. Part I.F.5.a – Monitoring Requirements and Frequency, Water Level Measurements –**

EnergySolutions proposes to change the frequency of groundwater level measurements from monthly to quarterly.

Justification: Groundwater elevations have been extensively documented at the Clive facility for more than 20 years. The magnitude and variability of hydraulic gradients are well-characterized, as is the direction and variability of groundwater flow. As presented in the *Revised Hydrogeologic Report* for the Clive Facility (Version 3.0, 2012), groundwater flow is relatively slow, and groundwater elevation at each compliance well does not typically change significantly from month-to-month. For these reasons, a quarterly frequency for groundwater elevation measurements is adequate to maintain and document compliance with the gradient performance standards listed in the GWQDP.

**34. Part I.F.5.c.1.i – Monitoring Requirements and Frequency, Ground Water and Pore Water Quality Sampling and Analysis, Ground/Pore Water Analytical Methods – EnergySolutions**

proposes to modify this section.

Justification: The deleted text is self-evident.

**35. Part I.F.5.c.2.ii – Monitoring Requirements and Frequency, Ground Water and Pore Water Quality Sampling and Analysis, Analysis Parameters – EnergySolutions**

proposes to delete general inorganic and general radiologic parameters from the list of annual analysis parameters.

Justification: As documented in the 2012 *Comprehensive Groundwater Quality Evaluation Report*, shallow groundwater at the Clive facility has been characterized extensively for more than 20 years. Continued sampling and analysis for general inorganic parameters on an annual basis is not required to demonstrate compliance with Utah groundwater quality protection regulations, and additional data do not add appreciably to the characterization of the hydrogeology of the facility. This justification also is applicable to potassium-40 and gross beta analyses. In addition, gross beta is not necessary, because the groundwater monitoring program includes the individual beta-emitters carbon-14, iodine-129, strontium-90, technetium-99, and tritium.

**36. Part I.F.5.c.3 – Monitoring Requirements and Frequency, Ground Water and Pore Water Quality Sampling and Analysis, Permit Renewal Parameters – EnergySolutions**

proposes to expand the list of parameters (currently arsenic and molybdenum) that are sampled and analyzed once per permit-renewal cycle. Sampling will be performed prior to GWQDP renewal and results will be reported in the *Comprehensive Groundwater Quality Evaluation Report* also submitted as part of the GWQDP renewal.

Justification: These parameters have been removed as compliance parameters; justification is provided in Item 1 above. As a best management practice, EnergySolutions will sample for the parameters listed, and results will be compared to the background water-quality datasets and distributions developed for the 2012 *Comprehensive Groundwater Quality Evaluation Report* to evaluate potential changes in water chemistry. The comparison will be documented in the *Comprehensive Groundwater Quality Evaluation Report* submitted as part of the GWQDP renewal process.

**37. Part I.F.7 – Modification of Monitoring or Analysis Parameters – EnergySolutions**

proposes to delete this section.

Justification: The requirements of this section are self-evident. Also, there is no similar such condition in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.

38. **Part I.F.8 – Waste Characterization Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates RML waste characterization monitoring requirements. RML is incorporated by reference therefore its conditions do not need to be duplicated here.

39. **Part I.F.9 – Waste Liquid Content Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates RML requirements for the liquid content of waste. RML is incorporated by reference therefore its conditions do not need to be duplicated here.

40. **Part I.F.12 – Containerized Waste Storage Areas: Leakage/Spill Monitoring and BAT Status** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates BAT requirements from Appendix J.

41. **Part I.F.13 – Evaporation Ponds Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates BAT requirements from Appendix J.

42. **Part I.F.14 – Confined Aquifer Head Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates requirements from Parts I.F.1.d and I.F.5.

43. **Part I.F.16 – Intermodal Unloading Facility Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates BAT requirements from Appendix J.

44. **Part I.F.17 – Box-Washing Facility Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates BAT requirements from Appendix J.

45. **Part I.F.18 – Rail Car Wash Facility Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates BAT requirements from Appendix J.

46. **Part I.F.19 – Railcar Rollover Facility Monitoring** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates BAT requirements from Appendix J.

47. **Part I.F.22 – BAT Performance Monitoring Plan** – *EnergySolutions* proposes to delete this section.

Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.

48. **Part I.F.23 – BAT Contingency Plan** – EnergySolutions proposes to delete this section.  
Justification: Part I.F addresses compliance monitoring requirements, not non-compliance status. Duplicates requirements listed in Part I.G.4.c.
49. **Part I.F.24 – Stormwater Monitoring** – EnergySolutions proposes to delete this section.  
Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.
50. **Part I.F.25 – Shredder Facility** – EnergySolutions proposes to delete this section.  
Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.
51. **Part I.F.26 – Rotary Dump Facility** – EnergySolutions proposes to delete this section.  
Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.
52. **Part I.F.27 – Intermodal Container Wash Building** – EnergySolutions proposes to delete this section.  
Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.
53. **Part I.F.28 – Decontamination Access Control Building** – EnergySolutions proposes to delete this section.  
Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.
54. **Part I.F.29 – East Side Drainage Project** – EnergySolutions proposes to delete this section.  
Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.
55. **Part I.F.30 – DU Storage Building Monitoring** – EnergySolutions proposes to delete this section.  
Justification: Redundant, requirements incorporated at Part I.F.2. Duplicates BAT requirements from Appendix J.
56. **Part I.G.1.c – Other Methods to Determine Ground Water Quality Compliance Status** – EnergySolutions proposes to delete this section.  
Justification: Compliance status is clearly defined in Parts I.G.1.a and I.G.1.b. Also, there is no similar caveat for other methods in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.
57. **Part I.G.3.a.2 – Requirements for Ground Water Out-of-Compliance Status** – EnergySolutions proposes to delete to last sentence of this section.  
Justification: The requirement is redundant; the regulatory authority to require sampling and analysis of additional analytes is already given in Utah water quality regulations. Also, there

is no similar such requirement in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.

58. **Part I.G.4.a – Definition of Failure to Maintain BAT Requirements** – *EnergySolutions* proposes to delete to last sentence of this section.

Justification: The requirement is self-evident. Also, there is no similar such requirement in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.

59. **Parts I.H and I.H.1 – Reporting Requirements, Ground-Water Monitoring** – *EnergySolutions* proposes to modify text in these sections.

Justification: The deleted text is self-evident and/or redundant.

60. **Part I.H.2.d – Water Level Measurements, Fresh Water Equivalent Horizontal Hydraulic Gradient Limit** – The fresh water equivalent horizontal hydraulic gradient limits for the LARW embankment was changed from 9.67E-4 to 2.70E-3, and similarly the limit for the Mixed Waste embankment was changed from 9.67E-4 to 1.00E-3.

Justification: The *LARW Disposal Cell Updated Infiltration and Transport Modeling* report (Whetstone Associates, May 2012), submitted to DRC on May 29, 2012 (CD12-0123) provides technical justification for the change in the LARW embankment horizontal gradient limit. The *Mixed Waste Cell Infiltration and Transport Modeling* report (Whetstone Associates, November 22, 2000), submitted to DRC on November 22, 2000 (CD00-0747) provides technical justification for the change in the Mixed Waste embankment horizontal gradient limit.

61. **Part I.H.3 – Ground Water and Pore Water Quality Sampling** – Clarifies that surface water sampling results will not be reported. Also clarifies that total anions and cations will not be a reporting requirement (see Item 1 above). Adds that an electronic file format equivalent to a comma separated value (CSV) file may be submitted.

Justification: The GWQDP does not require surface water samples. With the changes proposed to the analytical program, total anions and cations will not be reported annually. However, they will be reported at GWQDP renewal per Part I.F.5.c.3. Allowing a CSV equivalent provides more flexibility for *EnergySolutions* to submit data files in a format that is easier for DRC to view and manipulate, e.g., Microsoft Excel files.

62. **Part I.H.6 – Annual “As-Built” Report** – *EnergySolutions* proposes to modify text in this section.

Justification: The deleted text is self-evident.

63. **Part I.H.7 – Waste Characterization Reporting** – *EnergySolutions* proposes to delete this section.

Justification: Duplicates requirements in the Waste Characterization Plan.

64. **Part I.H.8 – Collection Lysimeter Reporting** – As discussed in Item 4 above, *EnergySolutions* proposes to reduce the frequency of video inspection of collection lysimeters from annual to once per GWQDP renewal cycle.

Justification: See justification for Item 4 above. This modification is required for consistency with modification of Part 1.E.11.

65. **Part I.H.9 – Reporting of Mechanical Problems or Discharge System Failures** – *EnergySolutions* proposes to delete this section.  
Justification: Duplicates requirements in Appendix K, the BAT Contingency Plan.
66. **Part I.H.10 – Meteorological Reporting** – *EnergySolutions* proposes to modify this section.  
Justification: Submittal of a meteorological report at GWQDP renewal is redundant, because each annual report provides all meteorological data for the life of the facility.
67. **Part I.H.11 – Containerized Waste Storage Area Reporting** – *EnergySolutions* proposes to delete this section.  
Justification: Duplicates BAT requirements from Appendices J and K.
68. **Part I.H.12.b.1 – Evaporation Ponds BAT Failure Reporting** – *EnergySolutions* proposes to delete this section.  
Justification: Duplicates requirements from BAT Contingency Plan (Appendix K).
69. **Part I.H.12.c – Evaporation Ponds Annual Pump Inspection Reporting** – *EnergySolutions* proposes to delete this section.  
Justification: See justification for Part I.H.20.
70. **Part I.H.13 – Ground Water Usage Report** – *EnergySolutions* proposes to reduce the frequency groundwater usage reporting from annual to once per GWQDP renewal cycle.  
Justification: *EnergySolutions* has submitted an annual groundwater usage report since approximately 1998. These reports have indicated that groundwater usage is extremely limited and does not vary significantly over time. Given that the groundwater is Class IV, usage is extremely limited, usage does not change significantly with time, and groundwater travel times are very slow, annual reporting of groundwater usage is not necessary for protection of human health and the environment. One report per GWQDP renewal cycle is sufficient.
71. **Part I.H.16 – BAT Non-Compliance Reporting Requirements** – *EnergySolutions* proposes to delete this section.  
Justification: Duplicates requirements from BAT Contingency Plan (Appendix K).
72. **Part I.H.17 – Annual Cover Test Cell Report** – *EnergySolutions* proposes to modify this section.  
Justification: Modify text to match proposed change to RML submitted with the October 25, 2012 License renewal application.
73. **Part I.H.19 – Railcar Rollover Facility Reporting** – *EnergySolutions* proposes to delete this section.  
Justification: See justification for Part I.H.20.

**74. Part I.H.20 – BAT Semi-Annual Monitoring Report** – EnergySolutions proposes to eliminate the semi-annual BAT monitoring report.

Justification: The data and information included in the semi-annual BAT monitoring reports are reported, obtained, or available elsewhere. Specifically:

- Significant BAT failures are reported within 24 hours and written notification is required.
- Items such as container labeling issues, restoring free drainage, removal of water in accordance with priority requirements, and the scheduling of surface repairs are performed and documented on the inspection form. If the required schedule is not met, notification is provided.
- Fluid head levels and allowable leakage rate above the permit limits are reported within 24 hours of identification.
- Precipitation data are reported in the annual Meteorological Report.
- DRC representatives in most cases obtain storm water management information prior to semi-annual reporting, and DRC representatives perform inspections during or immediately after significant storm events.
- Inspection forms have been periodically requested by DRC representatives prior to submittal of semi-annual reports. These requests are always quickly satisfied.

**75. Part I.H.21 – Manifest Radionuclide Inventory Report** – EnergySolutions proposes to modify this section.

Justification: RML UT#2300249 is incorporated by reference therefore its conditions do not need to be duplicated here. The inventory report includes all manifested radionuclides; include individual radionuclides is redundant. Including half-lives and distribution coefficients is not necessary in the context of the inventory report. These parameters are included in technical submittals when they are used in the content (e.g., infiltration and transport modeling reports).

**76. Part I.H.22 – Comprehensive Ground Water Quality Evaluation Report** – The text was modified to clarify the scope of the water quality evaluation.

Justification: The evaluation is limited to compliance parameters in groundwater data from the current compliance monitoring wells. Also, it is not viable to evaluate the normality of reporting limits; normality testing should not be required for datasets with greater than 50% non-detections. The 2012 *Comprehensive Groundwater Quality Evaluation Report* determined that most parameters with detected, quantified results were normality distributed. This agrees with the premise of slow-moving groundwater in chemical equilibrium with aquifer solids, without the influence of recharge. However, for parameters with concentrations at or near the detection limit, the datasets are censored (below detection limits for non-radiologic parameters) or analytical error is relatively high (for radiological parameters). For these parameters, although they are probably normally distributed, due to analytical limitations, normality testing is not warranted. The U.S. EPA Statistical Analysis for Groundwater Monitoring Data at RCRA Facilities (Unified Guidance, EPA 530/R-09-007; March 2009) recommends that parametric statistical methods not be used for datasets consisting of greater than 50% non-detections.

**77. Part I.I.2 – Groundwater Mound Dewatering Near Wells GW-19A/GW-19B** – EnergySolutions proposes to delete this section.

Justification: EnergySolutions has met the requirements of this condition. On January 14, 2010, EnergySolutions submitted the plan and schedule for groundwater mound dewatering activities near wells GW-19A/GW-19B (CD10-0015). Groundwater extraction began in November 2009 and has continued to the present. As of November 8, 2012, approximately 350,000 gallons of groundwater had been extracted from the mound near GW-19A/GW-19B.

78. **Part II.A – Representative Sampling** – EnergySolutions proposes to modify this section by deletion of the last sentence.

Justification: The deleted text is self-evident. Also, there is no similar such requirement in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.

79. **Part II.B – Analytical Procedures** – EnergySolutions proposes to modify this section by deletion of the last sentence.

Justification: The deleted text is self-evident as it is included in UAC R317-6-6.12.A.

80. **Part II.G – Records Contents** – EnergySolutions proposes to delete this section.

Justification: The requirements of this section are redundant with requirements listed in Part I.H.3 and the Water Monitoring Quality Assurance Plan (Appendix B).

81. **Part II.G – Plugging and Abandonment Reports** – EnergySolutions proposes to modify this section.

Justification: Self-evident requirements were deleted.

82. **Part III.E – Proper Operation and Maintenance** – EnergySolutions proposes to modify this section.

Justification: The deleted text is redundant with the sentence immediately preceding it.

83. **Part IV.A – Prior Approval** – EnergySolutions proposes to delete this section.

Justification: The requirements are self-evident as they are included in the referenced UAC rules.

84. **Part IV.C – Modification of Approved Engineering Design, Specifications, or Construction** – EnergySolutions proposes to delete this section.

Justification: The requirements of this section are self-evident. Also, the requirements for modification of disposal cell engineering design or specifications are provided in Part I.D.10. There is no similar such condition in Ground Water Quality Discharge Permit No. UGW 370004 for the Energy Fuels Resources Inc. White Mesa Mill Facility.

85. **Appendix C, Part 2.1 – Monitoring for Free Liquids** – EnergySolutions proposes to modify this section.

Justification: Some of the stated requirements for the content of the Collection Lysimeter Free Liquids Monitoring form are repetitive.

86. **Appendix E – Procedure For Certification of 11e.(2) Material** – EnergySolutions proposes to delete this appendix.

Justification: The procedure for certification of 11e.(2) material is listed in 11e.(2) Byproduct Material License (UT 2300478) Renewal Application, Revision 5 (June 1, 2012). The procedure is not within the purview of the GWQDP.

87. **Appendix F, Part 2.2 – Post-Closure Monitoring Plan, Site Inspection** – EnergySolutions proposes to delete this section.

Justification: Post-closure site inspection requirements are specified in the Clive facility Radioactive Material License (UT 2300249) Renewal Application (October 25, 2012). The requirements are not within the purview of the GWQDP.

88. **Appendix F, Part 2.4 – Closure/Post-Closure Quality Assurance Procedures** – EnergySolutions proposes to delete this section.

Justification: Closure/post-closure site quality assurance procedures are specified in the Clive facility Radioactive Material License (UT 2300249) Renewal Application (October 25, 2012). The procedures are not within the purview of the GWQDP.

89. **Appendix F, Part 2.5 – Closure/Post-Closure Certification** – EnergySolutions proposes to delete this section.

Justification: Closure/post-closure certification requirements are specified in the Clive facility Radioactive Material License (UT 2300249) Renewal Application (October 25, 2012). The requirements are not within the purview of the GWQDP.

Permit No. UGW450005

**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 four separate operable units: a Low-Activity Radioactive Waste (LARW) cell, an 11e.(2) cell, a Mixed Waste cell, and a Class A West 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 xxxx xx, xxxx August 28, 2012

This permit and the authorization to operate shall expire at midnight, xxxx xx,xxxx-June 8, 2013.

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Director

Permit No. UGW450005

Division of Radiation Control

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## PART I. SPECIFIC PERMIT CONDITIONS

## 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~~December 2011, 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 Director.

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 Director.

## C. Ground Water Protection Levels

1. Ground Water Protection Levels, LARW cell, and Class A West cell

Based on the types of wastes to be ~~disposed 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 (GWPLs) 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, g~~Ground water quality in any compliance monitoring well at the LARW cell, and Class A West 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) cell~~, an evaluation of ~~indicator isotopes and their mobility, and the Ground Water Quality Standards~~ GWQS; ~~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, g~~Ground water quality in any compliance monitoring well at the 11e.(2) cell 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 indicator isotopes ~~and their mobility~~, and the ~~Ground Water Quality Standards (GWQS); ground water protection levels (GWPLs) are~~ 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, g~~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 Director.~~

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

Parameter	GWPL <sup>(1)</sup>	Parameter	GWPL <sup>(1)</sup>
<i>Field and Inorganic Parameters (mg/l)</i>		<i>Radiologic Parameters – Alpha Emitters <sup>(92)</sup> (pCi/l)</i>	
Cyanide	0.2		
Fluoride	4.0	Neptunium-237 <sup>(403)</sup>	7
Total Nitrate/Nitrite (as N)	10.0	Strontium-90	42
pH (units)	6.5 – 8.5	Thorium-230	83
<i>Dissolved Metals (mg/l)</i>		Thorium-232	92
Antimony	0.006	Uranium-233	26
Arsenic	NA <sup>(2)</sup>	Uranium-234	26
Barium	2.0	Uranium-235	27
Beryllium <sup>(3)</sup>	0.004	Uranium-236	27
Cadmium	0.005	Uranium-238	26
Chromium	0.1		
Copper	1.3	<i>Radiologic Parameters – Beta/Gamma Emitters <sup>(424)</sup> (pCi/l)</i>	
Lead	0.015	Carbon-14	3,200
Mercury	0.002	Iodine-129 <sup>(425)</sup>	21
Molybdenum	NA <sup>(2)</sup>	Technetium-99	3,790
Nickel <sup>(4)</sup>	0.10	Tritium	60,900
Selenium	0.05		
Silver	0.1	<i>Combined Radiologic Parameters (pCi/l)</i>	
Thallium	0.002		
Uranium—total <sup>(4)</sup>	0.03	Radium-226 + Radium-228 <sup>(436)</sup>	5
Zinc	5.0		
<i>Organic Parameters (mg/l)</i>			
Acetone <sup>(5)</sup>	0.7	1,2-Dichloroethane	0.005

Parameter	GWPL <sup>(1)</sup>	Parameter	GWPL <sup>(1)</sup>
2-Butanone <sup>(14)</sup>	4.0	Methylene Chloride <sup>(7)</sup>	0.005
Carbon Disulfide <sup>(5)</sup>	0.7	1,1,2-Trichloroethane <sup>(8)</sup>	0.005
Chloroform <sup>(6)</sup>	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.~~
- ~~9.2. 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).~~
- ~~10.3. Neptunium-237, as determined by Total Radioactive Neptunium, EPA Method 907.0.~~
- ~~11.4. 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).~~
- ~~12.5. Iodine-129, as determined by Total Radioactive Iodine, EPA Method 902.0.~~
- ~~13.6. 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).~~
- ~~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<sup>(1)</sup> – LARW, Class A West, and Evaporation Pond Wells**

Well ID	Parameter	GWPL <sup>(2)</sup>	Well ID	Parameter	GWPL <sup>(2)</sup>
<i>Inorganic/Metal Parameters (mg/l)</i>					
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			
<i>Radiologic Parameters (pCi/l)</i>					
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. **This table may be blank if no GWPL exceptions are set for LARW, Class A, and Pond wells.**
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 <sup>(1)</sup>	Parameter	GWPL <sup>(1)</sup>
<i>Field and Inorganic Parameters <sup>(2)</sup> (mg/l)</i>		<i>Organic Parameters—Specific to 11e.(2) (mg/l)</i>	
Cyanide	0.2	Acetone <sup>(5)</sup>	0.7
Fluoride	4.0	2-Butanone <sup>(11)</sup>	4.0
Total Nitrate/Nitrite (as N)	10.0	Carbon Disulfide <sup>(5)</sup>	0.7
pH (units)	6.5 – 8.5	Chloroform <sup>(6)</sup>	0.08
<i>Dissolved Metals <sup>(2)</sup> (mg/l)</i>		1,2-Dichloroethane	0.005
Antimony	0.006	Methylene Chloride <sup>(7)</sup>	0.005
Arsenic	NA <sup>(3)</sup>	Naphthalene <sup>(8)</sup>	0.02
Barium	2.0	Diethyl Phthalate <sup>(9)</sup>	5.0
Beryllium <sup>(4)</sup>	0.004	2-Methylnaphthalene <sup>(10)</sup>	0.004
Cadmium	0.005	Benzo(a)anthracene	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 <sup>(3)</sup>		
Nickel <sup>(4)</sup>	0.10		
Selenium	0.05		
Silver	0.1		
Thallium	0.002		
Uranium—total	0.03		
Zinc	5.0		
<i>Combined Radiologic Parameters (pCi/l)</i>			
Radium-226+radium-228	5		
<i>Radiologic Parameters (pCi/l)</i>			
Thorium-230	83		
Thorium-232	92		
Uranium-233	26		
Uranium-234	26		
Uranium-235	27		
Uranium-236	27		
Uranium-238	26		

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 Director may modify the Permit and set a GWQS for 2-methylnaphthalene.
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 <sup>(1)</sup> – 11e.(2) Wells**

Well ID	Parameter	GWPL <sup>(2)</sup>	Well ID	Parameter	GWPL <sup>(2)</sup>
<i>Inorganic/Metal Parameters (mg/l)</i>					
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. This table may be blank if no GWPL exceptions are set for 11e.(2) wells.
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
<i>Dissolved Metals (mg/l)</i>			
Uranium—total <sup>(4)</sup>	0.03		
<i>Radiologic Parameters (pCi/l)</i>			
<i>Alpha Emitters <sup>(21)</sup></i>		<i>Beta/Gamma Emitters <sup>(43)</sup></i>	
		Carbon-14	3,200
Neptunium-237 <sup>(32)</sup>	7	Iodine-129 <sup>(54)</sup>	21
Strontium-90	42	Technetium-99	3,790
Thorium-230	83	Tritium	60,900
Thorium-232	92		
Uranium-233	26		
Uranium-234	26	<i>Combined Radiologic Parameters (pCi/l)</i>	
Uranium-235	27	Radium-226 + Radium-228 <sup>(62)</sup>	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).~~
- 2.1. 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).
- 3.2. Neptunium-237, as determined by Total Radioactive Neptunium, EPA Method 907.0.
- 4.3. 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).
- 5.4. Iodine-129, as determined by Total Radioactive Iodine, EPA Method 902.0.
- 6.5. 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 <sup>(1)</sup> – Mixed Waste Wells**

Well ID	Parameter	GWPL <sup>(2)</sup>	Well ID	Parameter	GWPL <sup>(2)</sup>

- 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. This table may be blank if no GWPL exceptions are set for Mixed Waste wells.
- 2. The number of significant figures used for all GWPLs determined by laboratory results previously reported by the Permittee.

**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, and Class A West	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], and 2000 [Class A West Cell]

If after review of any environmental monitoring data collected at the facility, the Director 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

Final cover construction over the entire LARW cell was completed in October 2005. The engineering plans in Table 2A, below, are provided for reference to the cell design.

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) Manual (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 Manual (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

~~finer 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.~~
- ~~e) 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
<del>03046-VO1, Rev. 0</del>	<del>May 16, 2003</del>	<del>LARW Disposal Cell – Radon Barrier Design Sections and Details</del>

**Table 2A: Approved LARW Cell Engineering Design Drawings**

Drawing	Last Revision Date	Subject
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
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 Manual

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

Drawing	Last Revision Date	Subject
9420-4, Rev. <u>GF</u>	<del>March 4, 2002</del> <u>March 25, 2003</u>	11e.(2) Disposal Cell, Layout
9420-5, Rev. D	February 21, 2002	11e.(2) Disposal Cell, Cross Sections
9420-6, Rev. <u>ED</u>	<del>December 21, 2002</del> <u>March 25, 2003</u>	11e.(2) Disposal Cell, Ditch Cross Sections

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

- a) Cover System – shall include the following materials, as described from the top down:
  - 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:
  - 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.
  - 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.
  - 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.
  - 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 West Cell Engineering Design and Specifications

The best available technology design standard shall be defined by, and construction of the Class A West facility 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) Manual (Radioactive Materials License, Condition 44):~~

For the Class A West 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 Manual (Radioactive Materials License, Condition 44),~~ from the top down:
  - 1) ~~An 24-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. A minimum 6-inch thick surface layer consisting of clay plus at least 15% gravel by volume,~~ as specified on the approved engineering drawing number 100147-C04,

- 2) ~~A 6-inch thick upper (Type A) filter zone consisting of sandy gravel material, minimum 12-inch thick evaporative zone layer consisting of unit 4 clay~~
- 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, minimum 18-inch frost protection layer~~
- 4) ~~A 6-inch lower (Type B) filter zone on the top slope and 18-inch on the side slope, consisting of sandy gravel material with a minimum permeability of 3.5 cm/sec,~~
- 54) 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 approximately~~ 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 ~~745.3~~ 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 ~~and, measured perpendicular to the slope,~~ constructed in accordance with the approved LLRW and 11e.(2) CQA/QC Manual (~~Radioactive Materials License, Condition 44~~), and have a field hydraulic conductivity of 1.0E-6 cm/sec or less.

**Table 2C: Approved Class A West Cell Engineering Design Drawings**

Drawing	Last Revision	Subject
<b>Class A West Disposal Embankment</b>		
10014-C01Rev. 2	1/ <del>53</del> /12	Class A West Embankment – Embankment Features and Controls

**Table 2C: Approved Class A West Cell Engineering Design Drawings**

10014-C02, Rev. <u>32</u>	<u>10/23/12+3/12</u>	Class A West Embankment – Cross Sections
10014-C03, Rev. <u>43</u>	<u>10/23/12+5/12</u>	Class A West Embankment – Sections and Details 1 of 2
10014-C04, Rev. <u>43</u>	<u>10/23/12+1/3/11</u>	Class A West Embankment – Sections and Details 2 of 2
<del>10014-C05 Rev.4</del>	<del>5/2/12</del>	<del>Class A West Embankment – Active CWF and LC Areas</del>
<del>10014-C06 Rev.1</del>	<del>5/2/12</del>	<del>Class A West Embankment Large Component Area Plan &amp; Details</del>
<del>10014-C07 Rev.0</del>	<del>4/28/11</del>	<del>Class A West Embankment – CWF Area Plan &amp; Details</del>
<u>10014-C08 Rev 1</u>	<u>1/5/12</u>	<u>Class A West Embankment-Class A, Class A North &amp; Class A West Map</u>
10014-C09, Rev 1	11/4/11	Class A West Embankment – CWF Cross Sections
10014-U01 Rev. 2	1/5/12	Class A West Embankment – Embankment Location Map and Buffer Zone
10014-U02, Rev. 2	1/5/12	Class A West Embankment – Environmental Monitoring

5. Disposal Cell Location Restrictions

The LARW, 11e.(2), and Class A West 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), and Class A West 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' 54.846" N	113° 06' 55.564" 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 West	NW Corner	40° 41' 39.609" N	113° 07' 24.754
	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' 39.569" N	113° 06' 55.463" W

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 Class A ~~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) is defined under the Utah Radiation Control Rules, UAC R313-15-~~10091008~~, 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.~~

~~8.7. 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.

~~9.8. 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.

~~10.9. Collection Lysimeters for Future Construction at the Class A West Cell~~

Future construction of the clay bottom liner of the Class A West Cell 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 Director 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. Any change to the approved design or construction specifications in Appendix C requires prior Director approval. The Permittee shall notify the Director of construction of additional lysimeters in the Class A West Cell, at least one week prior to construction.~~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 Director approval.~~
- ~~b) Future Collection Lysimeter Construction Notification—the Permittee shall submit a notice of construction of additional lysimeters in the Class A West Cell. Said notice shall be submitted at least one week prior to construction in order to allow the Director to inspect lysimeter construction.~~

~~e) 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 Director approval.~~

~~11.10. 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 Director approval of infiltration and contaminant transport analysis of the proposed change. Said changes must be submitted to the Director 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 Director, at least 180 days prior to the effective date desired by the Permittee.~~

~~12.11. 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 4 Railcar Decontamination Pad	<del>T-100, Rev. 3</del>	<del>Aug. 14, 1999</del>	<del>Foundation</del>
	<del>T-101, Rev. 3</del>	<del>Aug. 16, 1999</del>	<del>Foundation Details</del>
	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 West Containerized Waste Facility and Large Component Area Evaporation Basin	10014-C05, Rev. 4	May 2, 2012	Class A West Embankment – Active CWF & LC Areas: Area and Haul Road Layout
	10014-C06, Rev. 1	May 2, 2012	Class A West Embankment Large Component Area Plan & Details
	10014-C07, Rev. 0	April 28, 2011	Class A West Embankment CWF Area Plan & Details

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

Related Facility	Drawing No.	Last Revision	Subject / Title
1995 Evaporation Pond	<del>9718-1, Rev. C</del>	<del>March 13, 2007</del>	<del>Facility Layout</del>
	9504-3, Rev. E	Oct. 28, 1999	Storage Pond
	9504-3A, Rev. A	Oct. 28, 1999	Leak Detection System Details, As-Built
	<del>9504-4, Rev. E</del>	<del>Oct. 28, 1999</del>	<del>Facility Details</del>
	<del>9718-4, Rev. A</del>	<del>Aug. 17, 1998</del>	<del>Piping Diagrams and Pump Station</del>
	08007-C01, Rev. <del>12</del>	<del>Oct. 19, 2011</del> <del>June 26, 2008</del>	1995 Evaporation Pond HDPE Repairs, New 60 mil HDPE Liner
1997 Evaporation Pond	<del>9718-1, Rev. C</del>	<del>March 13, 2007</del>	<del>Facility Layout</del>
	9718-2, Rev. D	Feb. 25, 1999	Evaporation and Storage Pond
	9718-2a, Rev. B	Feb. 25, 1999	Leak Detection System Details, As-Built
	<del>9718-3, Rev. --</del>	<del>Sept. 17, 1997</del>	<del>Details</del>
	9718-4, Rev. A	Aug. 17, 1998	Piping Diagrams and Pump Station
2000 Evaporation Pond	<del>0009-00, Rev. A</del>	<del>July 10, 2000</del>	<del>Site Plan and Facility Layout</del>
	0009-01, Rev. E	Feb. 22, 2008	Plan View
	0009-02, Rev. A	Jan. 29, 2001	Cross Sections
	<del>0009-03, Rev. B</del>	<del>Jan. 29, 2001</del>	<del>Details</del>
	0009-04, Rev. A	Jan. 29, 2001	Sump/Side Slope Cross-Section
	0009-05, Rev. A	Jan. 29, 2001	Leak Detection Details
	<del>0009-06, Rev. A</del>	<del>Feb. 22, 2008</del>	<del>Water Transfer Piping Details</del>
Mixed Waste Evaporation Pond	<del>9802-1, Rev. D</del>	<del>Dec. 22, 1999</del>	<del>Facility Layout</del>
	9802-2, Rev. F	Dec. 22, 1999	Water Storage Facility
	<del>9802-3, Rev. D</del>	<del>Dec. 22, 1999</del>	<del>Facility Details As-Built</del>
	<del>9802-4, Rev. B</del>	<del>Dec. 4, 1998</del>	<del>Water Storage Facility</del>
	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	<del>9621-1, Rev. C</del>	<del>July 20, 1998</del>	<del>Site Plan As-Built Drawing</del>
	9621-2, Rev. B	July 20, 1998	Foundation Plan As-Built Drawing
	<del>9621-3, Rev. B</del>	<del>July 20, 1998</del>	<del>Elevation Views As-Built Drawing</del>
	<del>9621-4, Rev. B</del>	<del>July 20, 1998</del>	<del>Elevation Views As-Built Drawing</del>
	<del>9621-5, Rev. B</del>	<del>July 20, 1998</del>	<del>Wall Detail As-Built Drawing</del>
Intermodal Unloading Facility	9705-1, Rev. A	July 31, 1998	Plan View
	9705-2, Rev. <del>BA</del>	<del>Nov. 20, 1998</del> <del>July 31, 1998</del>	Cross Section Drawings
	<del>9813-01, Rev. B</del>	<del>March 13, 2007</del>	<del>Layout</del>
	9813-02, Rev. A	July 31, 1998	Layout (and Details)
	<del>0701-G03, Rev. 1</del>	<del>June 8, 2007</del>	<del>Site Layout and Facility Legend</del>
	Railcar Rollover Facility	<del>0221-01</del>	<del>March 26, 2002</del>
<del>0221-02</del>		<del>March 26, 2002</del>	<del>Fabric Cover Frame Layout</del>
<del>0221-03</del>		<del>March 26, 2002</del>	<del>Rollover Cover South Elevation</del>
0221-04, Rev. <del>BA</del>		<del>April 24 Aug. 9, 2002</del>	Cover Run-off Collection and Drainage
07013-C0, Rev. <del>10</del>		March 31, 2008	Drainage repair plan
Rail Digging Facility	0107-01, Rev. B	April 25, 2002	Site Layout
	<del>0107-02, Rev. B</del>	<del>April 19, 2002</del>	<del>Digging Track Plan</del>
	<del>0107-03, Rev. B</del>	<del>April 12, 2002</del>	<del>Track and Pad Details</del>
	<del>0107-04A, Rev. A</del>	<del>April 25, 2002</del>	<del>Excavator Ramp</del>
Container Storage Pad	9514-1, Rev. C	March 13, 2007	Plan, Sections and Details

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

Related Facility	Drawing No.	Last Revision	Subject / Title
East Truck Unloading Facility	<del>05023-C104, Rev. 9</del>	<del>April 26, 2007</del>	<del>New Site Layout</del>
	05023-C301, Rev. 4	Sept. 22, 2005	Cross Sections
	05023-C401, Rev. 5	Dec. 12, 2005	Truck Unloading Area Plan View
	<del>05023-C402, Rev. 5</del>	<del>Dec. 12, 2005</del>	<del>Truck Unloading Dock Plan View</del>
	<del>05023-C403, Rev. 7</del>	<del>April 26, 2007</del>	<del>Enlarged Dock Plan View</del>
	<del>05023-C501, Rev. 5</del>	<del>Dec. 12, 2005</del>	<del>Truck Unloading Area Details</del>
	<del>05023-C502, Rev. 4</del>	<del>Dec. 12, 2005</del>	<del>Truck Dock Details</del>
	<del>05023-C503, Rev. 4</del>	<del>Dec. 12, 2005</del>	<del>Truck Dock Details</del>
	<del>05023-S1, Rev. 1</del>	<del>Sept. 22, 2005</del>	<del>Concrete Container Holding Pad Safety Protection</del>
Shredder Facility	<del>05056-F13, Rev. _</del>	<del>09/30/06</del>	<del>Shredder Facility; Outfeed Pad Plan and Pad Details (As-Constructed)</del>
	<del>05056-F13A, Rev. _</del>	<del>09/30/06</del>	<del>Shredder Facility; Shredder Pad Plan (As-Constructed)</del>
	<del>05056-F13B, Rev. _</del>	<del>09/30/06</del>	<del>Shredder Facility; Shredder Pad Details (As-Constructed)</del>
	<del>05056-L1, Rev. 6</del>	<del>09/06</del>	<del>Shredder Facility; Site Layout Plan (As-Built)</del>
	05056-L2, Rev. 2	<del>08/06</del> <del>Oct. 25, 2006</del>	Shredder Facility; Containment Pad Water Management Layout Plan
	05056-C1, Rev. 10	<del>09/06</del> <del>Oct. 5, 2006</del>	Shredding Facility; Operating Pad Layout (As-Built)
	05056-C6, Rev. 4	<del>09/06</del> <del>Oct. 5, 2006</del>	Shredding Facility; Operating Pad – Sections and Details (As-Built)
	<del>05056-C7, Rev. 7</del>	<del>9/17/07</del>	<del>Shredding Facility; Catch Basin and Manhole Layouts (As-Built)</del>
	05056-C8, Rev. 2	9/17/07	Shredding Facility; Drainage System Details
	<del>05056-F1 thru F14</del>	<del>Various</del>	<del>Details</del>
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. 3	November 10, 2011	Wash Building; Plan Sheet
	<del>05006-C5, Rev. 3</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Building; Section A-A</del>
	<del>05006-C6, Rev. 2</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Building; Section B-B</del>
	05006-C12, Rev. 1	Oct 6, 2006	Heater Building; Drainage Details and Sections
	<del>05006-C7, Rev. 1</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Building; Section C-C</del>
	<del>05006-C8, Rev. 1</del>	<del>Oct 6, 2006</del>	<del>Rail Car Wash Building; Section D-D</del>
	05006-C9, Rev. 1	Oct 6, 2006	Wash Building, Drainage Plan Sheet
	<del>05006-F1, Rev. 2</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Facility; Heater, Rotary and Wash Buildings foundation Plan and Details</del>
	<del>05006-F2, Rev. 3</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Facility; Heater Building Foundation Plan and Details</del>
	<del>05006-F10, Rev. 4</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details</del>
	<del>05006-F13, Rev. 1</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details</del>
	<del>05006-F25, Rev. 3</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details</del>
	<del>05006-F26, Rev. 3</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details</del>

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

Related Facility	Drawing No.	Last Revision	Subject / Title
	<del>05006-F27, Rev. 3</del>	<del>Oct 6, 2006</del>	<del>Rotary Dump Facility; Rotary Dumper Building Foundation Plan and Details</del>
	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
	<del>05006-F5, Rev.</del>	<del>November 10, 2011</del>	<del>Wash Building Foundation Plan and Details</del>
	05006-F9C, Rev. 3	6/11/08	Wash Building Foundation Details
Intermodal Container Wash Building	<del>05008-G1, Rev. 4</del>	<del>May 19, 2006</del>	<del>Intermodal Container Wash Building; Map Layout and Index</del>
	<del>05008-C100, Rev. 2</del>	<del>May 19, 2006</del>	<del>Intermodal Container Wash Building; Facility Location Map</del>
	05008-C101, Rev. 4	September 26, 2006	Intermodal Container Wash Building; Plan Sheet
	<del>05008-C102, Rev. 2</del>	<del>May 19, 2006</del>	<del>Intermodal Container Wash Building; Section A-A</del>
	<del>05008-C103, Rev. 3</del>	<del>May 19, 2006</del>	<del>Intermodal Container Wash Building; Section B-B</del>
	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	<del>05015-G001, Rev. 1</del>	<del>February 23, 2006</del>	<del>Access Control Building; Map Layout and Index</del>
	<del>05015-C100, Rev. 1</del>	<del>February 23, 2006</del>	<del>Access Control Building; Facilities Location Map</del>
	<del>05015-C101, Rev. 2</del>	<del>February 23, 2006</del>	<del>Access Control Building; Floor Plan</del>
	<del>05015-C102, Rev. 2</del>	<del>February 23, 2006</del>	<del>Access Control Building; Elevations</del>
	<del>05015-C103, Rev. 3</del>	<del>February 23, 2006</del>	<del>Access Control Building; Typical Sections</del>
	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
	<del>05015-P101, Rev. 1</del>	<del>February 23, 2006</del>	<del>Access Control Building, Plumbing Details</del>
East Side Drainage and Gray Water	<del>06007-G1, Rev. 5</del>	<del>2/26/07</del>	<del>East Side Drainage, Map Layout and Index</del>
	06007-G2, Rev. 4	2/26/07	East Side Drainage, Notes and Specifications
	06007-C1, Rev. <del>5</del> 6	<del>2/26/07</del> 2/23/12	East Side Drainage, General Site Plan

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

Related Facility	Drawing No.	Last Revision	Subject / Title
System Modifications			
	06007-C2, Rev. <u>56</u>	<u>2/26/07/23/12</u>	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
	<del>06007-P1, Rev. 4</del>	<del>2/26/07</del>	<del>East Side Drainage, Pipelines #4 and #5 Alignments and Profiles</del>
	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. <u>34</u>	<u>2/26/07/23/12</u>	East Side Drainage, Storm Water and Waste Flow Diagram

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

Related Facility	Drawing No.	Last Revision	Subject / Title
	<del>06007-P2, Rev. 4</del>	<del>2/22/08</del>	<del>Pipeline 4A and 5A Extension into the 1997 Pond</del>
Northwest Corner Evaporation Pond	06021-C1, Rev 5	October 19, 2011	Northwest Corner Pond; General Site Plan and Profile
	06021-C2, Rev. 8	October 19, 2011	Northwest Corner Pond; Pond Plan View
	06021-C3, Rev.5	08/29/07	Northwest Corner Pond; Sections and Details
	<del>06021-C4, Rev. 3</del>	<del>08/29/07</del>	<del>Northwest Corner Pond; Sections and Details</del>
	<del>06021-C5, Rev. 3</del>	<del>08/29/07</del>	<del>Northwest Corner Pond; Sump Plan, Sections, and Details</del>
	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	<del>9420-7D, Rev. 1</del>	10/15/09
DU Storage Building	<del>088800, sheet 1 of 10</del>	<del>8/19/10</del>	<del>Anchor Bolt Plan &amp; Details</del>
	<del>088800, sheet 2 of 10</del>	<del>8/19/10</del>	<del>Anchor Bolt Reactions</del>
	<del>088800, sheet 3 of 10</del>	<del>8/19/10</del>	<del>Rigid Frame Elevation</del>
	<del>088800, sheet 4 of 10</del>	<del>8/23/10</del>	<del>Roof Framing</del>
	<del>088800, sheet 5 of 10</del>	<del>8/23/10</del>	<del>Sidewall Framing</del>
	<del>088800, sheet 6 of 10</del>	<del>8/23/10</del>	<del>Sidewall Framing</del>
	<del>088800, sheet 7 of 10</del>	<del>8/19/10</del>	<del>Endwall Framing</del>
	<del>088800, sheet 8 of 10</del>	<del>8/19/10</del>	<del>Endwall Framing</del>
	<del>088800, sheet 9 of 10</del>	<del>8/19/10</del>	<del>Detail drawings</del>
	<del>088800, sheet 10 of 10</del>	<del>8/19/10</del>	<del>Detail drawings</del>
	<del>10008 L01</del>	<del>8/12/10</del>	<del>Building Location Map</del>
	<del>10008 L02</del>	<del>8/12/10</del>	<del>Building Plan &amp; Elevations</del>
	<del>J10197 E1</del>	<del>8/24/10</del>	<del>Electrical Plans and Schedules</del>
	<del>J10197 E2</del>	<del>8/24/10</del>	<del>Electrical installation Details, Wiring Diagrams and One-Line</del>
	<del>J10197 E3</del>	<del>8/24/10</del>	<del>Electrical Specifications</del>
	<del>J10197 M1</del>	<del>8/24/10</del>	<del>Mechanical Plans and Schedules</del>
	<del>J10197 M3</del>	<del>8/24/10</del>	<del>Specifications</del>
	<del>10008 C01, rev. 1</del>	<del>9/2/10 11/1/10</del>	<del>Site Ground Plan</del>
	<del>10335 S1</del>	<del>9/2/10</del>	<del>Foundation Plan and Footing Schedule</del>
	<del>10335 S2</del>	<del>9/2/10</del>	<del>Details</del>
<del>10335 S3</del>	<del>9/2/10</del>	<del>Notes</del>	
<u>LLRW Operations Building</u>	<u>07015-P101 (redlined)</u>	<u>Feb. 7, 2008</u>	<u>Plumbing Plan</u>
	<u>07015-V1, Rev. 2</u>	<u>March 1, 2010</u>	<u>Holding Tank Sections and Details</u>

13-12. 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

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.

## E. BAT Performance and Best Management Practice Standards

1. Waste Restrictions

- a) ~~Allowed Class A Low Level Radioactive Waste Volume – The volume of Class A Low level Radioactive Waste disposed in the Class A West and Mixed Waste embankments as described in drawing 10014 C01, rev 2 for the Class A West embankment, and in drawing 11009 W02, rev 0 for the Mixed Waste embankment shall not exceed a total of 10.08 million cubic yards.~~
- b)a) 11e.(2) Waste – any change ~~effecting~~ affecting 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 Director, after submittal of satisfactory technical justification to demonstrate that the requirements of Part I.D.1 of this Permit will be met.
- e)b) Solid Waste Landfill Equivalency – PCB/Radioactive Waste shall only be disposed of as designated in the State-issued Part B Permit.
- d)c) Mixed Waste, and Class A West Cells – waste to be disposed of in the Mixed Waste, and Class A West 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~~1009, or are defined as Naturally Occurring and Accelerator Produced Radioactive Materials under the Utah Radiation Control Rules, UAC R313-

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 West<sub>5</sub> and 11e.(2) Disposal Cells. LLRW<sub>5</sub> or 11e.(2) waste that exceeds the regulatory concentration 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 Director. Waste samples shall be collected in accordance with the currently approved Waste Characterization Plan (Radioactive Materials License, Condition 58); the 11e.(2) Byproduct Material License (UT 2300478) Renewal Application, Revision 5~~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 ( <u>methyl ethyl ketone</u> )	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

- b) Liquid Waste – acceptance of liquids and liquid content of all wastes shall be in accordance with the Radioactive Materials License.
- c) Chelating Agents – the disposal of any waste containing chelating agents greater than 0.1% by weight shall be limited to the Mixed Waste Cell and is prohibited in the Class A West<sub>5</sub> 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 Director 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, and 11e.(2), 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 Director,~~ installed in the Cover Test Cell.

~~The Permittee shall maintain and replace all soil moisture instrumentation as directed by the Director.~~

~~The Director 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 Director.~~

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 West, or 11e.(2) Cells at any concentrations.~~

6.5. Open Cell Time Limitation

For each open portion of ~~the any Class A West~~ disposal cell, final cover construction shall be completed in accordance with the approved engineering plans and specifications (Part ~~1.D.2 and 4I.D.4~~) ~~and the approved Construction Quality Assurance / Quality Control Manual requirements under the Radioactive Materials License on or before the end of no later than~~ 18 years after the date of initial placement of the first lift of ~~any LLRW~~ waste in that portion of the open cell. ~~This requirement will not apply to noncontaminated disposal areas, i.e., the large component area and containerized waste facilities (CWF). In these areas, the limitation would only apply when bulk LLRW is first placed on the lift area.~~ Final cover construction shall include but is not limited to completion of the following:

a. ~~Riprap Layer~~

b. ~~Type A Filter Layer~~

e. ~~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.~~

~~With prior Director approval of area-specific plans and schedule, this time limitation may be extended by use of low permeability clay, HDPE, or other engineering methods to discourage moisture infiltration to emplaced waste. 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 Director approval. Said modeling report or other studies must be submitted in their entirety to the Director 180 days prior to the expiration date of the respective 18-year open-cell time limit. Failure to secure Director 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.~~

7.6. General Stormwater Management Requirements

The Permittee shall contain all stormwater runoff at the Class A West, 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 West, 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 priority schedule listed in Appendix J, BAT Performance Monitoring Plan.
- b) 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. All contact stormwater accumulated and pumped shall be disposed of in the evaporation ponds ~~only as explicitly approved by the Director~~. However, contact stormwater from the Class A West, and 11e.(2) disposal cells may be used for minimal engineering and dust control purposes on the waste in the Class A West disposal cell and for dust suppression activities at the Shredder or Rotary Dump Facility.
- c) Class A West Containerized Waste Facility and Large Component Evaporation Basin – precipitation that falls on the Class A West 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 West Embankment~~ and the requirements of the currently approved

LLRW and 11e.(2) CQA/QC Manual (Work Element – General Requirements, specification "Runoff Control During Project" and Work Element – "Clay Liner Placement").

- 2) Fluid head in the evaporation basin shall not exceed a 1-foot level above the lowest point of the evaporation basin protective cover. ~~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 Manual (Work Element - Clay Liner Placement, specification "Liner Drying Prevention"). This requirement is met by completing an annual survey of the evaporation basin's surface to ensure that at least six inches of compacted clay is present above the top of the clay liner. This survey is to be completed no later than May 1 of each year.

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 Cell having completed and approved clay liner.

10. LLRW and 11e.(2) 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 of this Permit.~~
  - ~~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) 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:
- 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) ~~All containers in storage shall be inspected. 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 ~~JK~~ 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-piping~~ to ensure containment and conveyance of stormwaters to the approved evaporation ponds.

~~e) Prohibition and Restrictions for Dry Active Waste (DAW) Storage—DAW is defined as contaminated materials without soil-like texture or characteristics that has 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 DAW is prohibited at the facility. All temporary storage of DWA shall be conducted either inside buildings or in watertight containers at the Containerized Waste Storage Pad or other approved storage areas. DAW 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.~~

~~e)c) 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)d) Containerized Waste Management of Waste in Containers – 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 West Waste Facility):~~

- o Containerized Waste Storage Pad
- o Intermodal Unloading Facility
- o Railcar Rollover Facility
- o East Truck Unloading Facility storage pads
- o Decontamination Facilities (Box Wash, ~~Rail Car Wash~~ Track #2 and #4 Rail Wash Facility, Intermodal Container Wash Building)
- o Class A West Disposal Cell
- o Shredder Facility
- o Rotary Dump Facility

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

- o Intermodal Unloading Facility
- o Railcar Rollover Facility

- ~~o East Truck Unloading Facility (raised dock area excluded)~~
- o Decontamination Facilities (Box Wash, Track #4 Rail Wash Facility, Intermodal Container Wash Building Rail Car Wash Track #2 and #4)
- o Class A West Disposal Cell
- o Rail Digging Facility (bulk waste transfer only, waste storage prohibited)
- o Shredder Facility ~~in accordance with the State-issued Part B Permit and the TSCA Coordinated Approval~~
- o Rotary Dump Facility

11. LARW<sub>7</sub> and Class A West 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~~ The Permittee shall perform a video log inspection of each collection lysimeter constructed at the LARW<sub>7</sub> and Class A West Cells once per Permit renewal cycle. 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 Director 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 West, 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 in excess of the performance standards listed in Parts I.E.25 and I.E.26 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 Director review and approval prior to installation. As-Built reports shall be submitted for Director 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 Director, 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 ponds~~ 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 in accordance with the current approved Appendix J of this Permit approved by the Director. 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~~ in accordance with the current approved Appendix J of this Permit. 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 in accordance with the current approved Appendix J of this Permit approved by the Director. 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 in accordance with the current approved Appendix J of this Permit. ~~This vertical distance shall be determined by use of a gauging station approved by the Director. 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.
- ~~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).~~
- e)b) Rail Car Wash Decontamination Facilities – the Permittee shall operate and maintain decontamination facilities the Rail Car Wash Facility on Track No. 4 in accordance with the currently approved BAT Performance Monitoring Plan and BAT Contingency Plan in Appendices J and K, respectively of this Permit.

- d) Clive facility - All contact water (stormwater or operational) shall not leave the restricted area within Section 32.

~~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 Director approval shall constitute a violation of this Permit.~~

16. Mixed Waste Facility 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 Facility 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 of the asphalt ramps and concrete bay to prevent discharge to the subsurface. ~~Daily~~ inspections shall be performed in accordance with the current approved Appendix J of this Permit ~~documented to ensure compliance with the stormwater management requirements in Part I.E.7 of this Permit.~~

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 Director at least one week prior to the annual inspection to allow the Director 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 Director 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 ~~evaporation the ponds~~ in the Class A West ~~or Mixed Waste~~ 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 ~~evaporation the ponds~~, including underlying contaminated soil, must be disposed of in the Class A West or Mixed Waste 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.~~

e)b) 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 Director the opportunity to have a DRC representative present.

~~d) — To ensure free draining conditions exist 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.~~

e)b) 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 Director 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:

~~In~~ 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.~~~~
- ~~e) — 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:

~~In~~ 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.~~

- ~~e) — 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:

~~In~~ 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.~~
- ~~e) — 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 the 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 of this Permit.

27. DU Storage Building Performance Standard

The Permittee shall operate and maintain the DU Storage Building:

~~In~~ 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.~~

## 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 West, 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 GW-37, GW-38R, and piezometer PZ-1 shall be monitored only for ——ground water elevations
  - 3) Class A West Cell – existing wells GW-88, GW-89, GW-90, GW-91, GW-92, GW-93, GW-25, GW-94, GW-26, GW-95, GW-27, GW-99, GW-100, GW-101, GW-102, GW-106, GW-107, GW-108, GW-142, GW-143, GW-144, GW-145, GW-146, GW-147, GW-148, GW-149, and GW-150.
- b) Mixed Waste Cell Compliance Monitoring Wells (radiologic contaminants only) – the following wells shall be sampled and analyzed for purposes of compliance monitoring: ~~GW-133, GW-134, GW-135, GW-136, I-1-30, GW-151, GW-152, GW-153,~~ and GW-154, ~~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, ~~GW-19B~~, GW-27D, GW-148D, and GW-153D.

- 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 Director.
- 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 West	NW Corner	40° 41' 40.599" N	113° 07' 26.054" W
	SW Corner	40° 41' 13.245" N	113° 07' 25.996" W
	SE Corner	40° 41' 13.201" N	113° 06' 54.167" W
	NE Corner	40° 41' 40.556" N	113° 06' 54.165" W
11e.(2)	NW Corner	40° 41' 13.587" N	113° 07' 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 Director.

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 wells will be sampled, to the Director. ~~This allows 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 ~~are defined in the BAT Performance Monitoring Plan, Appendix J of this Permit.~~ ~~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, and Class A West Cell Collection Lysimeters—all collection lysimeters constructed at the LARW, and Class A West 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 Director, 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 Director.

- 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 a qualified independent Professional Engineer registered in the State of Utah.~~

### ~~3. Future Modification of Compliance Monitoring Systems or Equipment~~

~~If at any time the Director 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 Director 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 Director as per the requirements of Part I.H.

- a) Water Level Measurements – water level measurements shall be made ~~monthly~~ quarterly 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~~ permit renewal parameters listed in Part I.F.5.c.3, 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 Director 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 – 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  
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 Permit Renewal Parameters – arsenic and molybdenum groundwater samples will be collected for chemical analysis at the time of prior to Permit renewal and reported with the application for Permit Renewal. The analyses shall consist of the following:

- General Inorganic Parameters (All wells except Mixed Waste wells): chloride, sulfate, bromide, carbonate, bicarbonate, total nitrate/nitrite (as N), sodium, potassium, magnesium, calcium, iron, total dissolved solids, total anions and cations
- Trace Inorganic Parameters (All wells except Mixed Waste wells): fluoride and cyanide
- Trace Dissolved Metals (All wells except Mixed Waste wells): antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, zinc
- Organic Parameters (All LARW, Class A West, and Evaporative Pond wells): acetone, 1,2-dichloroethane, 2-butanone, methylene chloride, carbon disulfide, chloroform, 1,1,2-trichloroethane, vinyl chloride
- Organic Parameters (All 11e.(2) wells): acetone, 1,2-dichloroethane, 2-butanone, methylene chloride, carbon disulfide, chloroform, naphthalene, diethyl phthalate, 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chlordane, chrysene

6. Collection Lysimeter Sampling

Collection lysimeter sampling shall be conducted in compliance with the ~~currently approved~~ Water Monitoring Quality Assurance Plan ~~approved by the Director, 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 Director 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 Director. 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.~~

~~10.9. 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.~~

~~11.10.~~ 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.~~

~~13.12.~~ Evaporation Ponds Monitoring

- a) ~~1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation Pond Daily Monitoring – the Permittee shall perform monitoring in accordance with the BAT Performance Monitoring Plan, Appendix J of this Permit. 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 I.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, GW-153D, GW-19B, GW-148D, 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 facility 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.~~

~~20.18. 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 West cell:~~

- ~~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 Director 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 Director 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 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~~

- ~~e) — 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~~
- ~~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 H.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~~
- ~~e) — 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 H.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.

~~e) Other Methods to Determine Ground Water Quality Compliance Status— at the discretion of the Director, 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 Director of the probable out-of-compliance (POOC) status within 30 days of the initial ~~detection~~determination.
- b) Immediately implement a schedule of quarterly ground water sampling and analysis for the well(s)/parameter(s) of concern, consistent with the requirements of 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 Director.

~~e) Quality Assurance Plan, Appendix B of this Permit. This quarterly sampling will continue until the compliance status can be determined by the Director.~~

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 Director of the out-of-compliance status within 24 hours, and provide written notice within 5 days of the ~~detection determination~~ 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 Director. ~~At the discretion of the Director, 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 Director required in Part I.G.3(a) of this Permit, the Permittee shall submit for Director 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 Director, 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 Director 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 BAT failure occurs at any facility, the Permittee shall implement the most current BAT Contingency Plan approved by the Director 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. 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 Director, for Director 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~~ The Permittee shall submit the following reporting information.

0.1. Ground-Water Monitoring

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

a) Routine Annual Monitoring

<u>Time Period</u>	<u>Report Due By</u>
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 Director:~~

<u>Time Period</u>	<u>Report Due By</u>
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 compliance 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 / ~~intermediate~~ aquifer nested well group, including but not limited to: I-1-30 / I-1-100, GW-153 / GW153D, GW-19A / GW-19B, GW-27/GW-27D, and GW-148/GW-148D. Said summaries shall include measured water level depth, ~~and~~ 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 ~~shallow-aquifer compliance monitoring~~ 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 West, 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 Director. 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 2<sup>nd</sup> 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.~~

<u>Disposal Cell</u>	<u>Fresh Water Equivalent Horizontal Hydraulic Gradient Limit</u>
Class A West	1.00E-3
LARW	<del>2.70E-39.67E-4</del>
Mixed Waste	<del>1.00E-39.67E-4</del>
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~~ groundwater 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, and 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 or equivalent format, or as otherwise approved by the Director.

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 West, and 11e.(2) Disposal cells ~~in compliance with the currently approved design and specifications and LLRW and 11e.(2) Construction Quality Assurance/Quality Control Manual (Radioactive Materials~~

~~License, Condition 44). These~~ This reports will be submitted ~~for the Director's approval~~ on or before December 1 of each calendar year, and will be prepared in accordance with the LLRW and 11e.(2) Construction Quality Assurance/Quality Control Manual.

~~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 Director in writing within 7 calendar days from the date of discovery.~~

~~8.7.~~ Collection Lysimeter Reporting

The Permittee shall provide a verbal report to the Director 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 Director within 7 calendar days of discovery. 180 days prior to Permit expiration, the Permittee shall submit ~~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 Director 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.~~

~~10.8.~~ 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 Director 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 sample results 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 Director approval to document equipment, methods, and results of said pump test.~~
  - ~~e) Annual Pump Inspection—results of the annual pump inspection and boroscope video inspection conducted in accordance with Part I.F.13.d shall be submitted for the Director's approval as part of the 1st Semi-annual BAT Monitoring Report.~~

13. Annual Ground Water Usage Report

~~180 days prior to Permit expiration, the Permittee shall submit a On or before March 1 of each calendar year the Permittee shall survey and report on 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 Director 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.~~

~~17.16. Annual Cover Test Cell Report~~

~~On or before March 1 of each calendar year the Permittee shall submit an annual report for Director 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.~~

~~18.17. Reserved~~

~~19. Railcar Rollover Facility Reporting~~

~~The Permittee shall submit the daily inspection results required in Part I.E.7e.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. Reserved~~

~~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) ~~1995, 1997, 2000, Mixed Waste, and Northwest Corner Evaporation Ponds—the Semi-annual BAT monitoring report shall:~~
- 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.~~
- e) ~~Reporting Schedule—the BAT Semi-annual Monitoring Report shall be submitted for Director approval in accordance with the following schedule:~~

<del>Half</del>	<del>Report Due On</del>
<del>1<sup>st</sup> (January–June)</del>	<del>September 1</del>
<del>2<sup>nd</sup> (July–December)</del>	<del>March 1</del>

~~\*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 Director approval~~ a summary report of activities for radioisotopes ~~disposed at the facility 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 summary~~ of all manifest inventory data available for ~~these~~ radioisotopes disposed at the LARW, Class A West, 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 Director approval a comprehensive ground water quality evaluation report for the site. In submittal of this report, the Permittee shall present an ~~an complete and thorough~~ evaluation of all ground water and vadose zone water quality data available for the LARW, Class A West, 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 current compliance wells across the entire period of record, and an evaluation of parameter temporal relationships,
- b) Number of water quality data available for each compliance monitoring parameter for each current compliance well,
- c) Statistical tests of normality for each compliance monitoring parameter water quality data population for each current compliance well; including univariate tests or equivalent. Normality testing will not be required for parameters with datasets consisting of greater than 50% nondetections, as the intent of normality testing is not to determine if detection limits are normally distributed,
- d) Calculation of mean concentration and standard deviation on direct concentration values for all compliance monitoring parameters and current compliance wells. 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 for all compliance monitoring parameters and current compliance wells, 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.

Compliance monitoring parameters are those parameters listed in Tables 1A through 1F for which a GWPL is established.

23. Reserved

24. Revised Hydrogeologic Report

180 days prior to Permit expiration, the Permittee shall submit for Director 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 Secretary approval of~~ the last revised hydrogeologic report ~~dated September 1, 2004~~.

## I. Compliance Schedule

1. Ground Water Institutional Control Plan

The Permittee shall submit a ground water institutional control plan for Director approval at the time the site Decontamination and Decommissioning Plan required under Radioactive Materials License Condition 74 of Radioactive Material License #UT 2300249 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. Groundwater Mound Dewatering Near Wells GW-19A/GW-19B~~

~~On or before January 15, 2010, the Permittee will submit a plan and schedule for Director 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 Director 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 Director and the Permittee. Within 60 days of Director approval of said plan and schedule, the Permittee shall implement the approved plan and schedule.~~

3. Background Ground Water Quality Report for the new Mixed Waste Compliance Wells.

The Permittee shall submit for Director approval four quarters of sampling, for all Mixed Waste parameters listed in Table 1E of this Permit, for new Mixed Waste embankment wells:

GW-151      GW-152      GW-153      GW-154

to evaluate which parameters, if any, require additional data so that it can be included in the Ground Water Protection Level Exceptions for Mixed Waste, Table 1F. This report shall include the wells and parameters needing additional evaluation. The Director does not anticipate the background concentrations for any parameter listed in Table 1E to be greater than their respective ground water protection levels. As a result, compliance monitoring for these parameters will commence in the new Mixed Waste Embankment wells with the Permittee's completion of the four quarters of sampling. With the completion of this quarterly sampling, if any parameter(s) in any well requires additional evaluation, with which to calculate background values for inclusion in the Mixed Waste Exceptions Table, Table ~~1E~~1F, a minimum of an additional four quarters of sampling will commence, to build a data population. The Permittee will ~~than then~~ submit a background ground water quality report for the Mixed Waste

embankment parameters and compliance monitoring wells to be listed in Table ~~4E~~ 1F of this Permit.

This report shall include inter-well descriptive statistics for each Parameter, and well in question, such as:

- a. Graphs of temporal concentration trends in each well for each compliance monitoring parameter/constituent with an evaluation of seasonal and analytical variations,
- b. Normality testing along with a discussion of those data points, if any, that are outliers and justification of why the outliers should or should not be removed from the population prior to performing statistical calculations for each compliance monitoring parameter,
- c. Calculation of mean concentration and standard deviation for each constituent-compliance monitoring parameter in each well, and
- d. Calculation of mean concentration plus two (2) standard deviations for each constituent-compliance monitoring parameter in each well.

Compliance monitoring parameters are those parameters listed in Table 1E for which a GWPL is established.

After review and approval of this report, the Director may reopen this Permit and revise the ground water protection levels for the Mixed Waste embankment compliance wells. Compliance monitoring will continue in compliance monitoring wells GW-130, GW-131, and GW-132 until their abandonment.

4. Background Ground Water Quality Report for the new Class A West Compliance Wells.

The Permittee shall submit for Director approval four quarters of sampling, for all Class A West parameters listed in Table 1A of this Permit, for new Class A West embankment wells:

GW-142, GW-143, GW-144, GW-145, GW-146, GW-147, GW-148, GW149, and GW-150

to evaluate which parameters, if any, require additional data so that it can be included in the Ground Water Protection Level Exceptions for Class A West, Table 1B. This report shall include the four quarters of sampling data for all wells, and more detail on wells and parameters needing additional evaluation, if any. The Director does not anticipate the concentrations of any parameter listed in Table 1A to be greater than their respective ground water protection levels. As a result, compliance monitoring for these parameters will commence in the new Class A West Embankment wells with the Permittee's completion of the four quarters of sampling. With the completion of this quarterly sampling, if any parameter(s) in any well requires additional evaluation, with which to calculate

background values for inclusion in the Class A West Exceptions Table, Table 1B, a minimum of an additional four quarters of sampling will commence, to build a data population. The Permittee will ~~than~~ then submit a background ground water quality report for the Class A West embankment compliance monitoring parameters and compliance monitoring wells to be listed in Table 1B of this Permit .

This report shall include inter-well descriptive statistics for each Parameter, and well in question, such as:

- a. Graphs of temporal concentration trends in each well for each compliance monitoring constituent parameter with an evaluation of seasonal and analytical variations,
- b. Normality testing along with a discussion of those data points, if any, that are outliers and justification of why the outliers should or should not be removed from the population prior to performing statistical calculations for each compliance monitoring parameter,
- c. Calculation of mean concentration and standard deviation for each constituent compliance monitoring parameter in each well, and
- d. Calculation of mean concentration plus two (2) standard deviations for each constituent compliance monitoring parameter in each well.

Compliance monitoring parameters are those parameters listed in Table 1A for which a GWPL is established.

After review and approval of this report, the Director may reopen this Permit and revise the ground water protection levels for the Class A West embankment compliance wells. Compliance monitoring will continue in compliance monitoring wells GW-81, GW-82, GW-83, GW-84, GW-85, GW-86 until their abandonment, and in compliance monitoring wells GW-109, GW-110, GW-111, GW-112, GW-137, GW-138, GW-139, GW-140, and GW-141 until the new Class A West embankment wells are installed, and their abandonment.

## 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 Director.~~

## 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 Director, 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.G. 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 Director at any time. Records may be retained in electronic format.~~

#### H.H. 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 Radiation Control~~ at (801) ~~538-6146~~536-4250, during normal business hours (8:00 am – 5:00 pm Mountain Time).
2. A written submission shall also be provided to the Director within ~~5-7~~ calendar 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 Director or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

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 Director, 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:

1. 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 or a Utah registered professional engineer.
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 Director 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 Director approval. Failure to comply with any condition of said approval shall constitute a violation of this Permit.~~

## PART III. COMPLIANCE RESPONSIBILITIES

## 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 Director of the ~~Water Quality Board~~ Division of Radiation Control 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 Director. 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 Director approval.~~

B.A. Planned Changes

The Permittee shall give notice to the Director 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 Director 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 Director, within a reasonable time, any information which the Director 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 Director, 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 Director, it shall promptly submit such facts or information.

I. Signatory Requirements

All applications, reports or information submitted to the Director 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 Director 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 Director, 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 be submitted to the Director 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 Director. 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 Director 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 Director 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~~-6.4(D)
2. Changes have been determined in background ground water quality.
3. Determination by the Director 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~~ REVISED: December 7, 2012

## Ground Water Quality Discharge Permit Contingency Plan For Exceedences of Ground Water Protection Levels

### PURPOSE

This Ground Water Quality Discharge Permit (GWQDP) Contingency Plan describes the actions to be taken by ~~Envirocare of Utah, Inc. (Envirocare)~~, EnergySolutions to regain and maintain compliance with the protection levels in Part I.C of the GWQDP in the event that concentration limits are exceeded in the down-gradient compliance monitoring wells. This plan is a requirement of the GWQDP.

### SCOPE

Since there are many scenarios of the types of detected contamination and associated constituents, and since the implementation of a remediation program is dynamic with the requirements, the regulatory agency, and the characterization of the contamination, this plan does not outline a definitive remediation program. However, this plan describes the steps to respond to results of ground water sample analyses which show that concentration limits are exceeded.

### CONTINGENCY PLAN

When the concentrations of parameters in down-gradient compliance monitoring wells exceed the concentration limits as substantiated by confirmatory analyses, ~~Envirocare~~ EnergySolutions will prepare a Source and Contamination Assessment Study Plan in accordance with Part I.G.3.b. ~~implement the following process:~~

- ~~(1) Envirocare shall take corrective action to evaluate all possible plausible pollution sources. This will include:~~
- ~~a. Ensuring that the embankments are otherwise operated in compliance with the applicable standards. Where any structural problems are apparent with the cap, cover, or the liner, these structures will be repaired.~~
  - ~~b. Removing any leachates that may have accumulated in the cell thereby ceasing any apparent discharge to ground water.~~
  - ~~e. Preparing a detailed and comprehensive operational history of the facility which explores all activities that may have contributed to a ground water discharge. Such activities may include but not be limited to:~~

- ~~— Spills during unloading or transfer~~
- ~~— Waste water discharges~~
- ~~— Run on and run off controls~~
- ~~— Accumulation of leachates~~
- ~~— Construction and quality control of the cell liner or cap~~
- ~~— Waste disposal operations~~
- ~~Embankment subsidence~~

If the ~~Executive Secretary~~Director determines that ground water remediation is needed, ~~Envirocare Energy Solutions~~ must submit a Ground- Water Remediation Plan to the ~~Executive Secretary~~Director within 30 days of a request. Within 7 calendar days from notification to submit a Ground Water Remediation Plan, Energy Solutions may request a meeting with DRC to appeal the Director's decision and to provide an alternative.

The Ground- Water Remediation Plan must include:

- d.a. A description and schedule of how ~~Envirocare Energy Solutions~~ will accomplish the characterization of the physical, chemical, and/or radiological extent of the ground water contamination. This will include a description of any additional wells to be used or installed to characterize the plume extent of impact and the hydrogeologic characteristics of the affected zone, the analytical parameters to be obtained, the samples of ground water and soil to be taken, and any other means to measure and characterize the affected ground water and contamination zone, as needed.
- e.b. A description and schedule of how ~~Envirocare Energy Solutions~~ will implement a corrective action program that prevents contaminants from exceeding the ground water protection levels at the compliance monitoring point(s) by removing the contaminants, treating them in place, or by other means as approved by the ~~Executive Secretary~~Director.
- f.c. A description of the remediation monitoring program to demonstrate the effectiveness of the plan
- g.d. Descriptions of how corrective action will apply to each of the possible plausible sources of pollution identified in the detailed and comprehensive history in 1c above.

h.e. ~~Envirocare~~ EnergySolutions will implement the Ground Water Remediation Plan within 30 days of ~~Executive Secretary~~ Director Approval. A weather-based delay of field activities will require Director Approval.

**APPENDIX B:**

**Water Monitoring  
Quality Assurance Plan**

APPROVED: December 5, 1991

LATEST REVISION: 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: June 27, 2011 and December 7, 2012, respectively

# Collection Lysimeter Operation, Maintenance, and Closure Plan

~~June 27, 2011~~ December 7, 2012

## 1.0 GENERAL

This plan outlines the procedures for the operation, maintenance, and closure of the collection lysimeters as required by Part I.E.11 of Ground Water Quality Discharge Permit No. UGW450005 (Permit).

The primary purpose of collection lysimeters is to monitor the performance of the bottom liner of the LLRW and Class A West cells. If free liquid is detected in the collection lysimeters, it will provide an early warning of leachate migrating toward groundwater.

Collection lysimeters will be constructed using the plans and specifications approved by the Utah Division of Radiation Control (DRC). General collection lysimeter design incorporates a 20 to 25 foot deep manhole with a stand pipe or riser just beyond the edge of a disposal cell and a collection pan situated approximately 300 feet from the edge of waste, under the clay liner of a disposal cell. A transfer pipe connects the collection pan to the stand-pipe.

## 2.0 OPERATION PLAN

### 2.1 Monitoring for Free Liquids

The standpipe in the manhole will be monitored as follows for the presence of free liquids.

- Weekly for the first year after the date of initial waste placement over the lysimeter pan.
- Twice per month (on approximately the 1<sup>st</sup> and 15<sup>th</sup> of the month) for the second year after the date of initial waste placement.
- Monthly thereafter until final cover is completed over the collection lysimeter.
- Annually for the first 5 years after final cover construction; then
- Every other year throughout the post-closure monitoring period.

The collection lysimeter will be monitored by removing the manhole cover and standpipe end plug. The collection lysimeter is then probed for free liquids using an electronic water level meter. The depth to water measurement and other relevant data is recorded on the Collection Lysimeter Free Liquids Monitoring form (the Form) provided as Attachment 4 of Appendix J of the Permit, if free

liquids are detected. Completed forms will be maintained at the site and made available for State inspections as required by Part II.H and II.K.2 of the Permit.

~~If and w~~When free liquids are detected in a standpipe, the DRC will be notified verbally within 24 hours and in writing within 7 calendar days. Immediately following the initial detection of free liquids, the monitoring frequency will be increased to daily in order to assess the flow rate into the collection lysimeter. Free liquid samples will be taken in accordance with Section 2.3 below. Daily monitoring will continue until otherwise approved by the ~~Executive Secretary~~Director. Considerations for a request to reduce monitoring frequency will include if the flow rate has stabilized, and quarterly purging and sampling of the lysimeter standpipe are scheduled. The free liquids monitoring frequency will then be decreased to an appropriate monitoring interval following ~~Executive Secretary~~Director approval.

*Note: Some of the older collection lysimeters have settled since construction, leading to isolated low spots where standing water may collect without draining. Removal of this water to facilitate video inspections does not trigger the increased monitoring frequency requirements.*

Free liquids will not be allowed to accumulate in the standpipe to a level less than 12 inches below the intersection of the transfer pipe. The standpipe will be purged of free liquids when they are detected, unless a sampling event is planned and the volume is being allowed to accumulate to provide adequate sample volume for analysis. Purging will be performed using a dedicated bailer or a peristaltic pump. ~~The volume of water removed from a collection lysimeter will be recorded on the Form. Other information required on the Form include the date, time, monitoring personnel, collection lysimeter identification number, the presence of free liquids, a depth to water measurement, the collection lysimeter total depth, and the total volume of water removed. The Form must be signed and dated by appropriate monitoring personnel and reviewed by the Director of Compliance and Permitting or designee, prior to transferring custody to Document Control.~~

Water removed from a collection lysimeter and not included in samples will be disposed in an evaporation pond permitted under Part I.E.14 of the Permit; or in ~~permitted the~~Mixed Waste ~~evaporation~~tanks; or in the Mixed Waste Leachate Impoundment.

## ~~2.2~~ Confined Spaced Entry

~~Collection lysimeter manhole entry is to be made following applicable procedures as determined by the Safety and Health Department.~~

## 2.32 Sampling of Free Liquids

Free liquids samples will be collected within 24 hours of initial detection as specified in Part I.F.6 of the Permit. Because of the limited amount of water expected to be in the collection lysimeters, samples for analysis will be collected using the following priority list, if less than 3,720 milliliters (ml) are present.

Priority	Parameter	Sample volume (ml)
1	Field Parameters- Temperature, pH, Specific Conductivity	100
2	Radiologics – LARW Suite	2,000
3	Metals/Inorganics – LARW Suite	500
4	TDS/TSS	500
5	Major Cations and Anions	500
6	Volatile Organic Compounds (VOCs)	3 X 40
TOTAL		3,720

Any deviation from this priority list must be approved by the **Executive Secretary/Director**. Samples will be collected using either a dedicated bailer or a peristaltic pump.

## 3.0 MAINTENANCE PLAN

The inspection/maintenance procedures for the collection lysimeters will consist of a visual inspection performed ~~annually, starting in the year construction is completed once per Permit renewal cycle~~, which includes visually checking the leachate collection manhole and exposed piping for cracks, end plug leaks, shifting or other damage. The visual inspection will include a video inspection of the transfer pipe ~~that will be accessed from the cleanout port~~. The video inspection will be recorded ~~on magnetic or optical media~~ and will include checking the transfer pipe for leaking joints, penetrations in the pipe, and cracked or otherwise damaged pipe sections. If damaged or leaking pipes are discovered these sections will require repair unless otherwise approved by the **Executive Secretary/Director**.

Details of the inspection and maintenance activities will be recorded in a groundwater field notebook containing waterproof paper that will be kept on file at Clive for at least three years following the date of the inspection as required by Part II.H of the Permit. ~~These documents shall be made available to State inspection as required by Part II.K.2 of the Permit.~~ Any observation of structural failure or upset that would compromise the function or performance of the collection lysimeter system shall be reported to the **Executive Secretary/Director** verbally within 24 hours and in writing within 7 calendar days, as required by Part II.I of the Permit.

#### 4.0 CLOSURE PLAN

Lysimeter closure will be performed only when one of the following criteria is met, as approved by the ~~Executive Secretary~~Director:

- 1) Post closure monitoring has been completed, or the
- 2) Lysimeter collection system is damaged beyond repair, or the
- 3) Lysimeter collection system is permanently abandoned.

DRC will be notified at least 7 calendar days prior to lysimeter closure. Any deviation from the following closure method will be approved by DRC prior to lysimeter closure.

Lysimeter closure will be accomplished by pressure grouting, using a sand, cement, and bentonite slurry mixture. Grouting will be performed from the cleanout port ~~back into the transfer pipe or an access point where the transfer pipe is cut off from the outside of the manhole.~~ Placement of grout will begin at the lysimeter-pan end of the transfer pipe and will proceed back toward the manhole (access point). The volume of slurry mixture pumped will be measured to determine the extent of slurry injected into the collection pan and transfer pipe.

The standpipe will ~~then~~ be cut off of the transfer pipe and ~~be~~ disposed as Class A waste. The entire manhole shall be removed. The transfer pipe shall be cut off from the outside of the manhole so that manhole removal does not pull it out from beneath the liner. To facilitate safe and effective grouting, standpipe and manhole removal and associated excavation may occur before grouting. Radiological sampling will be performed to demonstrate that the excavated area meets the release criteria of operating procedure CL-RS-PR-180, *Restricted Area Release Surveys*, prior to backfilling. Any soils that exceed the limits of this procedure shall be excavated and disposed in the Class A West cell. The excavated area where the manhole was removed shall be backfilled in accordance with the LLRW and 11e.(2) CQA/QC Manual, work element "Foundation Preparation".



# CQA Plan for Collection Lysimeter Construction

June 2, 2011

Revision 1

Authored By: Damon Young 6-6-11  
Date

Reviewed By: [Signature] 6/6/11  
Date

Approved By: [Signature] 6/6/11  
Date

Approved By: [Signature] 6/6/11  
Date

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1.0 PURPOSE

To establish the material specifications, construction specifications, quality control and quality assurance requirements that shall be used to ensure that construction and inspection activities of the Collection Lysimeter(s) comply with applicable State and Federal regulations and approved design criteria.

2.0 SCOPE

This Construction Quality Assurance (CQA) Collection Lysimeter Plan applies to all aspects of Collection Lysimeter (Lysimeter) construction activities for EnergySolutions, Inc at the South Clive Disposal Facility. This plan addresses responsibilities, design criteria, inspections and testing, requirements and frequencies, documentation, and acceptance criteria associated with Earthwork, HDPE Liner, Piping, Geotextile, and Manhole installation activities of a lysimeter.

3.0 DEFINITIONS

**Clearing and Grubbing**

The removal of vegetation, debris, organic, or deleterious material from areas to be excavated for construction of cells. Grubbing depth will depend on the type of vegetation, debris, organic, or deleterious material on the site.

**Documentation (Document)**

Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

**HDPE Liner**

A synthetic membrane having a water permeability less than  $1 \times 10^{-12}$  cm/sec, used to line the lysimeter sump. Geotextile

Any permeable woven textile used with foundation, soil, rock, earth, or any other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

**Inspection Frequency**

Inspection activities established in this plan are minimum requirements. Additional inspections or tests shall be performed any time it is deemed necessary by Quality Control, Construction Quality Engineer (CQE), Clive Quality Assurance Manager (CQAM), or the Project Manager.

**Lysimeter**

A component of the LLRW embankment installed below the embankment clay liner. It is designed to monitor liquids that may permeate the cover system, waste column, and embankment clay liner. The collected liquid can then be quantified and analyzed.

**Quality Control**

Those quality assurance activities/actions necessary to provide a means to control and measure the characteristics of an item, process, or facility to established requirements.

**Quality Record**

A completed document that furnishes evidence of the quality of items and/or activities affecting quality. For the purpose of this plan, a document is considered a quality assurance record when the quality related document has been completed and validated by the Quality Control Officer (QCO).

**Subgrade**

The soil prepared and compacted to support a structure, lysimeter or a pavement system.

**Vendor Data**

Supplier-furnished data that may be required by the contractor or purchase order; e.g.; drawings, operating and performance data, wiring diagrams, motor data, maintenance and operation control systems and procedures, test reports and procedures, personnel qualifications and certification, material certifications and fabrication techniques.

**Witness Point**

Designated points in embankment construction where the QCO, or the CQE and/or the Utah Division of Radiation Control (UDRC) shall randomly monitor, observe, inspect, review, or test the operation.

4.0 RESPONSIBILITIES

- 4.1 The **Director of Engineering** is responsible for design, design changes, as-built reports, and the overall specification and inspection requirements of this CQA Plan.
- 4.2 The **Project Manager** has the overall responsibility for the construction of the lysimeter including direction of the contractor(s). The Project Manager is also responsible for any required notifications to the Utah Division of Radiation Control (UDRC).
- 4.3 The **Quality Control Manager** has the overall responsibility for the implementation of the quality control inspection activities.
- 4.4 The **Construction Quality Engineer (CQE)** reports to the Clive Quality Assurance Manager and is responsible for hold and witness points, and surveillance activities that address inspections, observations, and documentation review, as applicable.

- 4.5 The **Quality Control Officer (QCO)** is responsible for implementing and/or directing inspection activities, and review and approval of inspection and testing records.
- 4.6 The **Quality Control Inspector(s)** are responsible for field surveillance and adhering to the inspection and testing requirements of this project plan. These individuals report to the QCO.
- 4.7 The **Engineering Technical Assistant** is responsible for maintaining the construction quality assurance records and transmitting those records to Document Control.
- 4.8 **Document Control** is responsible for maintenance of the embankment construction quality records in accordance with CL-QA-PR-005, Quality Assurance Records.

5.0 GENERAL

- 5.1 EnergySolutions, Inc. shall perform all construction inspections under the direction the Project Manager.
- 5.2 Design Changes shall be handled in accordance with CL-EN-PR-001, Engineering Design Control.
- 5.3 All personnel, shall be trained to the requirements of this document. All other applicable personnel qualifications shall be performed in accordance with the CL-TN-PR-010, General Qualification Procedure.
- 5.4 All measuring and test equipment shall be calibrated in accordance with CL-QA-WI-120, Control of M&TE.
- 5.5 Specific design, construction, and quality requirements are identified in the attachments to this CQA plan.
- 5.6 The Director of Engineering shall issue a unique Collection Lysimeter Detail drawing, approved for construction, for each lysimeter project. This drawing is required in addition to Drawing 0210-01,
- 5.7 The contractor shall be notified of testing results that do not meet the specifications. Failing areas shall be reworked and retested.

6.0 PROCEDURE

*Note: The following can occur simultaneously.*

- 6.1 Earthwork

- 6.1.1 The earthwork (excavation) for the project shall be to the lines, grades, and dimensions established by the Approved for Construction Project Drawings.

Earthwork for the Project encompasses excavations for the lysimeter sump, pipe trench, and the manhole. See Attachment 8.1, Earthwork for specifications.

- 6.1.2 Quality Assurance testing and inspection requirements (e.g. methods, frequencies, acceptance criteria) for the specified design criteria are delineated in Attachment 8.1, Earthwork Requirements.

## 6.2 Lysimeter Sump

- 6.2.1 The construction of the lysimeter sump includes the installation of the compacted Clay layer, HDPE, Geotextile, gravel, and sand.

*Note: This sump construction is also inclusive of the piping (perforated and non-perforated) and pipe boot installation that penetrates under and into the lysimeter sump.*

- 6.2.2 The design, material, and construction requirements are delineated in Attachment 8.2 Sump Requirements. The piping aspects of the sump are defined in Attachment 8.3, Piping Requirements. Additional details are specified in the Approved for Construction Project Drawings.

- 6.2.3 The compacted clay layer shall be completely constructed and approved prior to any excavation for the pipe trench into the sump. After piping installation into the sump, the compacted clay layer shall be replaced, inspected and approved in accordance with Attachment 8.2 Sump Requirements .

*Note: These are Witness Points and the CQE shall be notified.*

- 6.2.4 Quality Assurance testing and inspection requirements (e.g. methods, frequencies, acceptance criteria) for the specified design criteria are delineated in Attachment 8.2, Sump Requirements and Attachment 8.3, Piping Requirements.

## 6.3 Lysimeter Piping

- 6.3.1 The design, material, and construction requirements for the piping installation are specified in Attachment 8.3, Piping Requirements. Additional details are specified in the Approved for Construction Project Drawings.

6.3.2 Quality Assurance testing and inspection requirements (e.g. methods, frequencies, acceptance criteria) for the specified design criteria are delineated in Attachment 8.3, Piping Requirements.

6.4 Lysimeter Manhole

6.4.1 The design, material, and construction requirements for the piping installation are specified in Attachment 8.4, Manhole Requirements. Additional details are specified in the Approved for Construction Project Drawings.

6.4.2 Quality Assurance testing and inspection requirements (e.g. methods, frequencies, acceptance criteria) for the specified design criteria are delineated in Attachment 8.4, Manhole Requirements.

6.5 Records

6.5.1 All records generated to support construction quality and compliance of the embankment shall be maintained in accordance with CL-QA-PR-005, Quality Assurance Records. Examples of quality assurance records in support of this plan are attached. See Attachment 8.6.

6.6 Vendor Data

6.6.1 The Project Manager is responsible for submitting required vendor data to EnergySolutions Quality Department.

6.7 Surveillance

6.7.1 Surveillance activities shall be performed by the CQAM or designee in accordance with ES-QA-PR-002, Quality Assurance Surveillance.

6.8 Construction Certification Report

6.8.1 Within 30 days of completion of the construction of each lysimeter, a construction certification report shall be prepared under the direction of the Director of Engineering and submitted to the Executive Secretary for approval.

7.0 REFERENCES

- 7.1 CL-QA-PR-005, Quality Assurance Records
- 7.2 CL-QA-WI-120, Control of Measuring and Test Equipment
- 7.3 CL-EN-PR-001, Engineering Design Control
- 7.4 CL-TN-PR-010, General Qualification Procedure
- 7.5 ES-QA-PR-002, Quality Assurance Surveillances
- 7.6 Current revision of LLRW and 11e.(2) CQA/QC Manual for List of Forms.

8.0 ATTACHMENTS

- 8.1 Attachment 8.1, Earthwork Requirements
- 8.2 Attachment 8.2, Lysimeter Sump Installation Requirements
- 8.3 Attachment 8.3, Piping Installation Requirements
- 8.4 Attachment 8.4, Manhole Installation Requirements
- 8.5 Attachment 8.5, Collection Lysimeter Details, Drawing NO. 0210-01, Revision 1

Earthwork  
Attachment 8.1

**SUMP EXCAVATION:** The subgrade for the collection lysimeter sump shall be excavated to at least 1.0-foot below the compacted clay layer elevation shown on Drawing 0210-01. Survey the elevation of the compacted subgrade at the 4 bottom and 4 top corners of the sump side slopes.

**SUMP SUBGRADE COMPACTION:** The subgrade shall be compacted to at least 90 percent of the Standard Proctor (ASTM D698) maximum dry density. Perform at least one Standard Proctor (ASTM D698) moisture-density relationship at a rate of one test per soil type. Proctor results for representative samples taken for embankment foundation QC testing may be utilized. Conduct in-place moisture-density tests in accordance with ASTM D-6938 at a rate of one test per sump.

**PIPE TRENCH EXCAVATION:** The pipe trench shall be excavated to at least 0.5 foot below pipe grade. The trench width shall be at least 3-feet wide. Measure the trench width at a minimum of three places over the length of the trench using a commercial grade tape measure. Survey the subgrade elevation at the bottom of the pipe trench. Survey points shall be less than or equal to 50-feet apart.

**MANHOLE EXCAVATION:** The manhole excavation shall extend to at least .67 foot below the bottom-of-manhole grade shown on Drawing 0210-01. Survey the subgrade elevation at one point near the center of the manhole.

Perform the required survey of the compacted subgrade and attach the reviewed and approved survey notes to the Daily Construction Report (ES 1902).

Perform the required testing. Include the related standard proctor results in the project file. Record the results of the density testing on the Field Density Test form (ES 1905).

Perform the required survey of the pipe trench excavation and attach the reviewed and approved survey notes to the Daily Construction Report (ES 1902). Measure the trench width and document the results on the Daily Construction Report (ES 1902).

Perform the survey of the manhole subgrade elevation and attach the reviewed and approved survey notes to the Daily Construction Report (ES 1902).

Sump  
Attachment 8.2

**COMPACTED CLAY LAYER:** Place the compacted clay layer to the elevation shown on Drawing 0210-01. The compacted clay layer shall be placed in 12-inch maximum loose lifts compacted to at least 90 percent of the Standard Proctor (ASTM D698) maximum dry density. Perform at least one Standard Proctor (ASTM D698) moisture-density relationship at a rate of one test per soil type. Proctor results for representative samples taken for embankment clay layer QC testing may be utilized. Conduct in-place moisture-density tests in accordance with ASTM D-6938 at a rate of one test per sump. Measure the loose thickness of each lift using one grade pole near the center of each lift.

**COMPACTED CLAY SURVEY:** Survey the elevation of the completed compacted clay layer at the 4 bottom and 4 top corners of the sump side slopes. Grade tolerance shall be grade to 0.2-foot below grade. The completed compacted clay layer surface shall not have breaks in grade greater than 1 inch and be free of sharp edges or rocks.

**HDPE LINER MATERIAL REQUIREMENTS:** The lysimeter sump shall be lined with a 60-mil HDPE liner. Obtain the unique roll identification number and the liner manufacturer's QC certificate(s) of physical properties for the roll of liner used. Review the certificates for compliance with the specification.

**GEOTEXTILE MATERIAL REQUIREMENTS:** The geotextile cushion and filter layers shall consist of 8-ounce non-woven geotextile with a minimum mass per unit area of 7.0-ounces per square yard (7.0 oz/sy). Obtain certification documentation that the supplied material meets the above criteria.

**HDPE LINER INSTALLATION:** Place the HDPE liner on the compacted clay layer and extend the perimeter edges of the liner at least 0.5 foot beyond the top of the sump side slopes. Secure any lifted edges of the liner to the ground. Repair or patch any damage, holes, seams or relief cuts within the sump using standard fusion or extrusion welding methods in accordance with standard industry practice. Vacuum test any seams or repairs in accordance with ASTM D5641. The Project Manager shall provide all testing

Record the results of the density testing on the Field Density Test form (ES-1905).

Perform the required lift thickness measurement and document the results on Daily Construction Report (ES 1902).

Perform the final elevation survey of the compacted clay layer and attach the reviewed and approved survey notes to the Daily Construction Report (ES 1902). Visually inspect the final surface for breaks in grade, sharp edges or rocks in accordance with the specifications and document results on the Daily Construction Report (ES 1902).

**WITNESS POINT: The Compacted Clay Surface shall be inspected by the CQE or designee prior to the surface being covered.**

Perform the required inspection. Attach the certificates to the Daily Construction Report (ES 1902).

Perform the required testing and document the results on the Daily Construction Report (ES 1902) or obtain the supplied documentation and attach to the Daily Construction Report (ES 1902).

Observe the liner installation for conformance to the specifications. Notify contractor of any deficiencies requiring correction. Observe corrective measures and Document results on the Daily Construction Report (ES 1902).

Sump  
Attachment 8.2

documentation to the QC Inspector. Construct the pipe boot as shown on Drawing 0210-01 and in accordance with ASTM D6497.

**GRAVEL GRADATION MATERIAL**

**REQUIREMENTS:** The gravel shall meet the following gradation: 100% passing a 1½ -inch sieve, 0 to 55% passing a 3/8-inch sieve, and 0 to 10% passing a No. 4 sieve. The gravel shall be tested in accordance with ASTM C136 prior to use. Gradation results obtained from representative samples taken for embankment or concrete QC testing may be utilized.

**GRAVEL THICKNESS:** A 0.9 to 1.0 foot thick layer of gravel shall be placed around the perforated pipe in the collection lysimeter as shown on Drawing No. 0210-01. Measure the thickness of the gravel layer with at least one grade pole near the center of the sump. Compaction of the gravel layer is not required.

**SAND GRADATION MATERIAL**

**REQUIREMENTS:** The sand shall meet the following gradation: 100 percent passing a 3/4" sieve, 55 to 100 percent passing a No. 8 sieve, 20 to 65 percent passing a No. 30 sieve, and 0 to 15 percent passing a No. 100 sieve. The sand shall be tested in accordance with ASTM C136 prior to use. Gradation results obtained from representative samples taken for embankment or concrete QC testing may be utilized.

**SAND THICKNESS:** A 0.9 to 1.0 foot thick sand layer will be placed above the gravel layer as shown on Drawing No. 0210-01. Measure the thickness of the sand layer with at least one grade pole near the center of the sump. Compaction of the sand layer is not required.

**GEOTEXTILE PLACEMENT:** Place at least one layer of geotextile on the HDPE liner prior to gravel placement, above the gravel prior to sand placement, and above the sand prior to compacted clay layer placement as shown on Drawing No. 0210-01. Each component, including the perforated pipe shall be completely covered by the geotextile.

**GEOTEXTILE SURVEY:** Survey the top elevation of the completed sump installation at the center and 4 corners of the sump. The top elevation of the completed sump shall not exceed the clay liner foundation grade of the disposal cell.

Perform the required testing. Document the gradation on the Soil Classification Form (ES 1908). Include documentation of the gradation testing in the project file. Provide written justification for the use of representative samples on the Daily Construction Report (ES-1902)

Perform the required thickness measurement of the gravel layer and document the results in the Daily Construction Report (ES 1902).

Perform the required testing. Document the gradation on the Soil Classification Form (ES 1908). Include documentation of the gradation testing in the project file. Provide written justification for the use of representative samples on the Daily Construction Report (ES-1902)

Perform the required thickness measurement of the sand layer and document the results in the Daily Construction Report (ES 1902).

Verify that the placement of the lysimeter sump components meets specifications and document results in the Daily Construction Report (ES 1902).

Perform the required survey of the top elevations at the center and 4 corners of the completed sump installation. Attach the reviewed and approved survey notes to the Daily Construction Report (ES1902).

Piping Installation  
Attachment 8.3

**PIPE MATERIAL REQUIREMENTS:** All pipe and fittings shall consist of Schedule 80 PVC (ASTM D1785), except that the pipe and fittings inside of the collection manhole may alternatively consist of Schedule 40 PVC. The pipe within the lysimeter sump shall have 1/2-inch diameter holes at 4-inches on-center on both sides of the pipe as shown on Drawing 0210-01. All pipe and fittings shall be joined using PVC cement recommended by the pipe manufacturer.

**GRANULAR BEDDING MATERIAL REQUIREMENTS:** Granular bedding shall meet the following gradation: 100 % passing the 1 1/2 inch sieve, 50 to 100% passing the 3/4 inch sieve, 0 to 55 % passing the 3/8 inch sieve, and 0 to 10% passing the No. 4 sieve. The granular bedding shall be tested in accordance with ASTM C136 prior to use. Gradation results obtained from representative samples taken for embankment or concrete QC testing may be utilized.

**PIPE BEDDING INSTALLATION:** Place granular bedding to within  $\pm 0.1$  foot of pipe grade and survey the trench bedding elevation. Survey points shall be less than or equal to 50-feet apart.

**PIPE JOINING:** Place pipe sections on graded bedding and glue all joints using PVC cement. All pipe and fittings shall utilize socket type joints using PVC cement recommended by the pipe manufacturer.

**PIPE BEDDING INFILL:** Place granular bedding to at least .5 feet above the crown of the pipe.

**PIPE TRENCH BACKFILL:** Trench backfill, excluding the wedge beneath the sump, shall consist of granular bedding, or of native soils excavated from the pipe trench. If granular bedding is used as trench backfill, the final 1.0  $\pm$  0.2-foot thick lift shall consist of native soils. All clay and native soils shall be placed in 1.0  $\pm$  0.2-foot thick loose lifts. Compact all lifts to at least 90 percent of a Standard Proctor (ASTM D698) maximum dry density. Perform at least one Standard Proctor (ASTM D698) moisture-density relationship at a rate of one test per soil type. Proctor results for representative samples taken for embankment clay liner QC testing may be utilized. Conduct in-place moisture-density tests in accordance with ASTM D6938 at a rate of one test per 100 feet of trench for each lift of clay and/or native soil backfill.

Compaction testing of granular bedding material is not

Perform the required inspections and document the results in the Daily Construction Report (ES1902).

Perform the required testing. Document the gradation on the Soil Classification Form (ES 1908). Include documentation of the gradation testing in the project file. Provide written justification for the use of representative samples on the Daily Construction Report (ES-1902)

Perform the required survey of the granular bedding and attach the reviewed and approved survey notes to the Daily Construction Report (ES 1902).

Inspect pipe connection for presence of PVC cement and document the results in the Daily Construction Report (ES 1902).

Observe that bedding is placed to the crown of the pipe and document the results in the Daily Construction Report (ES 1902).

Perform the required testing. Include the related standard proctor results in the project file. Record the results of the density testing on the Field Density Test form (ES 1905). Provide written justification for the use of representative samples on the Daily Construction Report (ES-1902)

Piping Installation  
Attachment 8.3

required.

**BACKFILL LIFT THICKNESS:** Measure the loose lift thickness of clay and native soil backfill with grade poles at a spacing less than or equal to 50-feet apart.

**BACKFILL UNDER SUMP:** The wedge of trench backfill below the sump shall also consist of compacted clay. All clay and native soils shall be placed in  $1.0 \pm 0.2$  foot thick loose lifts compacted to at least 90% of the Standard Proctor maximum dry density (ASTM D698) at a rate of one test per soil type. Proctor results for representative samples taken for embankment clay liner QC testing may be utilized. Conduct in-place moisture-density tests in accordance with ASTM D6938 at a rate of one test per lift of clay backfill.

Perform the required thickness measurement and document the results on the Daily Construction Report (ES 1902).

Perform the required testing. Include the related standard proctor results in the project file. Record the results of the density testing on the Field Density Test form (ES 1905). Record the results of the lift thickness measurements on the Daily Construction Report (ES-1902).

**WITNESS POINT:** The Compacted Clay Surface in the sump shall be inspected by the CQE or designee prior to the surface being covered.

Manhole Installation  
Attachment 8.4

CL-

**GRANULAR BEDDING MATERIAL**

**REQUIREMENTS:** Granular bedding shall meet the following gradation: 100 % passing the 1½ inch sieve, 50 to 100% passing the ¾ inch sieve, 0 to 55 % passing the 3/8 inch sieve, and 0 to 10% passing the No. 4 sieve. The granular bedding shall be tested in accordance with ASTM C136 prior to use. Gradation results obtained from representative samples taken for embankment or concrete QC testing may be utilized.

Perform the required testing. Document the gradation on the Soil Classification Form (ES 1908). Include documentation of the gradation testing in the project file. Provide written justification for the use of representative samples on the Daily Construction Report (ES-1902)

**GRANULAR BEDDING INSTALLATION:** Place at least one 0.67 foot thick lift of granular bedding on the subgrade prior to placing the base section of the manhole. Measure the bedding thickness with at least one grade pole near the center of the manhole.

Perform the required measurement of the granular bedding and document results on the Daily Construction Report (ES 1902).

Compaction testing of the granular bedding layer is not required.

**MANHOLE MATERIAL REQUIREMENTS:** The manhole base and riser sections shall consist of precast concrete with a full-height ladder. The precast manhole sections and ladder shall conform to ASTM C478. The Project Manager shall provide written evidence that the ASTM requirements are met.

Inspect manhole riser section for the presence of ladder rungs and good general condition. Document results of the inspection on the Daily Construction Report (ES 1902) and attach the applicable vendor data.

**SEALANTS:** Assemble the manhole sections and seal each joint using preformed flexible joint sealant or a similar product (ASTM C990). Seal the pipe penetration on each side of the manhole wall using Quikrete® Mortar Mix or similar Portland cement mortar mix or a manufacturer specified pipe boot.

Inspect the assembled manhole riser joints for the presence of sealant. Inspect pipe penetrations for the presence of mortar mix or pipe boot around the pipe. Document the results of the inspections on the Daily Construction Report (ES 1902).

**BACKFILL:** The backfill within 3-feet of the manhole shall consist of granular bedding to a level greater than or equal to 5-feet below final grade. The final 5-feet of backfill shall consist of clay placed in 1.0 ± 0.1-foot thick loose lifts compacted to at least 90% of the Standard Proctor maximum dry density (ASTM D698) at a rate of one test per soil type. All other backfill may consist of granular bedding, clay or native soils excavated from the manhole excavation. Native soil and clay backfill shall be placed in 1.0 ± 0.1 foot thick loose lifts compacted to at least 90% of the Standard Proctor maximum dry density (ASTM D698) at a rate of one test per soil type. Proctor results for representative samples taken for embankment clay liner QC testing may be utilized. Conduct in-place moisture-density tests in accordance with ASTM D6938 at a rate of one test per soil type.

Perform the required testing. Include the related standard proctor results in the project file. Record the results of the density testing on the Field Density Test form (ES 1905). Record the results of the lift thickness measurements on the Daily Construction Report (ES-1902). Provide written justification for the use of representative samples on the Daily Construction Report (ES-1902)

Manhole Installation  
Attachment 8.4

CL-

Measure the loose lift thickness of clay and native soil backfill with at least one grade pole per lift.

Compaction testing of granular bedding material is not required.

**FINAL INSPECTION:** A final inspection of the project shall be conducted and documented by the QCO prior to acceptance of the work.

Perform final inspection and document results. Notify contractor of any corrective actions required and repeat inspection until all discrepancies are corrected.

DATE	DESCRIPTION OF CHANGE
8/6/11	REVISION BY B. GILDED FOR LARW PLAN & UPDATED FOR NOT FACTOR VS. WATER RESISTANCE
8/6/11	CLIVE UJAH
8/6/11	ENERGY SOLUTIONS
8/6/11	LLRW EXHAUSTION TREATMENT FACILITY
8/6/11	COLLECTION LYSIMETER DETAILS

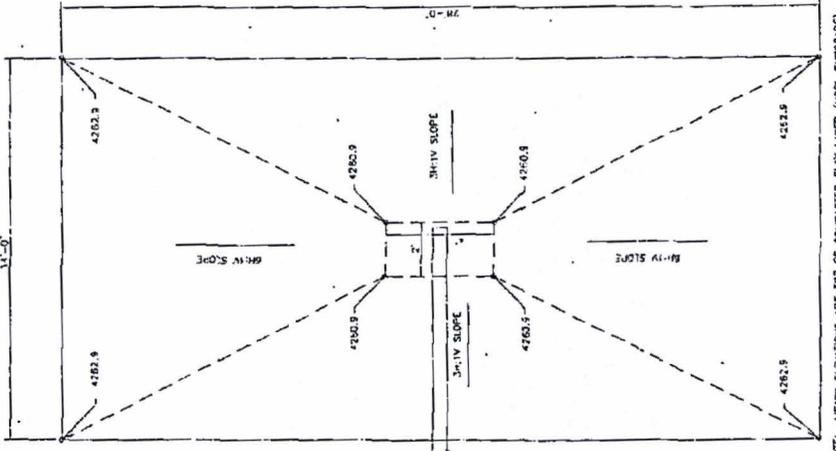
# ENERGY SOLUTIONS

**FINAL DRAWING**

PROJECT NO. 189530  
 DATE: 06/01/11  
 0210-01

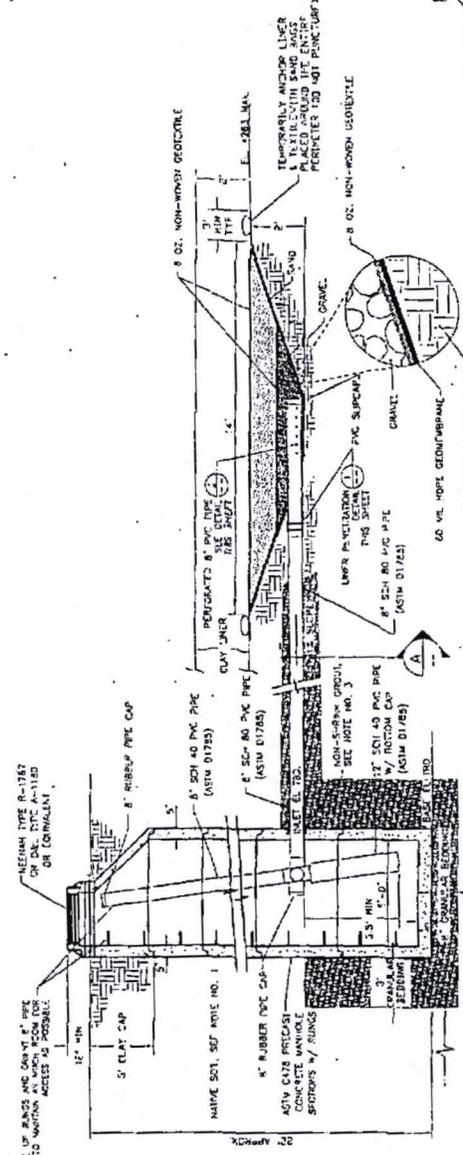


**GENERAL NOTE:**  
 REFER TO THE CURRENT CWOODP DRAWINGS FOR THE LOCATIONS OF CONSTRUCTED AND FUTURE LYSIMETERS IN THE LARW & LLRW EMBANKMENTS.

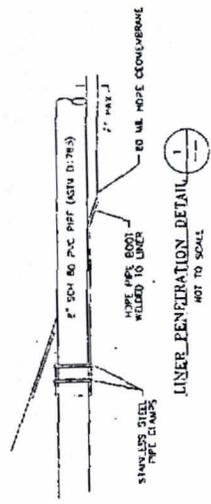


NOTE: USED ELEVATIONS ARE TOP OF COMPACTED CLAY LAYER (40% SUBGRADE)

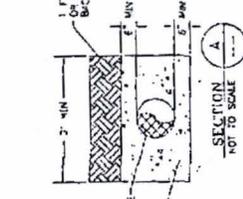
COLLECTION LYSIMETER - PLAN VIEW



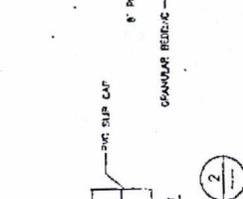
COLLECTION LYSIMETER SUMP DETAIL  
 NOT TO SCALE



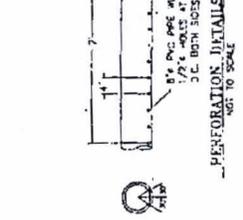
LINER PENETRATION DETAIL  
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MANHOLE PIPING DETAIL  
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PIERCING DETAIL  
 NOT TO SCALE



PENETRATION DETAIL  
 NOT TO SCALE



MANHOLE PIPING DETAIL  
 NOT TO SCALE

- NOTES:**
1. SHALL VERIFY THE LOWER MARKET MATERIALS AND METHODS ARE USED TO CONSTRUCT THE SUMP. THE SUMP SHALL BE CONSTRUCTED OF 60% NON-WOVEN GEOTEXTILE AND 12" COMPACTED CLAY LAYER. THE SUMP SHALL BE CONSTRUCTED OF 60% NON-WOVEN GEOTEXTILE AND 12" COMPACTED CLAY LAYER. THE SUMP SHALL BE CONSTRUCTED OF 60% NON-WOVEN GEOTEXTILE AND 12" COMPACTED CLAY LAYER.
  2. THE SUMP SHALL BE CONSTRUCTED OF 60% NON-WOVEN GEOTEXTILE AND 12" COMPACTED CLAY LAYER. THE SUMP SHALL BE CONSTRUCTED OF 60% NON-WOVEN GEOTEXTILE AND 12" COMPACTED CLAY LAYER.
  3. SEAL THE PENETRATION ON MANHOLE SECTION ON THE INSIDE AND OUTSIDE OF THE SUMP. THE SEAL SHALL BE MADE WITH A 1/2" THICK SEALANT. THE SEALANT SHALL BE APPLIED TO THE INSIDE AND OUTSIDE OF THE SUMP.
  4. ALL MATERIALS AND METHODS TO BE DETERMINED FOR EACH LYSIMETER AND PIPING IN A SEPARATE CONSTRUCTION DRAWING.

- MATERIAL SPECIFICATIONS (MATERIALS TO BE USED):**
- 1. 12" DIA. PVC PIPE (ASTM D1785)
  - 2. 6" DIA. PVC PIPE (ASTM D1785)
  - 3. 3" DIA. PVC PIPE (ASTM D1785)
  - 4. 60% NON-WOVEN GEOTEXTILE
  - 5. 12" COMPACTED CLAY LAYER

NOTE: RIGHT AND LEFT SHALL BE DETERMINED BY THE FIELD SURVEYOR.

NOTE: ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE SPECIFIED.

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APPENDIX D:

Reserved

APPENDIX E:

Reserved

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: December 7, 2012~~January 18, 2000~~

# Post-Closure Monitoring Plan

## 1.0 FACILITY CONDITIONS

### 1.1 General Description

~~Envirocare of Utah, Inc. (Envirocare) operates a waste disposal facility (Site) located at Section 32 Township 1 South and Range 11 West, Tooele County, Utah. The Site has been licensed to receive and dispose of naturally occurring radioactive material (NORM) waste, 11e.(2) waste, and low-activity radioactive waste (LARW). Envirocare has also been granted a permit to receive, treat, store, and dispose of Radioactive/Hazardous waste (Mixed Waste). Additionally, Envirocare has been granted a Ground Water Quality Discharge Permit, (GWQDP) Permit No. UGW454445, by the State of Utah, Division of Water Quality. This Plan does not attempt to satisfy the closure requirements of EnergySolutions Envirocare's Radioactive Materials License, the closure requirements of EnergySolutions Envirocare's State-issued RCRA Part B Permit, or closure requirements of EnergySolutions Envirocare's 11e.(2) License No. SMC-1599 UT 2300478. The portions of the EnergySolutions Envirocare Site which are covered by this Post-Closure Monitoring Plan include the Low Activity Radioactive Waste (LARW) and Class A West Disposal Areas; LARW, 11e.(2), and Class A West compliance monitoring wells, and compliance monitoring wells at the Mixed Waste Facility for radiological constituents, and compliance monitoring wells located within the 11e.(2) Disposal Area for non-radiological constituents. In addition, required sampling of Mixed Waste Landfill Cell Leachate is covered in this plan.~~

## 2.0 POST-CLOSURE MONITORING PROCEDURES

### 2.1 Sampling and Analytical Procedures

~~Post-closure sampling at the Site will include sampling of the LARW suction lysimeters and inspection of the observation manholes for the collection lysimeters. If fluids are present in the manholes lysimeter standpipes, samples will be collected. Post-closure sampling will also consist of groundwater sampling from compliance monitoring wells, soil sampling, and vegetation sampling.~~

~~All LARW suction collection lysimeter or and LARW, 11e.(2), and Class A West groundwater sampling procedures and methodology will comply with the approved Water Monitoring Quality Assurance Project Plan, GWQDP, Appendix B. All 11e.(2) groundwater sampling will be performed in accordance with the 11e.(2) License, Sections 11.1 and 11.2. Groundwater sampling for radiological constituents at the Mixed Waste Facility will be performed in accordance with the Water Monitoring Quality Assurance Project Plan, GWQDP, Appendix B Module VI, Ground Water Monitoring of the RCRA Part B Permit. Monitoring for and Sampling of any fluids from the LARW and Class A West collection lysimeters will be in accordance with the requirements of Appendix C of the GWQDP. Soil, and vegetation sampling will be conducted in~~

~~accordance with Appendix R of the Application for Renewal, Radioactive Materials License No. UT2300249, dated March 16, 1998.~~

~~Groundwater sampling will be performed for all compliance monitoring wells specified in the current GWQDP. Samples will be analyzed in accordance with the requirements given in Parts I.C and I.F.5.c of the GWQDP. Water samples collected from lysimeters will be analyzed in accordance with Part I.F.6 and Appendix C of the GWQDP, which are required by the GWQDP. Water samples collected from monitoring wells and lysimeters will be analyzed for all groundwater protection levels (GWPLs) and other monitoring parameters as required by the GWQDP. If monitoring of groundwater for Polychlorinated Biphenyls (PCBs) is required, it ~~shall~~ will be performed using the Test Methods, Practical Quantitation Limit (PQL), and Concentration Limits specified in Section 14 of the GWQDP, Appendix I, Plan for the Management of Waste Containing Polychlorinated Biphenyls (PCBs), and Table VI-1 of the State-issued Part B Permit ~~Mixed Waste Storage and Disposal Permit #982598898.~~~~

~~Mixed Waste Landfill Cell Leachate sampling will be performed on a semi-annual basis. Representative samples of leachate from the upper leachate collection access pipe will be analyzed for radiological constituents as specified in the GWQDP.~~

All groundwater, leachate, and lysimeter sampling and analysis will be reviewed by the Groundwater Manager or qualified designee. The Groundwater Manager or designee must be familiar with the EnergySolutions Envirocare Water Monitoring Quality Assurance Project Plan, and the requirements listed in the Radioactive Materials License, 1 le.(2) License, and RCRA- State-issued Part B Permit.

## ~~2.2~~ Site Inspection

~~The LARW/11e.(2) Cells will be inspected at a minimum of once every six-month period for the duration of post-closure monitoring. The Mixed Waste Landfill Cell will be inspected in accordance with Attachment II-8, *Post-Closure Monitoring Plan* of the RCRA Part B Permit. The LARW/11e.(2) inspection will include the following tasks:~~

- ~~a. — Inspection for evidence of any vandalism or mischief including any breach of the security fencing, damage to the monitoring devices or systems, deposition of any litter or wastes or any other situation which would hinder Envirocare's ability to control site access or monitor the facility.~~
- ~~b. — The cell caps will be viewed to determine any visual evidence of settlement, erosion, burrowing animals, and vegetation. Any vegetation observed on the cap or riprap will be removed within 10 working days to prevent any damage to the structural or hydraulic integrity of the cap, and subsequent infiltration of water. Any other damage to the cell cover, i.e., settlement, erosion, burrowing, etc., will also be repaired within 10 working days.~~

- ~~e. Surface drainage systems, including the drainage ditches and the dispersion area will be visually inspected for any erosion, blockage, settlement or any other condition which may prevent or impede free drainage. If such conditions are observed, corrective actions will be taken within 10 working days to restore a condition of free drainage to these areas.~~
- ~~d. The observation manholes for the collection lysimeters will be inspected for mechanical integrity and security status. If fluids are present in the observation manholes, their volume and flow rate will be recorded in addition to the information required by the GWQDP. If such conditions are observed, corrective actions to restore mechanical integrity and security status will be taken within 10 working days.~~
- ~~e. A report from these semi-annual inspections will be submitted to the Executive Secretary. The semi-annual periods will be January-June and July-December. The reports will be submitted within 30 days of the end of the semi-annual period.~~

## 2.32 Groundwater Monitoring

Groundwater samples will be taken from the compliance monitoring wells on an annual basis for the period of post-closure monitoring (100-year period). The annual sampling events must be conducted at least six months later than the previous year's sampling event. A report of the analytical results of groundwater sampling will be submitted in writing to the ~~Executive Secretary~~Director within 90 days of the completion of the groundwater sampling event unless a corrective action report is required relating to groundwater under Section 3.0. Groundwater compliance will be determined by a comparison of the results of sampling to the established groundwater protection levels specified in the GWQDP.

~~Suction lysimeters, soil moisture instruments, and other devices will be monitored and sampled on an annual basis in accordance with the GWQDP.~~

In conjunction with the annual sampling event, the compliance monitoring wells will be inspected for security of the surface casing, mechanical integrity, condition of inside casing and well depth to assure the well's screens ~~are is~~ free and open to the formation. ~~The suction lysimeters will also be inspected for mechanical integrity and security status.~~ If any conditions requiring corrective actions are observed, these actions will be taken within ~~10 working days~~30 calendar days; or in accordance with a corrective action schedule approved by the Director.

## 2.4 Closure/Post Closure Quality Assurance Procedures

~~All groundwater, suction lysimeter, leachate, soil, and vegetation sampling, analyses, and documentation shall be conducted in accordance with the applicable Permit and/or License as listed in Section 2.1, with the exception of PCBs. Groundwater monitoring for PCBs as required, will be conducted using the Test Methods, Practical Quantitation Limit (PQL), and Concentration Limit as specified in Section 14 of the GWQDP, Appendix I, *Plan for the Management of Waste*~~

~~Containing Poly chlorinated Biphenyls (PCBs), and Table IV-1 of the Mixed Waste Storage and Disposal Permit #982598898.~~

## ~~2.5~~ Closure/Post-Closure Certification

~~All phases of closure operations will be documented by an "As-Built" Report which has been reviewed and stamp/certified by a Utah-registered professional engineer. Upon completion of closure, a certification will be provided by the engineer stating that all work has been performed in accordance with the accepted engineering plans and specification.~~

~~Surveys of the site will be performed annually during post-closure and certified by a Utah-registered land surveyor or Utah-registered professional engineer. Surveying will include the cap of each disposal cell, all surface drainage systems and the water level measuring point at each compliance monitoring well.~~

~~A surveying report will be submitted to the Executive Secretary on or before March 31 of each calendar year.~~

## 3.0 CORRECTIVE ACTION

In addition to any other corrective action that may be required under the GWQDP, the need for corrective action will be evaluated in the event that evaluation of results from Post-Closure monitoring detects migration of constituents to the groundwater, ~~slope settlement (any relative decrease in slope from the approved design slope between settlement monitor points) of the final cap, or any other situation which indicates a compromise of the Cells' integrity, or settlement of the drainage system (any relative decrease in grade of center line of any drainage ditch).~~ The ~~Executive Secretary~~Director will be notified within five 14 calendar days of discovery of a need for corrective action including, but not limited to, ~~security fence repair, cap repair, drainage system repair,~~ monitoring well replacement, or implementation of an escalated monitoring of ~~both~~ the vadose zone ~~and or~~ compliance monitoring wells due to the detection of groundwater or lysimeter water exceeding the protection levels. Within ~~ten~~30 calendar days of notifying the ~~Executive Secretary~~Director, ~~Energy Solutions Envirocare~~ will submit a plan and compliance schedule to complete the corrective action.

## 4.0 NOTIFICATION REQUIREMENTS

The ~~Utah~~ Division of Radiation Control ~~and the Utah Division of Solid and Hazardous Waste~~ will be notified ~~at least one (1) year in advance of the initiation of closure activities. Envirocare will notify the Divisions of completion of closure by the submittal of an engineers' certification of closure. The Divisions~~ will be notified at least 7 calendar days prior to ~~of any plans for performing~~ Post-Closure monitoring ~~so that representatives from the Divisions may be present.~~

APPENDIX G:  
Weather Station Monitoring Plan

APPROVED: September 14, 1994

REVISED: December 7, 2012~~October 31, 2008~~

# Weather Station Monitoring

Revision 12

Authored By: \_\_\_\_\_  
Michael LeBaron, Permitting Engineer Date

Reviewed By: \_\_\_\_\_  
Curtis Kirk, Manager, Quality Assurance ~~Manager~~ Date

Approved By \_\_\_\_\_  
Rick Chalk~~Mark LeDoux~~, Manager, Health  
Physics and Safety~~Corporate Radiation Safety~~  
Officer Date

Approved By \_\_\_\_\_  
Sean McCandless, Manager~~Director~~ of,  
Compliance and Permitting Date

- Non-Proprietary
- Proprietary
- Restricted Information
- Safeguards Information
- Sensitive Security Information

- New
- Title Change
- Revision
- Rewrite
- Cancellation

Effective  
Date \_\_\_\_\_

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**Weather Station Monitoring****1 PURPOSE AND SCOPE****1.1 Purpose**

EnergySolutions' Clive Facility continuously monitors weather conditions to demonstrate that the meteorological assumptions made in infiltration and unsaturated zone modeling are conservative and/or representative of the actual conditions at the disposal site. In accordance with reference 2.4, wWeather data is used to minimize or prevent waste handling under conditions that could disperse contamination or create airborne radioactivity hazards.

This procedure provides a consistent method for the collection of data from the weather monitoring station at the Clive Facility, provides a consistent method for calibrating and maintaining weather data collection equipment and outlines a checklist of weekly, and bi-annual equipment and data inspection requirements that shall be performed by EnergySolutions personnel.

**1.2 Scope**

This procedure applies to the data-monitoring, operation, maintenance, equipment inspection and calibration of the EnergySolutions, Clive Facility Weather Station and any supporting equipment.

**2 REFERENCES**

- 2.1 Weather station component operating manuals (See Attachment 5.1).
- 2.2 ~~EnergySolutions, Clive Facility, Groundwater Quality Discharge Permit, Permit No. UGW450005 (as amended).~~
- 2.3 Quality Assurance Handbook for Air Pollution Measurement Systems, Vol. IV: Meteorological Measurements, Revision 3/95, Environmental Protection Agency.
- 2.4 ~~EnergySolutions, Clive Facility, Utah Division of Radiation Control, Radioactive Material License UT2300249 (as amended).~~
- 2.5 ~~EnergySolutions, Clive Facility, State-issued Part B Permit (as amended).~~
- 2.6 ~~EnergySolutions, Clive Facility, Training Manual, as approved CL-TN-PR-030, Qualification Procedure.~~
- ~~2.7 EnergySolutions, Clive Facility Procedure.~~
- ~~2.8 2.7 CL-QA-WI-120, Control of M & TE.~~
- ~~2.9 EnergySolutions, Clive Facility Qualification, Q1025: Weather Station Monitoring Technician.~~
- 2.8 ANSI/ANS-3.11-2000, Determining Meteorological Information at Nuclear Facilities.
- ~~2.10 2.9~~ ES-QA-PR-005, Records.

**3 GENERAL**

**Weather Station Monitoring****3.1 Definitions**

- 3.1.1 *Continuous Monitoring* - Continuous monitoring is defined as monitoring wind direction and speed, temperature, and daily precipitation such that >90% of the data is successfully obtained on an annual basis. Continuous monitoring for pan evaporation is defined as >90% of the data collected between May 1 and October 1 on an annual basis (ANSI/ANS-3.11-2000).
- 3.1.2 *Weather Station* - Devices used, collectively, to measure and record meteorological parameters at the EnergySolutions, Clive Facility which include:
- CR10X Datalogger for data collection and transmission
  - Evaporation pan and stilling well for evaporation monitoring
  - Pyranometer for solar radiation measurements
  - Precipitation gauge for precipitation measurements
  - Thermometers at 2 and 10 meters for temperature measurements
  - Anemometer and wind vane for wind speed and direction readings
- 3.1.3 *Weather Station Logbook* - A bound logbook with sequentially numbered pages that details activities related to the Weather Station, as required by this procedure.
- 3.1.4 *Weather Station Monitoring File* - A file maintained in Document Control that includes completed Weather Station Logbooks, completed calibration and meteorological reports, and quality assurance check records.
- 3.1.5 *Weather Station Monitoring Technician* - Individual qualified in the operation and routine maintenance of the Weather Station. Technicians are also trained in the operation of the Weather Station software that controls data retrieval and formatting.

**3.2 3.2 Responsibilities**~~3.2.1 Director of Compliance and Permitting~~

~~3.2.23.2.1~~ The ~~Manager, Director of~~ Compliance and Permitting, or designee, has the overall responsibility for implementation of this procedure, and for producing the annual weather data report as specified in this procedure.

~~3.2.3 Permitting Engineer~~

~~3.2.43.2.2~~ The Permitting Engineer is responsible for the operation of the Weather Station, instigating equipment replacement when necessary, maintenance of the Weather Station Monitoring File, and ensuring that equipment inspections, semi-annual calibrations and data quality assurance checks are conducted by qualified individuals as specified in this procedure. The Permitting Engineer ensures that the electronic weather data is maintained on a secure server that is fault-tolerant, and is

**Weather Station Monitoring**

backed up regularly.

~~3.2.5—The Director of LLRW Operations and/or the Director of Mixed Waste Operations~~

~~3.2.63.2.3~~ The Manager, Waste Disposal Operations~~Director of LLRW Operations and/or the Director of Mixed Waste Operations~~ is responsible for ceasing the movement and placement of bulk waste during periods of excessive dust generation caused by high winds or other adverse environmental conditions.

~~3.2.7—The Director of Health Physics~~

~~3.2.83.2.4~~ The Manager, Health Physics and Safety~~Director of Health Physics (RSODHP)~~ has the authority to suspend operations in accordance with ALARA principles, including airborne radioactivity concern due to high wind or other meteorological conditions.

~~3.2.9—The Quality Assurance Department~~

~~3.2.103.2.5~~ The Quality Assurance Department verifies that the Weather Station is calibrated semiannually in accordance with its requirement to track calibrations associated with Measuring & Test Equipment (M & TE), and ensures the quality and integrity of weather data.

~~3.2.11—Weather Station Monitoring Technician~~

~~3.2.123.2.6~~ The Weather Station Monitoring Technicians ~~perform inspections of~~ inspects the Weather Station as required by this procedure and reviews weather data to ensure proper operation of the station.

~~3.2.13—Document Control Department~~

~~3.2.143.2.7~~ The Document Control Department ~~shall maintain~~ at the Weather Station Monitoring File. ~~The Weather Monitoring File shall include completed Weather Monitoring Logbooks, completed calibration and meteorological reports, and quality assurance check records.~~

~~3.2.15—Health Physics Department~~

~~3.2.163.2.8~~ The Health Physics Department shall be responsible for monitoring wind speed and informing the Manager, Waste Disposal Operations~~Director of LLRW Operations, the Director of Mixed Waste Operations~~ and/or the RSODHP of wind speeds in excess of 13.4 meters per second (30 mph).

~~3.2.17—Calibration Vendor~~

~~Semi annually, the Calibration Vendor shall inspect the weather station, perform any necessary repair or maintenance, and ensure that weather data are collected accurately.~~

**Weather Station Monitoring****3.3 Precautions and Limitations**

None.

**3.4 Records**

3.4.1 Records shall be managed in accordance with Reference 2.9 Weather related records are created and stored in accordance with Sections 3.1.3, 3.1.4, 3.2.2, and 3.2.7 of this procedure. Records associated with this procedure include the Weather Station Logbook, Semi-annual calibration documentation, and weekly quality assurance checks. These three document types constitute the Weather Monitoring File and shall be maintained in OnBase throughout the life of the facility.

**4 REQUIREMENTS AND GUIDANCE****4.1 General Requirements**

4.1.1 The Weather Station monitors weather data continuously, and records the following meteorological parameters at the indicated frequencies:

- Evaporation, hourly with daily totals
- Solar radiation, hourly
- Precipitation, hourly with daily totals
- Temperature at 2 and 10 meters, hourly
- Wind speed and direction, hourly

4.1.2 A qualified Weather Station Monitoring Technician acting under the direction of the Permitting Engineer shall perform all weather monitoring activities. Weather Station Monitoring Technicians shall be qualified in accordance with Reference 2.6 of this procedure by completing the qualification module "Q1025 Weather Station Monitoring Technician" contained in the EnergySolutions, Clive Facility Training Manual. It should be noted that the Permitting Engineer can act in place of the Weather Monitoring Technician with respect to these duties.

~~4.1.3 Document Control shall maintain a Weather Monitoring File. The Weather Monitoring File shall include quality assurance check records and completed calibration and meteorological reports. Weather Monitoring Logbooks that have been completely filled shall also be kept as part of the Weather Monitoring File.~~

~~4.1.4~~ 4.1.3 The Permitting Engineer, or qualified designee, shall record details of any of the following activities in the Weather Station Logbook:

- Inspection and calibration
- Maintenance and repair
- Computer software modifications

**Weather Station Monitoring**

- Any other activities or events that may impact weather data  
Logbook entries shall include date, type of action and expected influence on weather data.

4.1.54.1.4 The Permitting Engineer shall ensure that the Evaporation Pan is drained during winter months to prevent the water from freezing and possibly rupturing the basin.

4.1.64.1.5 The ~~Manager, Waste Disposal Operations~~ ~~Director of LLRW Operations, the Director of Mixed Waste Operations~~ and the RSODHP have the authority to suspend or terminate bulk waste handling operations based on adverse environmental conditions.

## 4.2 Procedure

### 4.2.1 Data Monitoring and Reporting

4.2.1.1 Weather data shall be monitored and downloaded continuously from the Datalogger and stored on a secure network server.

4.2.1.1.1 Access to the directory containing weather data files shall be restricted to users authorized by the Manager, Compliance and Permitting ~~Engineer~~, and authenticated by network log-in.

4.2.1.1.2 Weather data recorded and stored in electronic format shall include:

- Hourly and daily evaporation totals
- Hourly solar radiation
- Hourly and daily precipitation totals
- Hourly temperature at 2 meters and 10 meters
- Hourly wind speed and direction

4.2.1.2 Weather data are backed up continuously to two separate locations to ensure that data ~~are~~ not lost from the system. Weekly, the Permitting Engineer or a qualified Weather Station Monitoring Technician shall review the data to verify that the Weather Station is operating correctly.

~~4.2.1.3 Semi-annually, the Quality Assurance Department shall review weather data for completeness and integrity. Any discrepancies shall be resolved with the Permitting Engineer.~~

~~4.2.1.4~~ 4.2.1.3 The Manager, Director of Compliance and Permitting shall produce an annual report of the weather data, and provide

Weather Station Monitoring

copies to ~~EnergySolutions' Vice President of Environmental Compliance and Permitting and~~ the Utah Division of Radiation Control on or before March 1st. The annual report shall include meteorological data for the previous reporting year (January 1st through December 31st).

~~4.2.1.5~~4.2.1.4 ~~LLRW~~ Health Physics Personnel shall observe wind speed information during work hours.

~~4.2.1.5~~4.2.1.4.1 Health Physics Personnel shall monitor the 5-minute maximum wind speed and inform the ~~Manager, Waste Disposal Operations~~~~Director of LLRW Operations, the Director of Mixed Waste Operations~~ and/or ~~RSODHP~~ of wind speeds in excess of 13.4 meters per second (30 mph).

~~4.2.1.5~~4.2.1.4.2 ~~In accordance with Radioactive Material License UT 2300249, Condition 35.D, t~~The ~~Manager, Waste Disposal Operations~~~~Director of LLRW Operations, the Director of Mixed Waste Operations~~ and/or ~~the RSODHP~~ shall cease all bulk waste handling when the 5-minute average wind speed reaches 15.6 meters per second (35 mph). When both the 5-minute average and 5-minute maximum wind velocities are below 15.6 meters per second as observed on the meteorological station, bulk waste management may resume.

#### 4.2.2 Calibration, Maintenance and Quality Assurance

4.2.2.1 Weather Station calibration and inspection shall be performed according to manufacturer's recommendations.

4.2.2.2 Any vendor performing work on the Weather Station shall ~~be approved by the Quality Assurance Department. As part of the approval process, the Quality Assurance department shall ensure that the vendor~~ possesses expertise in meteorological science, either through certifications and accreditations, on-the-job experience or educational background of personnel.

4.2.2.3 Semiannually, ~~or more frequently if specified in the manufacturer's recommendations, an approved vendor shall inspect~~ the weather station; shall be inspected/calibrated and any necessary repair or maintenance performed ~~to perform any necessary repair or maintenance, and~~ ensure that weather data have been, and are being, are collected accurately.

## Weather Station Monitoring

4.2.2.4 The vendor shall inspect and calibrate the following instruments during the inspection (see Attachment 5.1 for more detailed specifications):

- Datalogger
- Evaporation pan and stilling well
- Pyranometer
- Precipitation gauge
- 2 and 10 meters thermometers
- Anemometer and wind vane
- Aspirated Shield

**Note:** The semi-annual calibration and inspection include an inspection of the blower for the aspirated shield. Once every two years, the blower shall be replaced~~calibration vendor shall replace the blower~~ in accordance with the Weather Station manufacturer's recommendations.

4.2.2.5 The Quality Assurance department shall maintain~~ist~~ Weather Station instruments in the Measuring and Testing Equipment Master Index (as required by CL-QA-WI-120, Control of M & TE), and shall help ensure timely calibration of these instruments by notifying the Permitting Engineer prior to the calibration due date.

4.2.2.6 Weekly, the Permitting Engineer or qualified designee shall ensure that quality assurance checks on the weather station data are conducted to evaluate their validity. The person performing the quality assurance checks will possess experience in statistical analyses and a bachelor's degree in engineering, chemistry, physics, or any of the physical-science related fields. These checks shall be performed on all data obtained for the following parameters:

- Wind direction and speed;
- Temperature;
- Daily precipitation; and,
- Pan evaporation.

4.2.2.6.1 The following guidance documents, or documents of an equivalent nature, will be used to perform

quality assurance checks:

- The most current on-site meteorological data;
- *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (PSD) EPA-450/4-87-012 (1987);
- *Meteorological Monitoring Guidance for Regulatory Modeling Applications*, EPA-454/R-99-005, February, 2000;
- Quality Assurance Handbook for Air Pollution Measurements Systems, Vol. IV: *Meteorological Measurements* EPA/600/R-94/038d (1995); and,
- Quality Assurance Handbook for Air Pollution Measurements Systems, Vol. I: *A Field Guide to Environmental Quality Assurance* EPA/600/R-94/038a (1995).

## 4.2.2.6.2

Quality assurance checks shall be performed to standard industry practices. Documentation shall include the following:

- The date and time the data were received by the ~~quality assurance reviewer~~ Calibration Vendor;
- The individual who sent the data to the ~~quality assurance reviewer~~ Calibration Vendor;
- The date and time the quality assurance analysis was performed;
- The individual(s) who performed the analysis;
- The analytical techniques or methods used; and,
- The results of the analysis.

## 4.2.2.6.3

~~Documentation of the quality assurance checks shall be maintained for at least three years by the Permitting Engineer, or designee. Copies of the documentation will be submitted to Document Control by January 31 of each year. Document Control shall electronically capture the quality assurance documentation and maintain it as part of~~

Weather Station Monitoring

~~the Weather Monitoring File.~~

4.2.2.6.4 Should failure in any of the systems outlined in Section 4.2.2.6 be discovered via the quality assurance checks, the failure shall be reported to the Permitting Engineer within one working day of discovery. The repair shall then be implemented within three working days of notification to the Permitting Engineer. If the failure cannot be corrected within the established timeframe, the DRC will be notified and a modified repair schedule submitted within two working days of the notification.

4.2.2.6.5 Repairs made to the weather station shall be documented in the Weather Station Logbook and included in the annual meteorological report.

4.2.2.7 The calibration vendor shall provide a report of calibration and inspection activities. The Permitting Engineer shall review the report to ensure that the calibration has been performed properly. ~~The Permitting Engineer shall submit the report to Document Control to be maintained in the weather station file, and to the QA department to update the Measuring and Testing Equipment Master Index. The QA department shall also review the report as part of their scheduled surveillances.~~

4.2.2.8 The Permitting Engineer, or qualified Weather Station Monitoring Technician, shall record all calibration activities in the Weather Station Logbook. Entries shall include dates of activities, personnel involved, and information regarding findings or repairs.

~~4.2.2.9 Annually, the Quality Assurance department shall perform a surveillance of the weather station calibration process to ensure that it meets the requirements of this procedure.~~

#### 4.2.3 Inspection Activities

4.2.3.1 On a weekly basis, a weather monitoring technician, or qualified designee, will inspect the Weather Station facilities in accordance with EnergySolutions form EC-98340, Weather Monitoring Form (Attachment 5.2). A record of these inspections will be kept with the Weather Station Logbook.

~~On a quarterly basis, the Director of Compliance and Permitting, or qualified designee, will review the weekly inspection form (EC-98340) for completeness and to ensure~~

**Weather Station Monitoring**

~~that the weather station is functioning as required.~~

**5 ATTACHMENTS AND FORMS**

- 5.1 Weather Station Component Model/Serial Numbers and Operating Instructions References
- 5.2 Form EC-98340, Weather Monitoring Form

**Attachment 5.1 – Weather Station Component Model/Serial Numbers and Operating Instructions References**

**Datalogger:**

Operating Instructions: “CR10X Measurement and Control Module Operator’s Manual,” Revision 9/01, Campbell Scientific, Inc.

Manufacturer: Campbell Scientific Model: CR10X or equivalent S/N: X30411

**Evaporation Pan and Stilling Well:**

Operating Instructions: “Model 255-100 Analog Input Evaporation Gauge Instruction Manual,” Revision 7/98, NovaLynx Corporation.

Manufacturer: NovaLynx Model: 255-100 or equivalent S/N: 0558

**Automatic Refill System:**

Operating Instructions: “Novalynx Model 255-620 Evaporation Pan Automatic Refill System Instruction Manual, Revised June 2001.”

Manufacturer: NovaLynx Model: 255-620 or equivalent S/N: N/A

**Pyranometer:**

Operating Instructions: “LI200S Pyranometer,” Revision 2/96, Campbell Scientific, Inc.

Manufacturer: LiCor Model: 200 -or equivalent S/N: PY15627

**Precipitation Gauge:**

Operating Instructions: “Model Number 380C/382C 12-Inch Rain Gauge Operation Manual Document Number 380-9801,” 7/2/94, Met One Instruments.

Manufacturer: Met One Model: 385 or equivalent S/N: E1987

**Thermometer:**

Operating Instructions: “43347 RTD Temperature Probe and 43408 Aspirated Radiation Shield,” Revision 2/99, Campbell Scientific, Inc.

**Two-meter probe:**

Manufacturer: R.M. Young Model: 43347 or equivalent S/N: ECWX2M

**Ten-meter probe:**

Manufacturer: R.M. Young Model: 43347 or equivalent S/N: ECWX9M

**Anemometer:**

Operating Instructions: “05103 and 05305 R.M. Young Wind Monitor Instruction Manual,” Revision 9/96, Campbell Scientific, Inc.

Manufacturer: R.M. Young Model: 05305 or equivalent S/N: 11541

**Weather Station Monitoring**

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Aspirated Shield:

Operating Instructions: "43347 RTD Temperature Probe and 43408 Aspirated Radiation Shield,"  
Revision 2/99, Campbell Scientific, Inc.

Manufacturer: R.M. Young                      Model: 43408 or equivalent S/N: N/A



EC-98340  
Revision 1

**Weekly Meteorological Monitoring Station Inspection Form**

Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Inspector: \_\_\_\_\_  
 Reviewer: \_\_\_\_\_  
 (Name and Date)

Current Weather Conditions
----------------------------

Inspection Activity	Comments
<b>General Area</b>	
Y N Weeds are controlled?	
Y N Area is free of wind blown debris?	
Y N Evidence of tampering or vandalism?	
Y N Weather Monitoring Station Gate is closed?	
Y N All electrical connections are in place?	
<b>Evaporation Pan</b>	
Y N Automatic Refill system is free of visible leaks?	
Y N Circumference of pan is free of visible leaks?	
Y N Hoses and fittings are free of visible leaks?	
Y N Pan is free and clear of organic debris?	
<b>Precipitation Gauge</b>	
Y N Wind shield is secure and fastened into place?	
Y N Tipping bucket is locked firmly into place?	
Y N Gauge shows evidence of tampering?	
Y N Rain funnel is free and clear of debris?	
Y N Tipping bucket is free and clear of debris?	
Y N If winter: Heater is functioning and collected snow is being melted?	
<b>Note: The cover for the precipitation gauge will not be removed during storm events</b>	
<b>2 - Meter Blower</b>	
Y N Intake is clear of blockages?	
Y N Blower is functioning?	

Appendix H  
Permit No. UGW450005

## APPENDIX H:

Reserved

Appendix I  
Permit No. UGW450005

## APPENDIX I:

Reserved

## APPENDIX J:

# Best Available Technology (BAT) Performance Monitoring Plan

LATEST REVISION: ~~May 1, 2012~~September 7, 2012

APPENDIX K:  
Best Available Technology (BAT)  
Contingency Plan

LATEST REVISION: ~~November 14, 2011~~ September 7, 2012