



Department of Energy
Office of Legacy Management

October 28, 2008

Mr. Ray Plieness, Director
LM-20
U.S. Department of Energy
Office of Legacy Management
2597 B3/4 Road
Grand Junction, CO 81503

SUBJECT: Commercial Disposal of Residual Radioactive Waste

Dear Mr. Plieness:

The enclosed document is the U.S. Department of Energy (DOE) Rocky Flats Site (RFS) request for a permanent exemption from DOE Order 435.1, in accordance with Section 3.d.(7), to allow commercial disposal of low level radioactive waste (LLW). The main waste streams targeted for disposal at the commercial facility consist of demolition debris generated during the dam breach project (grouted PVC and metal pipe, miscellaneous metal valves, etc.) that may be determined to be LLW, and spent groundwater treatment media contaminated with residual radioactivity from the Solar Pond Plume Treatment System (SPPTS). Other LLW may be generated periodically due to monitoring, maintenance, and investigation activities involving excavation in areas where residual contamination was allowed to remain in place. Subsurface debris and ancillary wastes associated with project radiological controls, such as used personal protective equipment, could also be generated and may require disposal as radioactive waste.

The information required for consideration in the exemption request, referenced in DOE Order 435.1 and outlined in DOE Manual 251-1-1B, is addressed in Chapter 1. In addition, each requirement specified in DOE Manual 435.1-1, for the approval of LLW waste disposal at non-DOE facilities, is addressed in Chapter 2.

The volume of dam breach demolition debris may total 200 cubic yards (yd³), depending on characterization results. However, it is likely that much of this demolition debris will be free-released and managed as solid waste for disposal at the local municipal landfill. The dam breach project began in October 2008 and is expected to end sometime in April 2009. Depending on the volume of LLW generated, off-site disposal could occur periodically for the duration of the project.

The SPPTS spent treatment media, consisting of approximately 300 yd³ of zero valent iron, gravel, woodchips, and piping system components, will be generated in early to mid-2010. Also, approximately 1 yd³ of SPPTS treatability study media, consisting of gravel and plastic rings from a treatability study conducted in the spring of 2007, will be disposed with the SPPTS media. Ancillary wastes associated with project radiological controls, such as used personal protective equipment, will also be generated. Off-site disposal of SPPTS LLW will occur shortly after project

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REPLY TO: Westminster, CO Office

completion. Spent media change out is currently anticipated to take place every 4 to 5 years of operation. However, reconfiguration of the treatment system is being planned for phased installation in 2009 and 2010. The goal of the reconfiguration is to significantly reduce the volume of the uranium contaminated treatment media and potentially decrease the frequency of spent media replacement to once every 10 years.

The RFS plans to utilize Energy Solutions of Utah, LLC (ESU), for the off-site disposal of LLW. Disposal of waste at ESU will result in immediate disposition of the LLW, resulting in savings on long-term storage costs, Nevada Test Site (NTS) application and certification costs, and schedule accommodation costs to dispose of this material at the NTS.

Due to the episodic nature, small quantity, and variability of RFS LLW, other future waste considered for disposal at ESU will fall within the exemption parameters. Therefore, the RFS is seeking a permanent exemption from DOE Order 435.1.

The approval process for granting an exemption, as described in the Order, is as follows:

Approving Officials, including Heads of Departmental Elements (which includes Operations and Field Office Managers), shall provide notification of proposed exemption to the Office of Environmental Policy and Guidance (EH-41) and the Office of the Assistant Secretary for Environment, and Safety and Health (EH-1), to ensure consistency with Departmental policy and identification of any significant concerns. Approving officials will not issue a final approval granting an exemption unless:

Office of Environmental Policy and Guidance (EH-41) and the Office of the Assistant Secretary for Environment, Safety and Health (EH-1) concur with the proposed exemption decision; or

The 30-day calendar review period passes without objection or request for additional information from Headquarters (EH-41) and the Office of the Assistant Secretary for Environment Safety and Health (EH-1).

Please respond to me with questions, concerns, or your concurrence. If you have any questions, regarding this submittal, please call me at (720) 377-9682.

Sincerely,



Scott R. Surovchak
LM Site Manager

Mr. Plienness

-3-

Enclosures

cc:

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Project File RFS 515.20(A) (thru S. Raynes)

Post-Closure AR File (thru H. Young)

**Exemption from DOE Order 435.1 for Disposal of the Rocky Flats Site
Low Level Radioactive Waste at Energy Solutions of Utah**

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1.0 Exemption Process per DOE Manual 251.1-1B

1.1 Introduction

U.S. Department of Energy (DOE) directives require that DOE low level radioactive waste (LLW) shall be treated, stored, and disposed at the site where the waste was generated if practical or at another DOE facility (DOE M 435.1-1, 1999). If DOE capabilities are not practical or cost effective, an exemption may be approved to allow LLW disposal at a commercial facility. LLW will be generated at the Rocky Flats Site (RFS); waste streams targeted for disposal at a commercial facility consist of demolition debris that will be generated during the dam breach project, and the Solar Pond Plume Treatment System (SPPTS) spent groundwater treatment media. Episodic generation of other LLW may result from monitoring, maintenance, and investigation activities including the potential for excavation in areas where residual radioactivity may be present.

This chapter describes the preparation of generic exemption requests in accordance with DOE Manual 251.1-1B, Chapter X, Exemptions (DOE M 251.1-1B, 2006). Although DOE M 251.1-1A is referenced in DOE Order 435.1, "Radioactive Waste Management" (DOE O 435.1, 2001), the Manual was superseded by 251.1-1B and will be referenced as such in the remainder of this document. Requests for exemptions should address the following information, as appropriate:

1. Site or facility for which an exemption is being requested.
2. Reference to the requirements for which the exemption is sought.
3. Identification and justification of the acceptance of any additional risks that will be incurred if the exemption is granted.
4. Benefits to be realized if the exemption is provided.
5. Indication of whether the exemption being requested is temporary. If it is temporary, an indication of when compliance will be achieved.
6. Identification of other pertinent data or information used as a basis for obtaining an exemption. See Chapter 2.
7. Requests for exemptions to environment, safety, and health requirements (not applicable).

This information, as applicable and appropriate, is provided in the sections below.

1.2 Rocky Flats Facility Description

Requirement (1) Site or facility for which an exemption is being requested

The RFS is a DOE facility owned by the United States. Rocky Flats is located in the Denver metropolitan area, approximately 16 miles northwest of Denver, Colorado, and 10 miles south of Boulder, Colorado. Nearby communities include the cities of Arvada, Broomfield, and Westminster, Colorado.

Beginning in 1951, DOE and its predecessor agencies and contractors managed and operated RFS under authorization of the Atomic Energy Act (AEA). RFS was part of the United States' nationwide nuclear weapons complex to manufacture nuclear weapon components from various radioactive, hazardous, and nonhazardous materials. Manufacturing activities, accidental industrial fires and spills, and support activities including waste management resulted in the release of hazardous substances, hazardous wastes, and hazardous waste constituents to air, soil, sediment, groundwater, and surface water. Contaminants included radionuclides such as plutonium-239/240, americium-241, and various uranium isotopes; organic solvents such as trichloroethene, tetrachloroethene, and carbon tetrachloride; metals such as chromium; and nitrates.

RFS was listed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) in 1989. Cleanup and closure were completed in 2005.

Cleanup and closure resulted in the removal of all surface pavement, sidewalks, and buildings, except for the former east and west vehicle inspection sheds. Remaining manmade features at Rocky Flats include water monitoring stations and wells, surface-water detention ponds and associated dams, the closed Original Landfill and the closed Present Landfill and groundwater treatment systems. Between ground surface and 3 feet (ft) below grade, essentially all structures were removed, with the exception of some utility lines less than 2 inches in diameter, the aforementioned vehicle inspection sheds, three passive groundwater collection and treatment systems that serve an ongoing function, and the Present Landfill seep collection and treatment system. At depths greater than 3 ft below grade, some subsurface structures remain in place. These include slabs, tunnels, and building foundations (including caissons or grade beams in some areas); sewer lines and water lines; culverts, foundation drains, and storm drains; valve vaults and process waste lines; and remnants of utility conduits (such as cables and wires).

Some of these subsurface features may contain residual contamination. Portions of the former buildings have residual americium-241 and plutonium-239/240 contamination, including former Buildings 371/374 basement and sub-basement slab/walls, former Building 730 basement slab, former Building 771 first and second floor slabs and walls, former Building 771C slab, former Building 774 first and second floor slab/walls, and the tunnel between former Buildings 771 and 776.

The final Corrective Action Decision/Record of Decision (CAD/ROD) for RFS was issued on September 29, 2006. The RFS has two Operable Units (OUs) within the boundaries of the property: the 1,308-acre Central OU and the 4,883-acre Peripheral OU. The Central OU consolidated all areas of Rocky Flats that required additional remedial/response actions, while also considering practicalities of future land management. The Peripheral OU includes the remaining, generally unimpacted portions of RFS, and surrounds the Central OU.

The response action in the final CAD/ROD is no action for the Peripheral OU, and institutional and physical controls with continued monitoring for the Central OU. The off-site areas at RFS, known as OU 3, were addressed under a separate no action CAD/ROD dated June 3, 1997.

On May 25, 2007, EPA published a Notice of Partial Deletion from the NPL for the Peripheral OU and OU 3 (72 FR 29276). This Notice of Partial Deletion was based on a determination that no hazardous substances occur in the OUs in excess of levels that allow for unlimited use and unrestricted exposure. Most of the property outside the Central OU was transferred to the U.S. Department of the Interior on July 12, 2007, for the establishment of a National Wildlife Refuge managed by the U.S. Fish and Wildlife Service (USFWS).

The remedy requirements for the Central OU are being implemented in accordance with the *Rocky Flats Legacy Management Agreement* (RFLMA) between DOE, EPA, and the Colorado Department of Public Health and Environment (CDPHE) (DOE 2007). DOE-LM is responsible for ongoing RFS surveillance and maintenance, which is performed under contract by the S.M. Stoller Corporation. Surveillance and maintenance activities required by RFLMA may on occasion necessitate investigation or construction work that could generate LLW for off-site disposal. Other activities to reduce long term maintenance costs and enhance ecological conditions may also involve removal or reconfiguration of existing features, such as historical dams installed for surface water retention and management during operation of the RFS.

1.3 Purpose/Objective

Requirements (2) and (5) Reference to the Requirement for which exemption is sought, and an indication of whether the exemption being requested is temporary. For temporary exemptions indication of when compliance will be achieved.

According to DOE Order 435.1, *Radioactive Waste Management*, Section 3.d.(7), when capabilities for treatment, storage, or disposal of low level waste (LLW) and mixed low level waste (MLLW) at DOE facilities are not practical, exemptions developed in accordance with DOE Manual 251.1-1B, may be approved to allow use of non-DOE facilities, provided that the requirements of this order are met. This chapter summarizes the RFS DOE Order 435.1 exemption request. This is a request for a permanent exemption from DOE Order 435.1, since the nature of any future radioactive wastes from RFS will be similar to these wastes, such that they will be small volumes of demolition debris and incidental wastes from radiological controls, generated on an infrequent basis and in an episodic manner.

1.4 Waste Stream Description and Project Management

Requirement (6) Identification of other pertinent data or information used as a basis for obtaining an exemption

Prior to completing the cleanup and closure of RFS, DOE issued the October 2004, *Pond and Land Configuration Environmental Assessment Comment Response, and Finding of No Significant Impact* (DOE 2004), in which DOE proposed to breach dams A-1 and A-2 (located in North Walnut Creek) and dams B-1, B-2, B-3, and B-4 (located in South Walnut Creek). DOE proposed the dam breach in order to remove the dams from state regulation, to return the streams to a more natural flow condition, and to reduce long-term active management and maintenance. Since RFS has been cleaned up, undergone closure, and transitioned to the long term surveillance and maintenance phase, LM intends to implement the proposed action in the Environmental Assessment.

This work involves excavation, demolition, and removal of old culverts, piping and related components previously left in place, and the use of heavy equipment. The dam breach work involves constructing a notch in each dam and installing a stop log structure to create a natural flow through configuration, which will enhance ecological resources. The project will result in removal of the subsurface dam piping and ancillary equipment within the construction area.

Prior to RFS closure, the pond sediments and surrounding soils underwent sampling and analysis. The investigation resulted in removal of sediments from ponds B-1, B-2, and B-3 because plutonium and americium concentrations were above soil action levels; triggering clean up actions. Clean soil was used to backfill the excavated areas. Plutonium and americium concentrations in the other pond areas, while above background in some locations, did not trigger clean up and no further action was required. Prior to sediment removal, plutonium concentrations of up to 760 picocuries per gram (pCi/g) were measured in the pond sediment.

The pre-closure investigation did not include characterization of subsurface piping within the dams, some of which is filled with grout, because the items were inaccessible. Table 1 provides a description of the components to be removed during the dam breach project. Based on process knowledge, it is possible that some of the grouted piping being removed could have detectable contamination. The dam breach project includes radiological surveys of the piping and other infrastructure as it is removed to determine if these wastes must be disposed of as LLW. Ancillary wastes associated with project radiological controls, such as used personal protective equipment, will also be generated. The dam breach waste streams, targeted for disposal at Energy Solutions of Utah, LLC (ESU), could potentially consist of up to 200 cubic yards (yd³) of LLW in the form of demolition debris. The exact amount of debris and levels of contamination will be determined by excavation, surveying, segregation, and sampling and analysis, as needed, to provide adequate characterization.

The Solar Ponds Plume Treatment System (SPPTS) treats groundwater contaminated with nitrates and depleted uranium, and some proportion of naturally occurring uranium. The SPPTS waste streams, targeted for disposal at ESU, consist of approximately 300 yd³ of spent media composed of zero valent iron, pea gravel, wood chips, and ancillary piping. Based on process knowledge, using the SPPTS influent and effluent concentrations and groundwater volume treated, the spent media contains approximately 0.75 lbs of uranium. Additionally, approximately 1 yd³ of SPPTS treatability study waste consisting of pea-gravel and plastic rings, from a treatability study conducted in the spring of 2007, is being stored for LLW disposal when the SPPTS spent media is shipped for disposal. The SPPTS spent media uranium concentration was estimated using mass balance calculations. The one-time generation of treatability study waste was sampled and analyzed for uranium concentration. The results are presented in Table 2. Spent media change out is currently anticipated every 4 to 5 years of operation. However, reconfiguration of the treatment system is being planned for phased installation in 2009 and 2010, with a goal to significantly reduce the volume of the uranium contaminated treatment media and potentially decrease the frequency of spent media replacement to every 10 years.

Other LLW may be generated from time to time due to monitoring, maintenance, and investigation activities that involve excavation in areas where residual radioactivity might be present. Subsurface debris and ancillary wastes associated with project radiological controls, such as used personal protective equipment, could also be generated, requiring disposal as LLW.

Table 1. Items That May Require Removal during the Dam Breach Project

Dam	Item/Feature	Detail
A-1	main outlet pipe 46.5 yd ³	corrugated metal pipe (cmp): ~100 ft, 48-inch diameter, full of grout; concrete cutoff collars, standard (std) metal end section
	outlet/valve works 2yd ³	steel platform; misc. concrete; valve components
	transfer pipe from N. Walnut Cr. Bypass Pipeline to Pond A-1	cast iron pipe (cip): ~40 ft, 10-inch diameter 7.44 yd ³
	valve A1-5 casing (vertical riser pipe on transfer pipe)	cmp: ~10 ft, 24-inch diameter
A-2	main outlet pipe	ductile iron pipe (dip): ~150 ft, 10-inch diameter, full of grout; concrete cutoff collars
	outlet/valve works	concrete thrust blocks, valve and lift pedestals; valve components
	service spillway pipe	cmp: ~125 ft, 42-inch diameter; outfall: std metal end section
	service spillway inlet drop structure	trash rack; concrete box drop structure
B-1	piezometer TH046592	typical well components
	piezometer TH046792	typical well components
	low level outlet pipe	dip: ~100 ft, 10-inch diameter, full of grout; concrete cutoff collars
	low level outlet/valve works	valve components; riser casing
	strip drain pipe	ABS plastic: ~50 ft, 4-inch diameter
	main outlet pipe	cmp: ~100 ft, 36-inch diameter, full of grout, std metal end section; conc. drop structure: full of concrete;
B-2	low level outlet pipe	dip: ~100 ft, 10-inch diameter, full of grout; concrete cutoff collars
	low level outlet/valve works	valve components; riser casing
	service spillway drop structure	concrete drop box; trash rack
	service spillway outlet pipe	cmp/HDPE: ~100 ft, 36-inch diameter
	old WWTP diversion pipe valve	valve components; riser casing
	old WWTP pipeline manhole	typical concrete manhole
B-3	piezometer TH046992	typical well components
	piezometer TH047092	typical well components
	service spillway/drop structure	metal railing; concrete drop box
	service spillway pipeline	cmp: ~90 ft, 48-inch diameter, standard metal end section
	strip drain pipe	abs plastic: ~20 ft, 4-inch diameter
	low level standpipe	dip: ~5 ft, 10-inch diameter
	low level outlet pipe	dip: ~30 ft, 10-inch diameter
	low level outlet valve	valve components and riser
B-4	service spillway	concrete spillway, box culvert, and flip bucket
	old stairway footers	concrete blocks

Table 2. Uranium in SPPTS Treatability Study and SPPTS Media Waste

Specification Descriptions	Nor-Pac Plastic Rings Media	Zero Valent Iron	Wood Chips	Pea Gravel Media	Comments
SPPTS Treatability Study Waste Volumes	55 gal (7.35 ft ³)	Not used	Not used	200 gal (24 ft ³)	Activity conducted in April 2007
Uranium Activity of Treatability Study Waste	0.05 µCi	NA	NA	0.9 µCi	Activity is based on uranium leached from 100 g sample of spent material
SPPTS Media Volumes	Not Used	34 yd ³	203 yd ³	64 yd ³	Change-out –expected in 2010
Uranium Activity in SPPTS Media	NA	25.5 µCi	153 µCi	48.5 µCi	SPPTS media activity calculation is based on equal distribution of activity per volume of media and a total uranium weight of 75 lbs, using CDPHE conversion factor of 2 pCi/3 µg for natural uranium

µCi = microcuries
 µg = micrograms
 NA = Not Applicable

1.5 Selection of Existing Contracts

Rocky Flats has the flexibility to utilize existing contracts within the DOE complex with ESU, or to utilize a waste broker who has a standing contract with ESU, part of which covers disposal of LLW. Funding is in place for off-site disposal of the RFS LLW.

1.6 Method of Transportation

The RFS LLW will be packaged in soft-sided or hard-sided boxes or in super-sacks in full compliance with applicable DOT requirements for the concentration and quantity of radioactive materials being shipped. The LLW will be transported from the RFS to ESU by truck.

1.7 Transportation Analysis

Requirement (3) Identification and justification of the acceptance of any additional risks that will be incurred if the exemption is granted

Under CERCLA, the RFS analyzed the potential environmental consequences associated with transporting LLW and MLLW to off-site commercial and government facilities for treatment and/or final disposal. The destinations evaluated included the ESU Clive, Utah, facility, and the analyzed wastes included waste streams similar to those addressed in this exemption request,

which were historically transported in bulk form. LLW generated during cleanup and closure of RFS was transported and disposed of at the ESU (formerly known as Envirocare of Utah, Inc.) facility. Based on the results of that evaluation, it is reasonable to expect that occasional and infrequent shipments by truck, containing individual packages of these waste streams, will not pose a significant risk under normal transport conditions.

1.8 Use of an Off-site Disposal Facility

Requirement (4) Benefits to be realized by providing the exemption

Presently, RFS has no capability for disposal of LLW on site. In addition, RFS is not certified to ship waste to the Nevada Test Site (NTS) as an approved generator. In our current situation, disposal at the Nevada Test Site (NTS) is not an option. Due to the small quantities and infrequent generation of LLW at RFS, it is unlikely that LM will pursue an NTS certification in the future.

Additional considerations compel use of a commercial facility over the use of NTS. These include the following:

- The certification period required to dispose of these wastes at the NTS would well extend the proposed duration of the activity;
- A DOE contract is in place with ESU and can be used by LM for the disposal of debris, soil, and construction materials contaminated with residual radioactivity;
- Minimal health and environmental risks are associated with these waste streams, based on the small amount of the low concentrations of activity;
- As indicated in section 2.4, significant cost savings would be realized for DOE by using the commercial facility in lieu of the NTS.

ESU is a commercial facility that is fully licensed to accept and dispose of LLW. Based upon the characterization of the initial waste streams targeted for commercial disposal, ESU can accept these wastes (see a copy of the license in Appendix A for radioisotopes and concentrations allowed). The DOE Office of Health, Safety, and Security performed an audit in April 2008 and no significant deficiencies were found (Appendix B). Historically, ESU has been used by many other DOE facilities for the disposal of treated MLLW and LLW (e.g., Mound Site, Fernald Site, Laboratory for Energy-Related Health Research [LEHR] Site, the Lawrence Livermore National Laboratory [LLNL], Oak Ridge, and Brookhaven). Previously, under DOE-EM CERCLA clean-up and closure actions, RFS utilized ESU for the disposal of treated MLLW and bulk LLW, so other exemptions have been obtained for the disposal of RFS waste at ESU.

2.0 DOE Order 435.1 Exemption Requirements for Commercial Disposal at Energy Solutions

2.1 Introduction

DOE Order 435.1 requires that DOE radioactive waste shall be treated, stored, and in the case of low-level waste, disposed of at the site where the waste is generated if practical, or at another DOE facility (DOE, 1999). If DOE capabilities are not practical or cost effective, exemptions may be approved to allow use of non-DOE facilities for the storage, treatment, or disposal of DOE radioactive waste based on the following requirements:

- (a) Such non-DOE facilities shall:
 1. Comply with applicable federal, state, and local requirements;
 2. Have the necessary permit(s), license(s), and approval(s) for the specific waste(s); and
 3. Be determined acceptable by the Field Element Manager based on a review conducted annually by DOE.
- (b) Exemptions for the use of non-DOE facilities shall be documented to be cost effective and in the best interest of DOE, including consideration of alternatives for on-site disposal, an alternative DOE site, and available non-DOE facilities; consideration of life-cycle cost and potential liability; and protection of public health and the environment.
- (c) DOE waste shall be sufficiently characterized and certified to meet the facility's waste acceptance criteria.
- (d) Appropriate National Environmental Policy Act (NEPA) review must be completed. For actions taken under CERCLA, it is DOE's policy to incorporate NEPA values into the CERCLA documentation.
- (e) Headquarters shall be notified of any exemption allowing use of a non-DOE facility and the Office of the Assistant Secretary for Environment, Safety, and Health (EH-1) shall be consulted prior to the exemption being executed.
- (f) Host States and State Compacts where non-DOE facilities are located shall be consulted prior to approval of an exemption to use such facilities, and notified prior to shipments being made.

The ESU facility in Clive, Utah, is identified as the most viable commercial low-level radioactive waste disposal facility because:

- It is the closest permitted and licensed low-level radioactive waste facility to the RFS site;
- It maintains adequate liability insurance (Appendix C);
- It has been used extensively by DOE sites, including RFS, for waste disposal;
- It has been audited by DOE within the last year; and
- Favorable DOE-established contract rates are available.

The comparison of this facility to other DOE disposal options is discussed in section 2.4. Each of the requirements specified in DOE Manual 435.1-1, dealing with approval of exemptions for use of waste disposal services at non-DOE facilities, is addressed below.

2.2 Disposal Facility Demonstration of Compliance

Requirement (a)1. The non-DOE facilities shall comply with applicable federal, state, and local requirements

ESU is managed in compliance with applicable federal, state, and local requirements. The DOE Office of Health, Safety, and Security performed an audit in April 2008 through the DOE Consolidated Audit Program (DOECAP), and no Priority I findings were identified (Appendix B). ESU has been used by several DOE facilities for the disposal of both treated MLLW and LLW (e.g., the Mound Site, Fernald Site, LEHR Site, LLNL, Oak Ridge, and Brookhaven). The RFS has used ESU for the disposal of LLW and LLW in the past, and other exemptions have been obtained for the off-site disposal of RFS waste at the Clive facility.

2.3 Disposal Facility Permits, Licenses, and Approvals

Requirement (a)2. The non-DOE facilities shall have the necessary permit(s), license(s), and approval(s) for the specific waste(s).

ESU has all of the permits, licenses, and approvals necessary for disposal of RFS SPPTS LLW and contaminated demolition debris. The waste-specific facility permits, licenses, and approvals include:

- State of Utah, Radioactive Material License (Appendix A).
- State of Utah, Ground Water Quality Discharge Permit.
- United States Environmental Protection Agency, Region 8, Toxic Substances Control Act Approval.
- State of Utah, Division of Air Quality, Air Order.

All of the isotopes, and their respective activity concentrations associated with wastes identified in Tables 1 and 2, are included on ESU's radioactive material license issued by the State of Utah, and meet license activity concentration limits. Any future waste streams will be reviewed against the ESU waste acceptance criteria (WAC), and only waste meeting the license requirements will be sent for disposal.

Requirement (a)3. The non-DOE facilities shall be determined by the Field Element Manager to be acceptable based on a review conducted annually by DOE.

In April 2008, the DOE Office of Health, Safety, and Security performed an independent audit of ESU through the DOECAP (Appendix B) and found no significant deficiencies. The LM RFS Manager, as delegated authority of the RFS, accepts the results of this audit. Shipments to ESU from the individual facilities represented by the audit team have continued. The RFS will verify the completion and results of additional annual audits prior to shipments.

2.4 Cost Comparison of Disposal Options

Requirement (b) Exemptions for the use of the non-DOE facilities shall be documented to be cost effective and in the best interest of DOE, including consideration of alternatives for on-site disposal, an alternative DOE site, and available non-DOE facilities; consideration of life-cycle cost and potential liability; and protective of public health and the environment.

A comparison of disposal alternatives is required for approval of LLW disposal at a non-DOE facility. The comparison must consider on-site disposal, an alternative DOE site, and the proposed non-DOE facility.

In accordance with DOE Order 435.1, on-site disposal of RFS LLW demolition debris was considered as a potential disposal option. Since the RFS site was closed under CERCLA and on-site disposal of LLW generated during surveillance and maintenance activities was not included in the CAD/ROD, onsite disposal is not an option. Therefore, no costs were estimated for this alternative.

Authorized release of RFS LLW as solid waste was reviewed pursuant to DOE Order 5400.5. DOE Headquarters' position on the concept of 'no DOE-added radioactivity', and the lack of an established *de minimus* or risk-related values for determining what is not regulated, left no options for managing any residual radioactivity as solid waste in the State of Colorado.

Nevada Test Site (NTS) is the alternative DOE site selected for this comparison because it is the nearest DOE low-level radioactive waste disposal facility to the RFS site. LM is not currently on the list of approved generators to dispose of RFS waste at the NTS. Two options exist for NTS disposal:

1. National Security Technologies (NS Tech) can arrange disposal under their approved program.
2. NTS program approval can be obtained directly from NTS for this waste disposal operation.

Disposal under NS Tech's NTS-approved program involves review of generator process knowledge documentation, complete analytical data package review, sampling and analysis plan review, quality assurance plan review, and review of personnel qualifications to determine whether the waste profile satisfies NTS program requirements.

If the waste documentation is satisfactory (i.e., no additional sampling is required), NS Tech will prepare the waste profile, Information Gathering Document, Package Storage and Disposal Requests and bar codes, certification memorandums and labels. NS Tech will certify the shipments by inspecting the loaded containers and paperwork prior to shipment and performing day-of-shipping observations.

The tasks involved in obtaining NTS program approval to receive the RFS LLW include:

- Revision and/or preparation of a new quality assurance plan, waste characterization plan, waste management plan and waste stream profile.

- Development of an NTS Implementation Crosswalk Plan (an in-depth analysis of how procedures and plans address and correspond to NTS requirements). The Crosswalk Plan will also provide the preliminary gap analysis, or missing procedures and protocols, that must be corrected prior to the site audit.
- Hiring of an autonomous Waste Certification Official to oversee the NTS program implementation, conduct quality assurance assessments, and communicate with NTS on all programmatic issues.
- Conduct of an NTS Generator Audit, which must focus on:
 - Radioactive waste management.
 - RCRA waste management.
 - Sampling and analytical plans and procedures and quality assurance.
 - Laboratory procurement processes and audits.
 - Packaging and transportation procedures.
- Correction of actions identified during the audit. On average, two to three corrective actions are identified during the audit. These actions must be corrected prior to final generator approval.
- Preparation of a timeline for program approval. Three to six months are necessary to develop a program which complies with the NTS waste acceptance criteria, and three to six months are required to successfully complete the accreditation process.

Because of the lengthy timeline to obtain program approval, the LLW would need to be managed at RFS for a relatively long period, and there are no buildings on-site for long term storage of more than a few cubic yards of LLW. Thus, long term storage would likely entail procurement of weather resistant storage facilities pending shipment for disposal.

Costs were estimated for 300 yd³ of solar pond treatment system media, which for compaction purposes, is packaged as soil in all scenarios. These LLW disposition scenarios include subcontracted packaging, transportation, and disposal at the ESU facility; packaging, transportation, and disposal at NTS under the NS Technologies or other NTS-approved program; packaging, transportation, and program approval for disposal at NTS; and self-performed packaging, transportation, and disposal at the ESU facility in Clive, Utah. The comparison in Table 3 demonstrates that self-performed disposal at ESU is the best alternative based on cost.

Cost analyses will be performed on future proposed shipments to ensure cost effectiveness continues to be a priority. Other attributes that may be used for comparison include regulatory compliance (i.e., meeting Department of Transportation requirements), states' rights issues, programmatic issues, and potential exposure (on-site workers, off site, etc.).

Additional hazards to personnel that have been identified for these waste streams are industrial safety hazards for handling large, bulky, or dense items. Expected contamination levels, based on process knowledge, are likely to require contamination controls and radioactive material area postings, but would not present an external radiation hazard to workers or to the public.

Table 3. Comparison of Disposal Alternatives

Task	Disposal at Energy Solutions Facility in Utah by Subcontractor	NTS Disposal via A Subcontractor with an NTS-Approved Program	Obtain NTS Program Approval for NTS Disposal	Disposal at Energy Solutions Facility in Utah by SM Stoller
Planning ^a	\$38,834	\$102,000	\$18,000	\$20,500
NTS-Certification	\$0	\$0	\$112,000	\$0
Waste Packaging	\$21,000	\$21,000	\$21,000	\$21,000
Shipment ^b	\$100,000	\$140,000	\$140,000	\$100,000
Disposal Fee	\$672,850	\$0 ^c	\$0 ^c	\$64,350
Total Cost	\$832,684	\$263,000	\$291,000	\$205,850

Abbreviations

NS Technologies – National Security Technologies

NTS Nevada Test Site

Notes

^aIncludes commercial waste exemption, waste profile, data review, quality assurance, as needed.

^bCost per truck for transport to ESU estimated at \$5,000. Cost per truck for transport to NTS estimated at \$7,000.

^cDOE will incur no costs to dispose waste at NTS in fiscal year 2009, and no disposal fee will be charged.

As noted previously, other DOE sites ship waste to ESU for disposal, so the potential liability will not be increased by the use of ESU by RFS. Additionally, a recent audit of ESU found no significant deficiencies; therefore protection of the public health and environment will not be compromised.

2.5 Waste Characterization

(c) DOE waste shall be sufficiently characterized and certified to meet the facility’s WAC.

All waste shall be characterized and documented in the waste profile required for disposal at ESU. Prior to disposal, the RFS will certify that the waste form meets ESU’s WAC. All the isotopes and respective concentrations associated with the LLW are included on ESU’s radioactive material license issued by the State of Utah and are within their WAC limits. The waste streams meet all necessary WAC requirements for disposal at ESU.

2.6 NEPA

(d) Appropriate National Environmental Policy Act (NEPA) review must be completed.

The LM RFS (formerly the Rocky Flats Project Office) *Pond and Land Configuration Environmental Assessment Comment Response, and Finding of No Significant Impact* (DOE 2004), discusses the proposal to breach dams A-1 and A-2 (located in North Walnut Creek) and dams B-1, B-2, B-3, and B-4 (located in South Walnut Creek). This document thoroughly addresses all impacts, including the minor effects of transporting small volumes of waste for a short duration, in accordance with applicable Department of Transportation packaging and shipping regulations. “Regardless of the action chosen, activities would be performed in compliance with all governing environmental regulations. In both the proposed

action and the alternative, generated wastes would be properly characterized and reused or disposed of accordingly” (section 5.6, page 71). Based on resolution of agency and public comments, and information provided in the EA, DOE-RFPO approved the *Finding of No Significant Impact* on October 19, 2004 (DOE 2004). Additionally, a NEPA Action Review was conducted to ensure that proposed actions had not significantly changed since 2004. This document was published on June 9, 2008 (Appendix D).

Historical CERCLA documentation required analysis of the potential environmental consequences associated with packaging and transporting large quantities of LLW to off-site commercial and government facilities for treatment and/or final disposal. The evaluated destinations include ESU, and these waste streams are bounded also by this documentation.

2.7 Notifications

Requirement (e) Headquarters shall be notified of any exemption allowing use of a non-DOE facility and the Office of the Assistant Secretary for Environment, Safety, and Health (EH-1) shall be consulted of the exemption being executed.

The exemption request is being provided to EH-41 and EH-1 by LM. If a response is not received in 30 days, it will be assumed that there are no environmental objections and further consultation with EH-41 or EH-1 is not required.

Requirement (f) Host States and State Compacts where non-DOE facilities are located shall be consulted prior to approval of an exemption to use such facilities and notified prior to shipments being made.

RFS has notified both the State of Utah and the Northwest Interstate Compact that shipments to ESU are planned to begin by December 2008. Copies of these e-mail notifications are provided in Appendix E. The State of Utah has adopted a Generator Site Access Permit Program that requires generators to obtain a permit to use Utah radioactive disposal facilities. RFS will obtain a generator site access permit for ESU prior to shipping LLW to its facility. The access permit will be renewed annually to ensure the option of continued disposal of waste at ESU.

3.0 References

72 FR 29276. U.S. Environmental Protection Agency, *Notice of Partial Deletion from the NPL for the Peripheral OU and OU 3*, Federal Register, May 25, 2007.

DOE 2004. *Pond and Land Configuration Environmental Assessment, Comment Response, and Finding of No Significant Impact* (DOE/EA-1492), October.

DOE 2007. *Rocky Flats Legacy Management Agreement*, U.S. Department of Energy, U.S. Environmental Protection Agency, State of Colorado CDPHE, April 14.

DOE Order 435.1. *Radioactive Waste Management*, U.S. Department of Energy, August 21, 2001.

DOE M 435.1-1. *Radioactive Waste Management Manual*, U.S. Department of Energy, July 1999.

DOE M 251.1-1B. *Directives System Manual*, U.S. Department of Energy, August 16, 2006.

Environmental Protection Manual LMS/POL/S04329, continually updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

Appendix A
License Amendment

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LICENSE AMENDMENT

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

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

 LICENSEE) 3. License Number UT 2300249
) Amendment # 2
 1. Name EnergySolutions, LLC (EnergySolutions))
) *****
 2. Address 423 West 300 South) 4. Expiration Date
 Suite 200) January 25, 2013
 Salt Lake City, UT 84101) *****
) 5. License Category 4-a

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

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6. Radioactive Material (element and mass number)		7. Chemical and/or physical form		8. Maximum Radioactivity and/or quantity of material the Licensee may possess at any one time.
C.	Cesium-137	Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation	C.	Not to exceed 11 millicuries per source
D.	Americium-241	Sealed Neutron Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation	D.	Not to exceed 51 millicuries per source
E.	Americium-241 Americium-243 Neptunium-237 Plutonium-239 Plutonium-242 Thorium-229 Thorium-230 Uranium-232 Uranium-238	Liquid	E.	Not to exceed 5 microcuries total activity per source
F.	Strontium-90/Yttrium-90	Liquid	F.	Not to exceed 5 microcuries total activity
G.	Americium-241	Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation	G.	Not to exceed 5 microcuries total activity
H.	Thorium-230	Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation	H.	Not to exceed 48.6 microcuries total activity
I.	Plutonium-239	Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation	I.	Not to exceed 21.9 microcuries total activity

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6. Radioactive Material (element and mass number)		7. Chemical and/or physical form		8. Maximum Radioactivity and/or quantity of material the Licensee may possess at any one time.
J.	Strontium-90/Yttrium-90 and Americium-241	Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation	J.	Not to exceed 8.1 millicuries per source
K.	Am-241, Cd-109, Co-57, Tc-123m, Cr-51, Sn-113, Sr-85m, Cs-137, Co-60, and Y-88	Calibration or Referenced Combined Source(s)	K.	Not to exceed 5 microcuries per source
L.	Uranium-234, Uranium-235, Uranium-238, Americium-241, and Plutonium-239	Calibration or Reference Combined Source(s)	L.	Not to exceed 5 nanocuries per source
M.	Cobalt-60 and Cesium-137	Calibration or Reference Combined Source(s)	M.	Not to exceed 0.4 microcuries per source
N.	Reserved	Reserved	N.	Reserved
O.	Americium-241 and Europium-152	Calibration or Reference Combined Sources	O.	Not to exceed 2 microcuries per source
P.	Cesium-137	Sealed Source(s) registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation	P.	Not to exceed 12 millicuries per source

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

9. AUTHORIZED USE

- A. Licensee may receive, store, and dispose by land burial, radioactive material as naturally occurring and accelerator produced material (NARM) and low-level radioactive waste. Prior to receiving an initial, low-level radioactive waste shipment for disposal from a generator, the Licensee shall obtain documentation which demonstrates that the low-level radioactive wastes have been approved for export to the Licensee. Approval is required from the low-level radioactive waste compact of origin (including the Northwest Compact), or for states unaffiliated with a low-level radioactive waste compact, the state of origin, to the extent a state can exercise such approval.
- B. In accordance with Utah Code Annotated 19-3-105, the Licensee may not receive Class B or Class C low-level radioactive waste without first receiving approval from the Executive

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Secretary of the Utah Radiation Control Board and also receiving approval from the Governor and the Legislature.

- C. The Licensee shall fulfill and maintain compliance with all conditions and shall meet all compliance schedules stipulated in the Ground Water Quality Discharge Permit, number UGW 450005 (hereafter GWQ Permit), issued by the Executive Secretary of the Utah Water Quality Board.
- D. Reserved
- E. The Licensee may dispose of Class A Low-Level Radioactive Waste (LLRW) and NARM in both the Class A and Class A North disposal cell described in License Condition 40, and in the Mixed Waste Landfill Cell. Class A waste is defined in Utah Radiation Control Rule R313-15-1008 and NARM at R313-12-3.
- F. Effective January 1, 2002, the Licensee shall not accept, possess, store or dispose of any radioactive waste delivered to the disposal site by any conveyance, unless the associated Shipping Documents have a valid Generator Site Access Permit number, issued by the Utah Division of Radiation Control, affixed.
- G. The Licensee may receive, treat, and dispose radioactively contaminated aqueous liquids and liquid mercury as characterized in the waste profile at the mixed waste facilities only, the waste must be Class A LLRW at receipt.
- H. Reserved
- I. Licensed material in Items 6.C and 6.D, Sealed source(s) contained in compatible portable gauging devices (registered pursuant to R313-22-210 or an equivalent U.S. Nuclear Regulatory Commission or Agreement State regulation) for measuring properties of materials.
- J. Licensed material in Items 6.E through 6.L, for operational checks and efficiency determinations of radiation detection instrumentation.
- K. Licensed material in Items 6.M through 6.O, calibration or reference combined source(s) for use in conjunction with the Licensee's whole body counter.
- L. Licensed material in Item 6.P, sealed source(s) contained in MGP Instruments, Inc. Model IRD-2000 dosimeter calibrators/irradiators for tests and source checks of electronic dosimeters.

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SITE LOCATION

10. A. The Licensee may receive, store and dispose of licensed material at the Licensee's facility located in Section 32 of Township 1 South and Range 11 West, Tooele County, Utah.
- B. Section 32, Township 1 South and Range 11 West, Tooele County, Utah, is defined by the following points of reference:
- | | |
|---------------------------|---|
| Southwest Section Corner: | Latitude 40° 40' 51.894060" N
Longitude 113° 7' 28.579640" W |
| Elevation | 4269.76 feet above mean sea level (amsl) |
|
 | |
| Southeast Section Corner | Latitude 40° 40' 50.906471" N
Longitude 113° 6' 20.023247" W |
| Elevation | 4277.27 feet-amsl |
|
 | |
| Northwest Section Corner | Latitude 40° 41' 44.093832" N
Longitude 113° 7' 27.371551" W |
| Elevation | 4273.06 feet-amsl |
|
 | |
| Northeast Section Corner | Latitude 40° 41' 43.107203" N
Longitude 113° 6' 18.839771" W |
| Elevation | 4280.83 feet-amsl |
- C. The Southwest Section Corner marker of Section 32 shall be the Point of Beginning (POB).
- D. The Licensee shall cause a survey to be conducted by a Utah licensed land surveyor to identify the section corners of Section 32, Township 1 South, and Range 11 West, Tooele County, Utah (as defined in Condition 10.B). Licensee shall place monuments with brass caps at the identified section corner locations. Monuments shall be permanent and constructed in a manner that will protect them from being disturbed.
- E. Licensed material in Items 6.C through 6.P shall be used only at the Licensee's facilities referenced in Condition 10.B.
11. The open cell area within the Class A and Class A North disposal embankments where waste disposal/placement has or may occur, but the cover system has not been completed shall be limited to 3,650,000 square feet. Uncovered radioactive waste shall be limited to a surface area of 1,020,000 square feet.
12. Pursuant to UAC R313-12-55(1), the Licensee is granted an exemption to UAC R313-25-9, as it relates to land ownership and assumption of ownership.

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SPECIAL NUCLEAR MATERIAL

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

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

Table 13-A

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

- a - for uranium below 10 percent enrichment and a maximum of 20 percent of the weight of the waste of materials listed in License Condition 13.B
- b - for uranium at or above 10 percent enrichment and a maximum of 20 percent of the weight of the waste of materials listed in License Condition 13.B
- c - for uranium at any enrichment with unlimited quantities of materials listed in License Condition 13.B and License Condition 13.C

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

*The measurement uncertainty values in Column 3 above represent the maximum one-sigma uncertainty associated with the measurement of the concentration of the particular radionuclide. The SNM must be homogeneously distributed throughout the waste. If the SNM is not homogeneously distributed, then the limiting concentrations must not be exceeded on average in any contiguous mass of 600 kilograms.

- B. Except as allowed by notes a, b, c, and d in Condition 13.A, waste must not contain “pure forms” of chemicals containing carbon, fluorine, magnesium, or bismuth in bulk quantities (e.g., a pallet of drums, a B-25 box). By “pure forms,” it is meant that mixtures of the above elements such as magnesium oxide, magnesium carbonate, magnesium fluoride, bismuth oxide, etc. do not contain other elements. These chemicals would be added to the waste stream during processing, such as at fuel facilities or treatment such as at mixed waste treatment facilities. The presence of the above materials will be determined by the generator, based on process knowledge or testing.
- C. Except as allowed by notes c and d in Condition 13.A, waste accepted must not contain total quantities of beryllium, hydrogenous material enriched in deuterium, or graphite above one percent of the total weight of the waste. The presence of the above materials will be determined by the generator, based on process knowledge, physical observations, or testing.
- D. Waste packages must not contain highly water soluble forms of uranium greater than 350 grams of uranium-235 or 200 grams of uranium-233. The sum of the fractions rule will apply for mixtures of U-233 and U-235. Highly soluble forms of uranium include, but are not limited to: uranium sulfate, uranyl acetate, uranyl chloride, uranyl formate, uranyl fluoride, uranyl nitrate, uranyl potassium carbonate, and uranyl sulfate. The presence of the above materials will be determined by the generator, based on process knowledge or testing.
- E. Mixed waste processing of waste containing SNM will be limited to stabilization (mixing waste with reagents), micro-encapsulation, macro-encapsulation using low-density and high density polyethylene, macroencapsulation using cementitious mix (Macro Mix), and thermal desorption.

When waste is processed using the thermal desorption process, EnergySolutions shall confirm the SNM concentration following processing and prior to returning the waste to temporary storage.

Liquid waste may be stabilized provided the SNM concentration does not exceed the SNM concentration limits in License Condition 13.A. For containers of liquid waste with more than 600 kilograms of waste, the total activity (pCi) of SNM shall not exceed the SNM concentration in License Condition 13.A times 600 kilograms of waste. Waste containing free liquids and the solids shall be mixed prior to treatment. Any solids shall be maintained in a suspended state during transfer and treatment.

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

Before Receipt

1. **Waste Description.** The description must detail how the waste was generated, list the physical forms in the waste, and identify uranium chemical composition.
 2. **Waste Characterization Summary.** The data must include a general description of how the waste was characterized (including the volumetric extent of the waste, and the number, location, type, and results of any analytical testing), the range of SNM concentration ranges, and the analytical results with error values used to develop the concentration ranges.
 3. **Uniformity Description.** A description of the process by which the waste was generated showing that the spatial distribution of SNM must be uniform, or other information supporting spatial distribution.
 4. **Manifest Concentration.** The generator must describe the methods to be used to determine the concentrations on the manifests. These methods could include direct measurement and the use of scaling factors. The generator must describe the uncertainty associated with sampling and testing used to obtain the manifest concentrations.
- EnergySolutions shall review the above information and, if adequate, approve in writing this pre-shipment waste characterization and assurance plan before permitting the shipment of a waste stream. This will include statements that EnergySolutions has a written copy of all the information required above, that the characterization information is adequate and consistent with the waste description, and that the information is sufficient to demonstrate compliance with Conditions 13.F.1 through 13.F.4. Where generator process knowledge is used to demonstrate compliance with Conditions 13.A, 13.B, 13.C, or 13.D, EnergySolutions shall review this information and determine when testing is required to provide additional information in assuring compliance with the conditions. EnergySolutions shall retain this information as required by the State of Utah to permit independent review.

At Receipt

- EnergySolutions shall require generators of SNM waste to provide a written certification with each waste manifest that states the SNM concentrations reported on the manifest do not exceed the limits in Condition 13.A, that the measurement uncertainty does not exceed the uncertainty value in Condition 13.A, and that the waste meets Conditions 13.B through 13.D.
- G. Sampling and radiological testing of waste containing SNM must be performed in accordance with the following: One sample for each of the first ten shipments of a waste stream; or one sample for each of the first 100 cubic yards of waste up to 1,000 cubic yards of a waste stream; and one sample for each additional 500 cubic yards of waste following the first ten shipments or following the first 1,000 cubic yards of a waste stream. Sampling and radiological testing of debris waste containing SNM can be waived if the SNM concentration is lower than one tenth of the applicable limit in License Condition 13.A.

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- H. EnergySolutions shall notify the NRC, Region IV office within 24 hours if any of the above conditions are violated, including if a batch during a treatment process exceeds the SNM concentration in License Condition 13.A. A written notification of the event must be provided within 7 days.
- I. EnergySolutions shall obtain NRC approval prior to changing any activities associated with the above conditions.
- J. Notwithstanding License Condition 13.A through 13.I, for the Containerized Waste Facility described in License Condition 10.F, the following limits for possession of SNM apply to the total combined quantities of SNM at the Containerized Waste Facility:

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

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

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

MIXED WASTE

- 14. A. The Licensee may receive for treatment, storage, and disposal any radioactive waste as authorized by this license that is also determined to be hazardous (commonly referred to as mixed waste) as permitted by the “Hazardous Waste Plan Approvals” issued and modified by the Executive Secretary, Utah Solid and Hazardous Waste Control Board and “HSWA Permit” issued by the U.S. Environmental Protection Agency.
- B. The Licensee shall dispose of these wastes in the “mixed waste” disposal embankment only. Characteristic or listed hazardous waste treated at the Licensee’s facility shall not be disposed of in the Class A North, the Class A, or the 11.e(2) disposal cell.

WASTE TREATMENT AND PROCESSING

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

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processed waste in accordance with UAC R313-15-1008.

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

PROHIBITIONS AND WASTE ACCEPTANCE REQUIREMENTS

16. A. Sealed sources as defined in Utah Administrative Code (UAC) R313-12 shall not be accepted for disposal.
- B. In accordance with UAC R313-15-1008(2)(a)(v), waste shall not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.
- C. In accordance with UAC R313-15-1008(2)(a)(vi), waste shall not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste.
- D. In accordance with UAC R313-15-1008(2)(a)(vii), waste shall not be pyrophoric.
- E. Waste containing untreated biological, pathogenic, or infectious material including radiologically contaminated laboratory research animals is prohibited
- F. Liquid Waste Restrictions
- i. Except for liquid mercury, receipt of nonaqueous liquid waste is prohibited unless specifically approved by the Executive Secretary.
 - ii. Treated liquid radioactive waste shall be disposed in the Mixed Waste Landfill Cell in accordance with LLRW Construction QA/QC Manual.
 - iii. Only Utah Division of Radiation Control approved solidification or absorption agents as listed in the State-issued Part B Permit are authorized for liquid waste treatment.
 - iv. Liquid radioactive waste shall be solidified or absorbed in a manner such that no liquid component is disposed.
 - v. Only containers authorized by the U. S. Department of Transportation as specified in the regulations (49 CFR parts 100 thru 180) for transporting liquid radioactive materials shall be accepted for all liquid radioactive wastes, regardless of radioactivity concentrations.
- G. In accordance with UAC R313-15-1008(2)(a)(viii), gaseous waste received for disposal in the Containerized Waste Facility shall be packaged at an absolute pressure that does not exceed 1.5 atmospheres at a temperature of 20 degrees Celsius and the total activity of any container shall not exceed 100 curies (3.7×10^{12} Bequerels).

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- H. In accordance with UAC R313-15-1008(2)(a)(ii), waste received for disposal in the Containerized Waste Facility shall not be packaged in cardboard or fiberboard containers.
- I. The Licensee shall not accept for disposal any neutron source (e.g., polonium-210, americium-241, radium-226 in combination with beryllium or other target).
- J. Incinerator ash shall be treated, in preparation for disposal, in a manner that renders it non-dispersible in air.
- K. Radioactive waste containing chelating agents greater than 0.1 percent by weight shall be disposed of in the Mixed Waste Landfill Cell.
- L. The Licensee shall not accept containerized radioactive waste unless each waste package has been:
 - i. Classified in accordance with R313-15-1008, "Classification and Characteristics of Low-Level Radioactive Waste." In addition, the Licensee shall require that all radioactive waste received for disposal meet the requirements specified in the Nuclear Regulatory Commission, "Branch Technical Position on Concentration Averaging and Encapsulation", as amended.
 - ii. Marked as either Class A Stable or Class A Unstable as defined in the most recent version of the "Low-Level Waste Licensing Branch Technical Position on Radioactive Waste Classification." originally issued May, 1983 by the U.S. Nuclear Regulatory Commission.
 - iii. Marked with a unique package identification number, clearly visible on the package, that can be correlated with the manifest for the waste shipment in which the package arrives at the facility.
- M. The Licensee may accept containerized Class A LLRW in the following waste packages for disposal in the Containerized Waste Facility of the Class A or Class A North disposal cell:
 - i. DOT "strong, tight" containers in accordance with 49 CFR 173 and meeting the following void space criteria: void spaces within the waste and between the waste and its packaging shall be reduced to the extent practicable, but in no case shall less than 85 percent of the capacity of the container be filled
 - ii. High-Integrity Containers (HICs) exceeding the void space criteria provided in License Condition 16.M.i, shall be approved by the Executive Secretary.
 - iii. DOT "strong, tight" containers in accordance with 49 CFR 173 exceeding the void space criteria provided in License Condition 16.M.i and large components shall be placed as approved by the Executive Secretary.
 - iv. Oversized DOT containers (larger than 215 cubic feet) meeting the void space criteria provided in License Condition 16.M.i shall be placed in accordance with the currently approved LLRW Construction QA/QC Manual.

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MANAGEMENT OF FREE LIQUIDS

17. 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 one percent of the volume of the waste. Solid waste received and containing free liquid in excess of 1% by volume shall have the liquid removed and placed in the evaporation ponds or the liquid solidified prior to management. In addition, the Licensee shall notify the Division of Radiation Control within 24 hours that the shipment(s) failed the requirements for acceptance and manage in accordance with the Waste Characterization Plan.

RADIATION SAFETY

18. The Licensee shall comply with the provisions of UAC R313-18, "Notices, Instructions and Reports to Workers by Licensees or Registrants--Inspections"; and UAC R313-15, "Standards for Protection Against Radiation."
19. The Licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of UAC R313-19-100, Transportation."
20. Written procedures incorporating operating instructions and appropriate safety precautions for licensed activities shall be maintained and available at the location specified in License Condition 10.A. The written procedures established shall include the activities of the radiation safety and environmental monitoring programs, the employee training program, operational procedures, analytical procedures, and instrument calibration. At least annually, the Licensee shall review all procedures to determine their continued applicability.
21. The Licensee's Corporate Radiation Safety Officer shall review and approve written procedures as stated in License Condition 20 and subsequent changes to the procedures related to waste disposal operations.

ROUTINE MONITORING AND CONTAMINATION SURVEYS

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

TABLE 22-A

Type	Location	Frequency
A. Gamma Radiation Levels	1. Perimeter of Restricted Area(s)	1. Weekly
	2. Office Area (s)	2. Weekly
	3. Lunch/Change Area(s)	3. Weekly
	4. Transport Vehicles	4. Upon vehicle arrival at site and before departure.
	5. Mixed Waste Facility	5. Weekly
	6. Decontamination facilities	6. Weekly

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Type	Location	Frequency
B. Contamination Wipes	1. Eating Area(s)	1. Weekly
	2. Change Area(s)	2. Weekly
	3. Office Areas(s)	3. Weekly
	4. Railcar rollover and control shack	4. Weekly
	5. Equipment/Vehicles	5. Once before release
	6. Decontamination facilities	6. Weekly
	7. Mixed Waste Facility	7. Weekly
	8. Shredder Facility and control room	8. Weekly
	9. Rotary Dump and control room	9. Weekly
C. Employee/Personnel	1. Skin & Personal clothing	1. Prior to exiting restricted area
D. Gamma Exposure	1. Administration Bldg.(s)	1. Quarterly
E. Radon Concentration	1. Administration Bldg.(s)	1. Quarterly

23. The Licensee shall determine internal exposure of employees under its bioassay program, in accordance with UAC R313-15-204.
24. The Licensee shall implement a respiratory protection program that is in accordance with UAC R313-15-703.
25. The Licensee shall calibrate air sampling equipment at intervals not to exceed six months.
26. The operational environmental monitoring program shall be conducted in accordance with the License Renewal Application, Appendix R (revised), dated July 3, 2007.
27. Vehicles, containers, facilities, materials, equipment or other items for unrestricted use shall not be released from the Licensee's control if contamination exceeds the limits found in Table 27-A. Except as provided in 49 CFR 173.443(d), conveyances used for commercial transport of radioactive waste or materials, may not be returned to service until the radiation dose rate at each accessible surface is 0.005 mSv per hour (0.5mrem per hour) or less, and there is no surface removable (non-fixed) radioactive surface contamination as specified in paragraph (a) of 49 CFR 173.443.

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TABLE 27-A

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

- a. Where surface contamination on both alpha-and beta-gamma emitting nuclides exists, the limits established for alpha-and beta-gamma emitting nuclides should apply independently.
- b. As used in this table, dpm (disintegration's per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- c. Measurements of average contamination should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.
- d. The maximum contamination level applies to an area of not more than 100 cm².
- e. The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping the area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
- f. The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters shall not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

- 28. The Licensee shall submit the following to the Executive Secretary for review and approval pending resolution of all issues as judged by the Executive Secretary:
 - A. The Licensee shall submit a corrective action plan for the Cover Test Cell for Executive Secretary approval by no later than July 23, 2008. The corrective action plan shall identify all means necessary to collect valid data to verify actual performance of the cover system. Said plan shall include Cover Test Cell design, construction, instrumentation, monitoring, reporting, and comparison of actual performance to projected performance. The Cover Test Cell corrective

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action plan shall include:

- i. Performance goals to meet the objective of verifying modeled cover system performance.
 - ii. Methodologies and plans that provide quantitative and qualitative results capable of satisfying the objective.
 - iii. Design, construction, and operational plans to implement the methodologies and plans.
 - iv. Quality control and quality assurance requirements of work to be performed. Quality control and quality assurance specifications and procedures shall state specific actions and processes the Licensee will use to ensure compliance with designs and specifications, monitoring, reporting, ensure data validity, timely detect data deficiencies, enhance accuracy of data interpretation, and ensure correctness of results prior to being submitted to the Division.
 - v. In the event that the plan results in new instrumentation or construction, the Licensee shall complete all such activities within 30-days of Executive Secretary approval. Within 30-days of completion of said construction, the Licensee shall submit an As-Built report for Executive Secretary approval.
- B. The Licensee shall submit an annual report for Executive Secretary approval by March 1 of each calendar year. This annual report shall detail the Licensee's progress in implementing the corrective action plan, provide the data collected in the past year, analyze the data, and interpret the meaning of the data relative to the overall objective of the corrective action plan.

REPORTING

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

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

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

- B. A quarterly summary report detailing the radioisotopes, activities, weighted average concentrations, volume, and tonnage for waste disposed of during the calendar quarter. The report of volume (cubic feet and cubic yards) and tonnage (tons) shall be partitioned according to waste type: Low Level Radioactive Waste (LLRW), LLRW with PCBs, Mixed Waste (MW), MW with PCBs, MW Treatment, NORM, Containerized Class A, uranium/thorium mill tailings (i.e. 11e.(2) wastes), and waste generated prior to congress passing the Uranium Mill Tailings Radiation Control Act in 1978. The report(s) shall be submitted within 30 days after the expiration of each calendar quarter. Calendar Quarter shall mean:

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

- C. Reserved
 - D. For the Mixed Waste Landfill Cell, the Licensee shall ensure that the maximum acceptable activities, used as source terms in the groundwater performance modeling are not exceeded after facility closure. Therefore, the Licensee shall notify the Executive Secretary, at the earliest knowledge, that the following nuclides are scheduled for disposal: berkelium-247 and chlorine-36.
 - E. For the Class A and Class A North disposal cells, the Licensee shall ensure that the maximum acceptable activities used as source terms in the groundwater performance modeling are not exceeded after facility closure. Therefore, the Licensee shall notify the Executive Secretary, at the earliest knowledge, that the following nuclides are scheduled for disposal: aluminum-26, berkelium-247, calcium-41, californium 250, chlorine-36, rhenium-187, terbium-157, and terbium-158.
 - F. An annual report shall be submitted by March 31st and shall report the cumulative void space (expressed as a percent of waste volume) disposed of in the Containerized Waste Facility for the previous year.
30. Except as provided by this condition, the Licensee shall maintain the results of sampling, analyses, surveys, and instrument calibration, reports on inspections, and audits, employee training records as well as any related review, investigations and corrective actions, for five (5) years. The Licensee shall maintain personnel exposure records in accordance with UAC R313-15-201.

STAFFING/QUALIFICATIONS

- 31. Radiation Safety operations for bulk, containerized and mixed waste, portable gauging device(s), radioactive source(s), and dosimeter calibrator(s)/irradiator(s) shall be conducted by or under the supervision of Mark Ledoux, Corporate Radiation Safety Officer.
- 32. A. The Licensee's staff shall meet the qualifications as described in Appendix I (February 28, 2008, rev 20).
- B. Licensed material in License Conditions 6.C and 6.D. shall be used by, or under the supervision and in the physical presence of, the Corporate Radiation Safety Officer or individuals who have been trained in the Licensee's standard operating and emergency procedures and have satisfactorily completed at least one of the following:

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- i. The device manufacturer's training course for safe use and handling of portable gauging devices containing licensed material; or
 - ii. A portable gauge training program conducted in accordance with the provisions of a specific license issued by the Executive Secretary, an Agreement State or the U.S. Nuclear Regulatory Commission.
- C. Licensed material in License Conditions 6.E through 6.P shall be used by, or under the supervision of, the Corporate Radiation Safety Officer, or individuals designated in writing by the Corporate Radiation Safety Officer.
- D. The Licensee shall maintain the organizational independence of the programs that monitor and enforce employee safety, environmental protection, and public safety from programs responsible for production and profitability and other influences or priorities that might compromise quality and radiation safety.
- E. The Licensee shall establish a method for any employee or contractor to anonymously submit questions, concerns, ideas, or other comments regarding employee safety, environmental protection, and public safety to the Corporate Radiation Safety Officer. The method shall include documentation of all comments submitted, the Applicant's response to each comment, and a method for communicating the Licensee's response to employees and contractors.

CONSTRUCTION ACTIVITIES

33. The Licensee shall obtain prior written approval from the Executive Secretary prior to construction of significant facilities. Significant facilities shall include, but are not limited to waste, stormwater, and wastewater related handling, storage, and transfer projects.
34. The Licensee shall address and resolve all concerns the Division has identified regarding clay mining activities in areas adjacent to Section 32, as provided in a February 16, 2007 Division letter to the Licensee, including a February 9, 2007 Round 1 Interrogatory by the URS Corporation (URS 39400018.3090). The Licensee shall deliver detailed analyses, explanations, descriptions, and appropriate justification to the Division no later than July 1, 2008. If the Executive Secretary determines that unacceptable adverse conditions exist or might develop or evolve, the Licensee shall submit for approval a remedial action plan within 30 days of written notice of the determination by the Executive Secretary. The remedial action plan will address, among other topics, description of proposed activities, justification that the proposed activities will be adequate to protect the facilities in Section 32 from possible impacts of clay mining, and engineering design, specifications, and construction of proposed remedial actions.
35. Reserved.
36. A. The West Rail Spur and Unloading facility shall be operated as a transfer station for Surface Contaminated Objects (SCO) and large components, (waste storage is prohibited). These objects

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may be set on the gravel pad for 24 hours to facilitate unloading and transferring to the Class A disposal cell.

- B. The West Rail Spur and Unloading facility shall be operated as a transfer station for conveyances to be unloaded at the Containerized Waste Facility (unloading of waste packages is prohibited).
37. All ion exchange resins shall be disposed of as follows:
- A. Solidified using solidification agents approved by the Executive Secretary and disposed of in the Containerized Waste Facility; or
 - B. Packaged in High-Integrity Containers (HIC) approved by the Executive Secretary, carbon-steel liners, unapproved HICs, or poly HICs meeting the void space criteria described in License Condition 16.M.i and disposed of in the Containerized Waste Facility; or
 - C. Packaged in High-Integrity Containers (HIC) approved by the Executive Secretary, carbon-steel liners, unapproved HICs, or poly HICs not meeting the void space criteria described in License Condition 16.M.i and disposed of as approved by the Division under License Condition 16.M.ii or 16.M.iii in the Containerized Waste Facility; or
 - D. Disposed of in accordance with the requirements of the Construction Quality Assurance/Quality Control Manual.
38. The Licensee shall construct the Class A disposal Cell identified in Table 40-A in accordance with approved engineering design drawings "Series 9821".
39. Waste placement and backfilling within the Containerized Waste Facility shall be conducted in accordance with the following:
- A. The Containerized Waste Facility shall conform to the characteristics defined, analyzed, and described in the Engineering Justification Report "Class A Disposal Cell Containerized Waste Facility" (dated April 12, 2001); Engineering Justification Report, Addendum "Fifteen Percent Void Space Criteria" (Revision 1 dated October 10, 2001); and the AMEC letter to Envirocare of Utah, Inc. "Placement of Drums and B-25 Containers with 15 Percent Voids; Envirocare Class A - Containerized Waste Facility Near Clive, Utah" (dated October 2, 2001). Waste containers that have void space in excess of 15 percent shall be filled to the top of the container opening using Controlled Low Strength Material (CLSM) in accordance with the Construction QA/QC manual. The Licensee is exempt from the CLSM cold weather requirements and the 48 hour notification for void remediation only at the CWF Facility.
 - B. Waste container placement configurations and associated waste placement procedures, backfill materials and procedures, and backfill cover materials shall be those approved by the Executive Secretary following testing according to Work Element: Containerized Waste Facility-Waste Placement Test Pad of the currently approved LLRW Construction Quality Assurance/Quality Control Manual.

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- C. Waste delivered in a shielded transportation cask shall remain in the cask until the waste is approved for disposal and the disposal location is prepared for the shipment. Waste received for disposal in the Containerized Waste Facility shall not be handled, stored or transferred within the contaminated portion of the Restricted Area without the approval of the Corporate Radiation Safety Officer.
 - D. The Containerized Waste Facility shall be operated as a contamination-free portion of the Restricted Area until containerized waste disposal operations are completed. Bulk waste may then be used to complete the filling of the cell.
 - E. Interim storage is applicable only to the Containerized Waste Facility. Packages containing radioactive material shall not be stored for a period of longer than 30 days from the date of receipt. Retention of waste materials above ground pending disposal up to 3 working days does not constitute storage. All packages in storage shall be shielded so that the package or shielding shall not exceed 40 mR/hour at one meter from the surface.
 - F. Disposal of non-containerized decomposable or compressible waste at the Containerized Waste Facility is prohibited. Such waste shall be disposed of as debris in bulk waste portions of the Class A or Class A North disposal embankments, in accordance with debris placement requirements of the currently approved LLRW and 11e.(2) CQA/QC Manual.
40. The LARW and Class A Disposal Cells, shall be defined by the areas enclosed by the points of reference in Table 40-A. The Containerized Waste Facility within the Class A disposal cell shall be separated from the non-containerized area by a 6-foot chain link fence on the berm around the Containerized Waste Facility perimeter area.

TABLE 40-A

Disposal Cell Boundaries	<u>Coordinates</u>	
	<u>Latitude</u>	<u>Longitude</u>
LARW Disposal Cell		
Northeast Corner	40°41' 10.700524" N	113° 6' 36.372920" W
Southeast Corner	40°40' 52.230624" N	113° 6' 36.713462" W
Southwest Corner	40°40' 52.379041" N	113° 6' 51.184491" W
Northwest Corner	40°41' 10.851418" N	113° 6' 50.846182" W
Class A Disposal Cell		
NW corner	40°41' 28.004487" N	113°7' 23.847971" W
SW corner	40°41' 14.175042" N	113°7' 24.153414" W
SE corner	40°41' 13.717662" N	113°6' 54.827468" W
NE corner	40°41' 27.547403" N	113°6' 54.521700" W

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Disposal Cell Boundaries	<u>Coordinates</u>	
	<u>Latitude</u>	<u>Longitude</u>
Class A North Disposal Cell		
NW corner	40°41'46.28824"N	113°07'23.12804"W
SW corner	40°41'36.32803"N	113°07'23.11315"W
SE corner	40°41'36.35311"N	113°06'52.98226"W
NE corner	40°41'46.31332"N	113°06'52.99589"W

41. Reserved.
42. Reserved.
43. The Licensee shall construct the Class A North disposal cell identified in Table 40-A in accordance with approved engineering design drawings "Series 04080".
44. The Licensee shall fulfill all requirements and maintain compliance with all conditions in the LLRW CQA/QC Manual and engineering drawings currently approved by the Executive Secretary.
45. All engineering related soil tests conducted by the Licensee to demonstrate compliance with Condition 44 shall be performed by a laboratory certified and accredited by the AASHTO Materials Reference Laboratory (AMRL). Said certification / accreditation shall apply to clay liner, clay radon barrier, soil filter layers, sacrificial soils, and riprap materials, or other soil or man-made materials as directed by the Executive Secretary. Said certification shall include all engineering test methods required by License Condition 44, or as directed by the Executive Secretary.
46. Reserved
47. The Licensee shall not initiate disposal operations in newly excavated areas until the Division has inspected and the Executive Secretary has approved the cell/embankment liner.

CONSTRUCTION DRAWINGS.

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

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a revision block that documents the latest changes or modifications by date and includes the initials of the responsible reviewer for QA/QC tracking purposes.

- B. Drawings showing approved future designs shall be marked as "Final Drawings." Final drawings or drawings developed for construction shall be sealed by a Utah registered professional engineer. The drawings shall be developed in accordance with the standards of professional care.
- C. Within 30 days of completion of any project that requires approval by the Executive Secretary, a set of "As-Built" drawings shall be submitted for review. The drawings shall indicate as-built conditions as they existed no earlier than 30 days prior to the submittal. Drawings of finished construction shall be marked as "As-Built" in the final entry in the revision block.

SITE OPERATING PROCEDURES

- 49. Shipments containing free liquid in excess of 1% shall be absorbed, evaporated, or the liquids removed only at facilities with approved secondary containment or the rail rollover facility.
- 50.
 - A. On-site generated waste shall be managed according to its radiological, physical and chemical characteristics. Solid phase material shall be disposed in either the Class A Cell, Class A North Cell, Mixed Waste Cell, or the 11e.(2) Cell. Waste water from decontamination facilities will be put in the evaporation ponds or sprayed on disposal cells for purposes of dust and engineering controls.
 - B. Site equipment that has reached the end of its useful life, is not operational and does not meet the removable contamination limits of License Condition 27, Table 27-A, shall be disposed in the LLRW Class A Cell or Class A North Cell within 90 days as debris in accordance with requirements of the LLRW Construction Quality Assurance/Quality Control Manual or stored on approved facilities for storage, transfer, and sampling of bulk waste.
 - C. Facility vehicles transferring or unloading waste shall not be left unattended.
- 51. The following shall be implemented for LLRW and 11e.(2) Waste segregation purposes:
 - A. LLRW and 11e.(2) waste shall not be managed simultaneously at the Rail rollover facility, Shredder Facility, Rotary Dump Facility, or Rail Digging facility;
 - B. Any vehicle or facility used to manage waste for disposal within the 11e.(2) disposal embankment, must be clearly labeled to designate 11e.(2) management. The labels shall be visible from both sides of a vehicle/facility designated for 11e.(2) waste management.
 - C. Equipment, vehicles and facilities, which are used for management of LLRW will be cleaned of any material before being used for 11e.(2) waste management activities. Equipment, vehicles and

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facilities shall be cleaned of all waste material to a limit of 500 grams per square foot prior to being used for other waste types.

- 52. Waste shipments or transportation packages received shall meet the following contamination control requirements for removable contamination
 - *Less than 220 dpm/100cm² alpha
 - *Less than 2200 dpm/100cm² Beta-gamma

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

- 53. A. Quarterly, the Licensee shall clean the facility roads, or more frequently when needed. The material collected from cleaning the roads shall be disposed within an approved disposal embankment for Class A waste.
- B. On a biweekly basis (once every two weeks) between the first day of May and the last day of September, the Licensee shall spray a polymer solution on all exposed contaminated cell areas and areas of waste within the Class A Cell and Class A North Cell which have been disturbed in the previous two weeks. The Licensee will apply a polymer-based stabilizer in accordance with the manufacturer's instructions.
- C. The Licensee shall minimize the dust created during the process of placing and moving waste, through the use of water. Water or other engineering controls shall be placed on roads and in areas which work is being performed.
- D. The Licensee shall cease loading, hauling, and dumping of un-containerized waste whenever the 5-minute average wind velocities exceed 35 miles per hour. When both the 5-minute average and 5-minute maximum wind velocities are less than 35 mph as observed on the meteorological station, management of un-containerized waste may resume.

54. The Licensee shall fulfill and maintain compliance with all conditions and requirements in the Site Radiological Security Plan (Revision 2, March 28, 2006).

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

$$\frac{\text{Total Activity of chlorine-36 Received (picocuries)}}{\text{Total Mass of Active Cell (grams) + Completed Cell (grams)}} \leq 0.2828 \text{ picocuries per gram}$$

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

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$$\frac{\text{Total Activity of berkelium-247 Received (picocuries)}}{\text{Total Mass of Active Cell (grams) + Completed Cell (grams)}} \leq 0.0001 \text{ picocuries per gram}$$

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

$$\frac{\text{Total Activity of chlorine-36 Received (picocuries)}}{\text{Total Mass of Active Cell (grams) + Completed Cell (grams)}} \leq 8.75 \text{ picocuries per gram}$$

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

$$\frac{\text{Total Activity of berkelium-247 Received (picocuries)}}{\text{Total Mass of Active Cell (grams) + Completed Cell (grams)}} \leq 0.00314 \text{ picocuries per gram}$$

- 56. Containerized Class A waste shall be certified by the generator to meet the Waste Acceptance Criteria in accordance with the Waste Characterization Plan described in License Condition 58.
- 57. The Licensee shall move rail shipments into the Restricted Area within seven (7) days of arrival or return to the carrier when management of the waste is not possible within the (7) day period, unless additional time is approved by the Executive Secretary of the Division of Radiation Control. The Licensee may perform the following activities on rail lines, not including the main line adjacent to Section 32:
 - A. Visual Inspection
 - B. Radiation level surveys
 - C. Affix labels
- 58. The Licensee shall fulfill and maintain compliance with all conditions and requirements in the LLRW Waste Characterization Plan (dated March, 10, 2008).
- 59. Reserved.
- 60. All wind dispersed litter located outside of the disposal cell/embankments, shall be retrieved by the Licensee and returned to the Licensee's control within 24 hours.
- 61. Truck, railcar, and other equipment washdown (decontamination) facilities, including evaporation ponds, shall be controlled with fences or other approved barriers to prevent intrusion.
- 62. All burial embankments and waste storage areas, including immediately adjacent drainage structures, shall be controlled areas, surrounded by a six-foot chain link fence. Upon site closure, all permanent fences shall be six-foot high chain link topped with three strand barbed wire, tip tension wire, and

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63. Radioactive and mixed wastes within Section 32 and all rail spurs controlled by the Licensee around the Licensee's Disposal Facility are possessed by the Licensee. Waste conveyed to the facility by truck is in transport as long as the commercial carrier driver and vehicle remain at the Clive disposal facility. The Licensee does not possess such waste for purposes of determining compliance with surety requirements and SNM quantity limits, except that the Licensee does, however, possess any waste containing SNM that is not disposed of on the day it is delivered to the facility.
64. "Disposal" is the locating of radioactive waste into a lift of the disposal embankment. Disposal does not include the storage of waste in containers on a lift when the container will ultimately be emptied, the staging of containerized waste in the disposal embankment; or waste as "In Cell Bulk Disposal".

MANIFEST/SHIPPING REQUIREMENTS

65. The Licensee shall comply with UAC R313-15-1006 and UAC R313-25-33(8), Requirements for Low-Level Waste Transfer for Disposal at Land Disposal Facilities and Manifests.
66. The Licensee shall not accept radioactive waste for storage and disposal unless the Licensee has received from the shipper a completed manifest that complies with UAC R313-15-1006 and UAC R313-25-33(8).
67. The Licensee shall maintain copies of complete manifests or equivalent documentation required under Conditions 65 and 66 until the Executive Secretary authorizes their disposition.
68. The Licensee shall immediately notify the Executive Secretary or the Division's on-site representative of any waste shipment where there may be a possible violation of applicable rules or license conditions.
69. The Licensee shall require anyone who transfers radioactive waste to the facility to comply with the requirements in UAC R313-15-1006.
70. The Licensee shall acknowledge receipt of the waste within one (1) week of waste receipt by returning a signed copy of the manifest or equivalent document to the shipper. The shipper to be notified is the Licensee who last possessed the waste and transferred the waste to the Licensee. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received.
71. The Licensee shall notify the shipper (e.g., the generator, the collector, or processor) and the Division when any shipment or part of a shipment has not arrived within 60 days after receiving the advance manifest.
72. The Licensee shall maintain a record for each shipment of waste disposed of at the site. At a minimum, the record shall include:
- A. The date of disposal of the waste;
 - B. The location of the waste in the disposal site;
 - C. The condition of the waste packages received;

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- D. Any discrepancy between the waste listed on the shipment manifest or shipping papers and the waste received in the shipment;
- E. A description of any evidence of leaking or damaged packages or radiation or contamination in excess of applicable regulatory limits; and
- F. A description of any repackaging of wastes in any shipment.

FINANCIAL ASSURANCE/CLOSURE

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

- A. Summary of Changes – the annual report shall include a written summary of any change in the cost estimate previously approved by the Executive Secretary, including, but not limited to:
 - i. A description of any modification, addition, or deletion of any direct cost or post-closure monitoring and maintenance (PCMM) cost line item, including supporting justification, calculations and basis;
 - ii. Any change to the unique reference number (cost line item) assigned approved by the Executive Secretary for any direct or PCMM cost line item.
- B. Indirect Costs shall be based on the sum of all direct costs in accordance with the following values:

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

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

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- D. Report Certification – the annual report shall be prepared under the direct supervision of and certified by a Professional Engineer or Professional Geologist currently licensed by the State of Utah with at least five (5) years of construction cost estimation experience. The annual report shall be developed in accordance with the standards of professional care.
 - E. Electronic Format – the Licensee shall provide the report in both paper and electronic formats, as directed by the Executive Secretary.
 - F. Within 60-days of Executive Secretary approval of said annual report, the Licensee shall submit written evidence that the surety has been adequately funded.
 - G. The Licensee shall prepare and maintain current a gravel resource evaluation report on-site that quantifies the gravel reserves remaining in the Grayback Hills Gravel Pit located in Section 24 of T. 1 N., R. 12 W (SLBM). Such report shall be prepared and certified on or before August 31 of each year by a professional engineer or professional geologist currently registered in the State of Utah.
74. One (1) year prior to the anticipated closure of the site, the Licensee shall submit for review and approval by the Executive Secretary a site decontamination and decommissioning plan. As part of this plan, the Licensee shall demonstrate by measurements and/or modeling that concentrations of radioactive materials which may be released to the general environment, after site closure, will not result in an annual dose exceeding 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public.
75. In accordance with UAC R313-25-33(6), the Licensee shall submit a financial statement annually by March 31st of each year for the previous year.
76. Reserved.

SPECIAL HANDLING

77. Except while waste packages are being handled in the active areas of the Containerized Waste Facility, external gamma radiation levels shall not exceed 40 mR/hr at one meter from the surface of any emplaced waste package or from shielding placed around disposed waste containers.
78. The Licensee shall observe the following controls on waste handling at the Containerized Waste Facility:
- A. Before unloading any waste container whose external gamma radiation at the surface exceeds 10 R/hr, an ALARA review shall be performed and documented and a pre-job briefing shall be conducted.
 - B. As part of the ALARA review, the Licensee shall determine and record (1) estimates of the radiation dose rates for the waste container, disposal unit working face, and any other potentially significant radiation sources; (2) expected durations of exposures to and distances from each radiation source; and (3) expected doses to each person involved in the actual disposal operation.
 - C. Before unloading any waste container whose external gamma radiation at the surface exceeds

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

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

79. Reserved.
80. The Licensee shall notify in writing the Executive Secretary at the earliest possible date, but no later than 10 days before scheduled receipt of each shipment with contact radiation levels in excess of 200 R/hr. The notification shall include the anticipated dates of receipt and plan for disposal in the Containerized Waste Facility.
81. The Corporate Radiation Safety Officer or other qualified person he designates shall be present for and shall observe the receipt, processing, handling, and disposal of each waste package with contact radiation levels in excess of 200 R/hr.
82. The Licensee shall dispose of only closed containers in the Containerized Waste Facility. The Licensee shall not dispose of any breached waste container in the Containerized Waste Facility without first repairing the breached container or overpacking it in an undamaged container. The Licensee is authorized to open packages at its facility only to:
- A. Repair or repackage breached containers.
 - B. Inspect for compliance with conditions of this license.
 - C. Confirm package contents and fill voids in packages/containers that have greater than 15% void space.
 - D. Accomplish other purposes as approved by the Executive Secretary.
83. The Licensee shall handle and emplace LLRW packages in the Containerized Waste Facility such that packaging integrity is maintained during handling, emplacement, and subsequent backfilling. Waste packages deposited in the Containerized Waste Facility shall be protected from any adverse effects of operations which may damage them.

SEALED SOURCES AND/OR DEVICES

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

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- ii. In the absence of a certificate from a transferor indicating that a leak test has been made within the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by equivalent regulations of an Agreement State prior to the transfer, a sealed source received from another person shall not be put into use until tested.
 - iii. Sealed sources need not be tested if they are in storage and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than 3 years without being tested for leakage and/or contamination.
 - iv. The leak test shall be capable of detecting the presence of 185 becquerels (0.005 μCi) of radioactive material on the test sample. If the test reveals the presence of 185 becquerels (0.005 μCi) or more of removable contamination, a report shall be filed with the Executive Secretary in accordance with R313-15-1208, and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Utah Radiation Control Rules. The report shall be filed within 5 days of the date the leak test result is known with the Division of Radiation Control, P.O. Box 144850, Salt Lake City, Utah 84114-4850. The report shall specify the source involved, the test results, and corrective action taken.
 - v.
 - (a) The Licensee is authorized to collect leak test samples in accordance with Condition 85.D of this license, the Licensee's renewal application (dated March 1, 2001), and the Licensee's Memo (dated March 11, 2002).
 - (b) The analysis of leak test samples shall only be performed by individuals who meet the qualifications of a Health Physics Technician I or II, as defined by this license. The analysis of leak test samples shall be performed in accordance with the Licensee's renewal application (dated March 1, 2001), and the Licensee's Memo (dated March 11, 2002). Alternatively, tests for leakage and/or contamination, including sample collection and analysis, may be performed by other persons specifically licensed by the Executive Secretary, the U.S. Nuclear Regulatory Commission, or an Agreement State to perform such services.
 - vi. Records of leak test results shall be kept in units of Becquerels or microcuries and shall be maintained for inspection by representatives of the Executive Secretary.
- B. Sealed sources or source rods, containing licensed material shall not be opened or sources removed from source holders, devices, or detached from source rods by the Licensee, except as specifically licensed by the Executive Secretary, an Agreement State, or the U.S. Nuclear Regulatory Commission to perform such services.
- C. The Licensee shall conduct a physical inventory every six months to account for all sealed sources and/or devices received and possessed under this license. The records of inventories shall be maintained for three years from the date of the inventory for inspection by the Division, and shall

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include the quantities and kinds of radioactive material, manufacturer's name and model numbers, location of the sources and/or devices, and the date of the inventory.

PORTABLE GAUGING DEVICES:

85. A. Each portable gauging device shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The gauge or its container must be locked when in transport, storage or when not under the direct surveillance of an authorized user.
- B. Each portable gauging device shall be kept under the constant surveillance (direct surveillance) of individuals trained in accordance with Condition 32.B of this license, when the device is not in secured storage, as required by Condition C of this license condition.
- C. When a portable gauging device is not in transit or under constant surveillance (direct surveillance) as required by Condition B of this license condition:
- i. The Licensee shall secure the device in accordance with R313-15-801(1) and (2).
 - ii. The Licensee shall not:
 - (a) leave the device unattended or unsecured;
 - (b) chain the device to a post, chain the device in the back of an open bed truck; or secure the device in any similar manner.
- D. Any cleaning and/or maintenance of portable gauging device(s) or the collection of leak test samples, performed by the Licensee, shall only be performed with the radioactive source/source rod in the safe shielded position.
- E. All cleaning and/or maintenance of portable gauging device(s), performed by the Licensee shall only be performed in accordance with Condition D of this license condition, and the manufacturer's instructions and recommendations.
- F. Any cleaning, maintenance, or repair of portable gauging device(s) that requires removal of the sources/source rod shall be performed only by the manufacturer or by other persons specifically licensed by the Executive Secretary, an Agreement State, or the U.S. Nuclear Regulatory Commission to perform such services.

DOSIMETER CALIBRATOR(S)/IRRADIATOR(S):

86. A. The LDM-2000 reader shall only be connected to a maximum of two IRD-2000 irradiator modules.
- B. Devices(s) shall only be:
- i. installed in areas where device(s) can be secured and limited to individuals authorized to use device(s) pursuant to Condition A of this license condition and Condition 32.C of this license.
 - ii. used by individuals who meet the qualifications of a Health Physics Technician I or II, as

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- defined by this license.
- iii. used in accordance with the manufacturer's operating manual and certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by equivalent regulations of an Agreement State. The Licensee shall follow the manufacturer's recommendations for preventative maintenance and operational testing.
- C. Maintenance and servicing of device(s) shall only be performed by the manufacturer or persons specifically licensed by the Executive Secretary, the U.S. Nuclear Regulatory Commission, or an Agreement State to perform such services.
 - D. The Licensee shall not perform calibration(s) for non-MGP Instrument dosimeters.

INCREASED CONTROL CONDITIONS

- 87. The Licensee shall comply with the requirements described in the Division's letter dated November 14, 2005 and attached document to the Division's letter entitled "Increased Controls for Licensees that Possess Sources Containing Radioactive Material Quantities of Concern." The Licensee shall complete implementation of said requirements before May 15, 2006 or the first day that radionuclides in quantities of concern are possessed at or above the limits specified in Table 1, provided as an attachment to the Division's letter dated November 14, 2005, whichever is later. Within 25 days after the implementation of the requirements of this License Condition, the Licensee shall notify the Executive Secretary in writing that it has completed the requirements of this License Condition.
- 88. The licensee shall comply with requirements described in the Executive Secretary's letter dated May 16, 2008, Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material" and Attachment 2, "Specific Requirements Pertaining to Fingerprinting and Criminal History Records Checks." The requirements of this license condition shall be implemented as part of the trustworthiness and reliability program of the Increased Controls requirements.
 - A. On or before August 14, 2008, the licensee shall provide under oath or affirmation, a certification that the Trustworthiness and Reliability Official is deemed trustworthy and reliable by the licensee as required in paragraph 2.B of Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material."
 - B. All fingerprints obtained by the licensee pursuant to this requirement must be submitted to the U.S. Nuclear Regulatory Commission for transmission to the U.S. Federal Bureau of Investigation (FBI). Additionally, the licensee's submission of fingerprints shall also be accompanied by a certification, under oath and affirmation, of the trustworthiness and reliability of the Trustworthiness and Reliability Official as required by paragraph 2.B of Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material."
 - C. The licensee shall complete implementation of the fingerprinting requirements on or before November 12, 2008. The licensee shall notify the Executive Secretary when full compliance

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with the requirements described in the Executive Secretary's letter dated May 16, 2008, Attachment 1, "Fingerprinting and Criminal History Records Check Requirements for Unescorted Access to Certain Radioactive Material" and Attachment 2, "Specific Requirements Pertaining to Fingerprinting and Criminal History Records Checks" have been achieved. Notification to the Executive Secretary shall be made within twenty-five (25) days after full compliance has been achieved.

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

CLOSEOUT CONDITIONS

89. Except as specifically provided otherwise in this license, the Licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Utah Radiation Control Rules, Utah Administrative Code R313 shall govern unless the statements, representations, and procedures in the Licensee's application and correspondence are more restrictive than the rules.
- A. License renewal application, Revision 2, dated June 20, 2005.
- B. The following documents refer to revisions made in Amendment 22:
- (1) Letter CD04-0481, dated October 27, 2004, Amendment and Modification Request – Class A North Embankment.
 - (2) Letter CD04-0548, dated December 23, 2004, Revised Class A North Disposal Embankment License Amendment Request.
 - (3) URS Review of Revised Class A North Embankment Amendment Request, dated December 29, 2004.
 - (4) Letter CD05-0024, dated January 17, 2005, Class A North Disposal Embankment License Amendment Request Revision 2.
 - (5) Letter CD05-0265, dated May 20, 2005, Revision of Appendix R, Environmental Monitoring and Surveillance Plan.
 - (6) Letter CD05-0266, dated May 25, 2005, Surety Calculations for the Class A North Disposal Cell.
 - (7) Memo: Treesa Parker to John Hultquist, dated May 25, 2005, Proposed revisions to RML for Amendment 22
 - (8) Email: Treesa Parker to Christine Haring, dated June 1, 2005, License Amendment 22 Minor Changes for Consistency.
- C. The following documents refer to revisions made in Amendment 22A:
- (1) Division letter dated November 14, 2005.
- D. The following documents refer to revisions made in Amendment 22B:
- (1) Letter CD05-0333, dated June 30, 2005, RML no. UT 2300249 Request for approval of revisions to Appendix I, Organization, and amendment of License Condition 32 A.
 - (2) Memorandum dated August 2, 2005, Subject; Review of Appendix I

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- (3) Letter CD05-0398, dated August 16, 2005, Request for approval of revisions to Appendix I, Organization and amendment of license condition 31.A,B,C, and 32A.
- (4) Letter CD05-0507, October 26, 2005, Additional information regarding proposed revisions to Appendix I, Organization and amendment of license condition 31.A,B,C, and 32A.
- (5) Letter CD05-0453, dated September 19, 2005 Request for amendment of License Condition 9.10 RML UT2300478; Organization.
- (6) Letter dated November 22, 2005, Request for information regarding request to revise Appendix I of the 11e(2) License Application and Amendment of L.C. 9.10.
- (7) Letter dated October 11, 2005, Re: Request for Information: Revision to Appendix I and amendment 31A. B. C. and 32A. dated August 16, 2005 (CD05-0398).
- (8) Memorandum, dated October 3, 2005, Subject; Appendix I, revisions to RML UT2300249 conditions 31 A, B, C, and 32 A.
- (9) Letter CD05-0411, dated August 23, 2005, Payment of administrative cost for Appendix I amendment request dated August 16, 2005.
- (10) Letter CD05-0472, dated September 30, 2005, License condition 39.E amendment
- (11) Email dated August 10, 2005, Subject: Draft amendment for LC 39.E and attached august 10, 2005, License Condition 39 E. amendment "draft".
- (12) Email dated September 16, 2005, Subject: RE: FW: Draft amendment for LC 39.E.
- (13) Letter CD05-0285, dated June 1, 2005, Envirocare containerized waste facility concrete overpacks corrective action plan.
- (14) Letter dated June 2, 2005, filling waste package voids at the containerized waste facility using controlled low strength material (CLSM)
- (15) Letter CD05-0326, dated June 27, 2005, Re: Letter to Mr. Dane Finerfrock, dated April 13, 2005, CD05-0181.
- (16) Letter CD05-0366, dated July 26, 2005, Re: Letter to Dane Finerfrock, dated June 27, 2005, CD05-0326.
- (17) Letter CD06-0011, dated January 12, 2006, Request to amend License Condition No. 2, Address.
- (18) Letter CD06-0043, dated February 3, 2006, Request to amend License Condition No. 1, Company Name.
- (19) Letter dated February 6, 2006, evidence of name change with the Utah Department of Commerce.
- (20) Email dated October 6, 2005, Subject: License condition 39.E.
- (21) Memorandum from Woodrow W. Campbell through Loren Morton and Dane Finerfrock to Envirocare File, dated January 13, 2006 regarding AMRL Soils Lab Certification for the Envirocare Soils Lab.
- (22) Email dated February 15, 2006 from Loren Morton to Dan Shrum, Subject: License Amendment for Condition 73.
- (23) Email dated December 23, 2005 from Loren Morton to Dane Finerfrock, Subject: Proposed Changes to License Condition 73 - Annual Surety Evaluation Report.
- (24) Letter dated February 22, 2006, Subject: Revise void remediation procedure OPC-6.0.

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- E. The following documents refer to revisions made in Amendment 22C:
- (1) Letter CD05-0435, dated September 8, 2005, Request to amend RML UT 2300249: Condition 58, Waste Characterization Plan.
 - (2) Letter CD05-0557, dated December 5, 2005, RML UT 2300249; Condition 58 Waste Characterization Plan – Revised License Amendment Request.
 - (3) Letter CD06-0072, dated February 27, 2006, Radioactive Material License UT 2300249: Condition 58 Waste Characterization Plan – Revised License Amendment Request.
 - (4) Email dated February 24, 2006 from Boyd Imai to Sean McCandless Re: Waste Characterization Plan.
 - (5) Letter CD06-0059, dated February 15, 2006, Radioactive Material License UT 2300249 – Self Identified Noncompliance.
 - (6) Letter dated March 17, 2006, from the DRC regarding the February 15, 2006 letter of noncompliance.
 - (7) Letter CD06-0055) dated February 9, 2006, Request to Amend RML UT 2300249 to show addition of Liquid Radioactive Sources to License Condition 6.E.
 - (8) Letter (CD06-0092) dated March 8, 2006, RML UT 2300249; Request for administrative amendment. Conditions 21A and B and Condition 81.
- F. The following documents refer to revisions made in Amendment 22E:
- (1) CD06-0389, “Request to amend Radioactive Materials License No. UT 23000249 and 11e.(2) Radioactive Materials License No. UT 23000478 – Request for approval revised Appendix I, *Organization*,” October 6, 2006.
 - (2) Shredder Facility
 - a. CD05-0448, “Radioactive Materials License No. UT 2300249 (RML) and Groundwater Quality Discharge Permit UGW450005 (GWQDP). Request to Construct Shredding Facility,” September 15, 2005.
 - b. CD05-0532, “Request to Construct Shredding Facility – Revised Design and Interrogatory Response,” November 14, 2005.
 - c. CD05-0556, “Request to Construct Shredding Facility – Additional Information,” December 2, 2005.
 - d. CD06-0036, “Request to Construct Shredding Facility – Response to Round 2 Interrogatories”, February 1, 2006.
 - e. CD06-0098, “Request to Construct Shredding Facility – Response to Round 3 Interrogatory,” March 10, 2006.
 - f. ASTM F-1417, “ASTM Method F 1417-92,” March 29, 2006.
 - g. CD06-0188, “Request to Construct Shredder Facility – Response to Round 4 Interrogatory,” May 9, 2006.
 - h. CD06-0211, “Request to Construct Shredder Facility – Response to Round 4B Interrogatory,” May 25, 2006.
 - i. CD06-0234, “Requests to Construct Shredder and Rotary Dump Facilities – Revised Wastewater Management Process,” June 19, 2006.
 - j. “EnergySolutions LLC Low-Level Radioactive Waste Closure & Post-Closure Trust License UT 2300249 Trust #16673400,” June 29, 2006.

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- k. CD-0346, "Interim Wastewater Management Plan for the Shredder Facility – Response to August 18, 2006 Request for Additional Information," August 31, 2006.
 - l. CD06-0388, "Radioactive Material License UT 2300429 and Groundwater Quality Discharge Permit (GWDP) No UGW450005 Shredder Facility – Request to Operate," October 5, 2006.
 - m. CD06-0407, "Comment on Proposed Amendment of Radioactive Material License UT 2300249 and Groundwater Quality Discharge Permit (GWDP) No UGW450005, October 18, 2006.
 - n. CD06-0414, "Radioactive Material License UT 2300249 and Groundwater Quality Discharge Permit No UGW450005 Shredder Facility – Submittal of Revised Drawings" October 25, 2006.
 - o. CD06-0425, "Groundwater Quality Discharge Permit No UGW450005 (GWQDP) Submittal of Revised Appendix J and K," November 7, 2006.
- (3) Rotary Dump Facility
- a. CD05-0564, "Request to Construct – Rotary Dump," December 12, 2005.
 - b. CD05-0570, "Request to Construct Rotary Dump 00 Submittal of Dose Assessment," December 16, 2005.
 - c. CD06-0086, "Request to Construct Rotary Dump Facility – Response to Round 1 Interrogatory," March 2, 2006.
 - d. ASTM F-1417, "ASTM Method F 1417-92," March 29, 2006.
 - e. CD06-0147, "Request to Construct Rotary Dump Facility – Revised Drawings," April 10, 2006.
 - f. CD06-0210, "Request to Construct Rotary Dump Facility – Response to Round 2 Interrogatory," May 25, 2006.
 - g. CD06-0211, "Request to Construct Rotary Dump Facility – Response to Round 4B Interrogatory," May 25, 2006.
 - h. CD06-0226, "Request to Construct Rotary Dump Facility – Response to Round 2B Interrogatories," June 8, 2006.
 - i. CD06-0234, "Requests to Construct Shredder and Rotary Dump Facilities – Revised Wastewater Management Process," June 19, 2006.
- (4) Intermodal Container Wash Building
- a. CD05-0291a, "Radioactive Materials License No. UT 2300249 (RML) and Groundwater Quality Discharge Permit UGW450005 (GWQDP). Request to Construct Intermodal Container Wash Building and Access Control Building," June 9, 2005.
 - b. CD05-0388, "Request to Construct Intermodal Container Wash Building – Revised Design and Supplemental Information," August 8, 2005.
 - c. CD05-0432, "Request to Construct Intermodal Container Wash Building – Revised Design and Interrogatory Response," September 1, 2005.
 - d. CD06-0110, "MARSSIM Release for New Intermodal Container Wash Facility," March 22, 2006.

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- e. CD06-0206, "Radioactive Material License UT 2300249 and Groundwater Quality Discharge Permit No UGW450005 Intermodal Container Wash Building – Request to Operate," May 22, 2006.
 - f. "EnergySolutions LLC Low-Level Radioactive Waste Closure & Post-Closure Trust License UT 2300249 Trust #16673400," June 29, 2006.
 - g. CD06-0259, "Groundwater Quality Discharge Permit (GWDP) No UGW450005 Intermodal Container Wash Building – Revised Appendix J and K," July 10, 2006.
- (5) Decontamination Access Control Building
- a. CD05-0291b, "Radioactive Materials License No. UT 2300249 (RML) and Groundwater Quality Discharge Permit UGW450005 (GWQDP). Request to Construct Intermodal Container Wash Building and Access Control Building," June 9, 2005.
 - b. CD05-0367, "MARSSIM Release of New Boxwash Access Control", July 26, 2005.
 - c. CD06-0139, "Radioactive Material License UT 2300249 and Groundwater Discharge Quality Permit (GWDP) No UGW450005 Decontamination Access Control Building – Request to Operate", April 6, 2006.
 - d. "EnergySolutions LLC Low-Level Radioactive Waste Closure & Post-Closure Trust License UT 2300249 Trust #16673400," June 29, 2006.
 - e. CD06-0245, "Groundwater Discharge Quality Permit (GWDP) No UGW450005 Decontamination Access Control Building – Revised Appendix J and K and Drawing No 05015-S100," June 30, 2006.
- (6) East Side Drainage Project
- a. CD06-0175, "Request to Construct East Side Drainage and Gray Water System Modifications," May 1, 2005.
 - b. CD06-0244, "East Side Drainage and Gray Water System Modifications – Response to DRC Review," June 30, 2006.
 - c. CD06-0293, "Groundwater Discharge Quality Permit No UGW450005 East Side Drainage and Gray Water System – Revised Design and BAT Plans," August 4, 2006.
 - d. CD06-0327, "Groundwater Discharge Quality Permit No UGW450005 East Side Drainage and Gray Water System – Revised Appendix J BAT Performance Monitoring Plan and Appendix K BAT Contingency Plan," August 23, 2006.
 - e. CD06-0328, "Groundwater Discharge Quality Permit No UGW450005 East Side Drainage and Gray Water System – Revised Drawings," August 24, 2006.
- G. The following documents refer to revisions made in Revision 0 of the License Renewal Application:
- (1) AGRA Earth & Environmental, Inc. 1999. Summary Seismic Stability and Deformation Analysis: Envirocare LARW Disposal Facility, Clive, Tooele County, Utah. September 1, 1999. (1998 LRA Appendix J)
 - (2) AGRA Earth & Environmental, Inc. 2000a. Evaluation of Settlement of Compressible Debris Lifts: LARW Embankments, Clive, Tooele County, Utah. June 1, 2000.
 - (3) AGRA Earth & Environmental, Inc. 2000b. Evaluation of Settlement of Incompressible Debris Lifts: LARW Embankments, Clive, Tooele County, Utah. June 1, 2000.

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- (4) AMEC Earth & Environmental, Inc. 2000a. Letter Report: Allowable Differential Settlement and Distortion of Liner and Cover Materials. October 4, 2000.
- (5) AMEC Earth & Environmental, Inc. 2000b. Letter Report Stability Considerations: Proposed LLRW Embankment. October 25, 2000.
- (6) AMEC Earth & Environmental, Inc. 2000c. Letter Report Stability Considerations - Addendum: Proposed LLRW Embankment. November 8, 2000.
- (7) AMEC Earth & Environmental, Inc. 2001. Response to Interrogatory Number 2: Placement of HICs in Caissons. October 1, 2001.
- (8) AMEC Earth & Environmental, Inc. 2002. Placement of Large Liners in Caissons. June 19, 2002.
- (9) Bingham Environmental. 1996. Project Memorandum HEC-1 and HEC-2 Analysis, LARW Application for License Renewal, Envirocare Disposal Facility, Clive Utah. November 26, 1996. (1998 LRA Appendix KK)
- (10) EnergySolutions (Rebecca McCloud) to Utah Division of Radiation Control (Dane Finerfrock). 2006. Correspondence concerning corporate ownership and name changes. February 6, 2006.
- (11) EnergySolutions (Tye Rogers) to Utah Division of Radiation Control (Dane Finerfrock). 2006. Correspondence concerning corporate ownership and name changes. February 3, 2006.
- (12) EnergySolutions LLC. 2007. "2006 Annual 083106 Rev 052107.xls" [annual surety review], Revision 22, May 21, 2007
- (13) EnergySolutions to Utah Division of Radiation Control. 2006. Letter number CD06-0348, Radioactive Materials License No. UT2300249 – Revision to License Condition 26, Appendix R request submitted to DRC on March 17, 2006. September 1, 2006.
- (14) Envirocare of Utah, Inc. to URS Corporation. 2005. Personal communication via electronic mail (Sean McCandless and Robert D. Baird, PE). January 27, 2005.
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- (67) Letter CD02-0315, "Revised CQA/QC Manual - Containerized Waste Facility: Placement of Large Liners/HICs - Revised Settlement Analysis and CQA/QC Language", Envirocare of Utah to Utah Division of Radiation Control, August 7, 2002.
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- H. The following documents refer to revisions made in Amendment 1:
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 - (2) Letter CD08-0078, "RML UT2300249, Condition 58 –Request for Amendment to the Waste Characterization Plan."
 - (3) Letter CD08-0004, "RML UT2300249 Amendment for Calibration Sources" dated January 2, 2008.
 - (4) Letter CD08-0066, "RML UT2300249; Request to amend License Condition 32" dated February 28, 2008.
 - (5) Email dated February 29, 2008 from Boyd Imai to Mark Ledoux Re: Amendment Request (CD08-004).
 - (6) Email dated November 23, 2007 from John Hultquist to Sean McCandless, Request for Information regarding WCP:
 - (7) Letter dated March 7, 2008, Utah Division of Radiation Control (Dane Finerfrock) to EnergySolutions, LLC. (Sean McCandless). "Appendix I Organization dated February 28, 2008".
 - (8) Memorandum from John Hultquist to File; dated March 11, 2008 Review of WCP revised November 9, 2007 and March 10, 2008.
- I. The following documents refer to revisions made in Amendment 2:
- (1) Executive Secretary's letter dated May 16, 2008 [LA# 116-2008]

UTAH RADIATION CONTROL BOARD

Dane L. Finerfrock, Executive Secretary

Date

Appendix B
DOECAP Audit

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Final Report

**Continuing
Qualification
Audit of
Energy
Solutions, LLC -
Salt Lake City, UT**

April 2008



**U.S. Department of Energy
Office of Health, Safety and Security**



Department of Energy
Washington, DC 20585
June 16, 2008

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Mr. Daniel Shrum
Vice President
EnergySolutions, LLC
423 West 300
South Suite 200
Salt Lake City, Utah 84101

Dear Mr. Shrum:

**DEPARTMENT OF ENERGY CONSOLIDATED AUDIT PROGRAM — CONTINUING
QUALIFICATION FINAL AUDIT REPORT — ENERGY SOLUTIONS, LLC — SALT
LAKE CITY, UTAH — APRIL 15-17, 2008 — AUDIT ID: 080417-ESU**

On behalf of the Department of Energy Consolidated Audit Program (DOECAP), I would like to thank you and the staff at EnergySolutions, LLC for working with us during the DOECAP continuing qualification audit conducted April 15-17, 2008. Your staff was very supportive during the audit and readily supplied the information needed to complete our assessment in a timely manner. We also appreciate your factual accuracy review of the draft audit report delivered to you at the audit exit briefing on Thursday, April 17, 2008. Your input was considered in finalizing the enclosed audit report.

This letter also serves to close DOECAP Fiscal Year (FY) 2007 Audit 070412-ESU. Any findings remaining open from previous DOECAP audits have been incorporated into this FY 2008 audit report, effectively closing all previous DOECAP audits of your facility.

Please submit your Corrective Action Plan (CAP) to me within 30 calendar days of receipt of this audit report, addressing each finding and observation noted. You will receive your electronic CAP format via e-mail for your use. Your CAP will be entered into the DOECAP electronic data system, where it will be tracked through closure.

The following format is required to facilitate CAP entry into the DOECAP electronic data system:

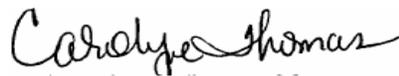
- (1) Detailed Corrective Actions: Provide a summary response to the finding that states the cause of the finding and what will be done to prevent recurrence, in addition, provide corrective actions that will be performed to address a finding.
- (2) Scheduled Date of Completion: Provide the estimated completion date for each corrective action.

Responses to observations must also be provided in your CAP. However, these responses do not require a detailed corrective action or completion date, but can be brief and concise statements.

Please submit your CAP via e-mail to me at thomascf@oro.doe.gov and copied to aderholdtsl@oro.doe.gov. To be accepted, the CAP must be in the Microsoft Word format provided to you electronically for this purpose. Please do not submit support documentation with your CAP at this time. We will request closure documentation just prior to your next scheduled DOECAP audit, to facilitate verification of CAP implementation during that audit.

If you require further information on this report or on the required format for your CAP, please contact Susan Aderholdt at (865) 576-0250.

Sincerely,

A handwritten signature in cursive script that reads "Carolyn Thomas".

Carolyn Thomas, Program Manager
Department of Energy Consolidated
Audit Program

Enclosure:

cc w/enclosure:

Christine Gelles, EM-12, CLVRLF/HQ
David Carden, DOE Oak Ridge Office
DOECAP Document Control Coordinator

cc w/o enclosure:

George Detsis, HS-31, 270CC/GTN/HQ
DOECAP Corrective Actions Coordinator

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**Department of Energy
Consolidated Audit Program
Continuing Audit of
EnergySolutions, LLC
Salt Lake City, Utah**

1.0 OBJECTIVE

A continuing qualification audit of the EnergySolutions, LLC facility in Salt Lake City, Utah, (hereafter referred to as ESU), was conducted April 15-17, 2008, by the Department of Energy Consolidated Audit Program (DOECAP). The objectives of this audit were to assess the management systems and operational activities at ESU, and to verify ESU's ability to meet the requirements of the Department of Energy (DOE) for the storage, handling, transportation, processing, or final disposition of DOE material.

2.0 SCOPE AND LOGISTICS

The audit focused on all areas of the facility that could impact the storage, handling, processing, or final disposition of DOE materials at ESU. Specific functional areas reviewed were as follows: (1) Quality Assurance (QA) management systems, (2) sampling and analytical data quality, (3) waste operations, (4) environmental compliance/permitting, (5) radiological control, (6) industrial and chemical safety and (7) transportation management. Detailed DOECAP checklists were used to guide the auditors' questions and lines of inquiry. Previously identified findings were evaluated as to status of corrective actions, and closed if DOECAP-accepted corrective actions were verified as satisfactorily completed.

The audit was led by a DOECAP qualified lead auditor. The audit team consisted of representatives (i.e., federal and contractor staff) from various DOE sites, identified in the table below by name, affiliation, and area(s) of audit review.

Team Member	Organization	Area of Review
David Carden	DOE Oak Ridge Office	Lead Auditor, Environmental Compliance
Pat Mars	DOE Nevada Site Office; National Securities Technology	Quality Assurance Management Systems
Joe Pardue	DOE Oak Ridge Office; Pro2Serve, Inc.	Sampling and Analytical Data Quality
Howard Hansen	DOE Los Alamos National Laboratory; University of California	Waste Operations
Dennis Knapp	DOE Savannah River Site; Washington Savannah River	Radiological Control
Jon Spezialetti	DOE Nevada Test Site; National Securities Technology	Industrial and Chemical Safety
Alfred Camp	DOE Savannah River Site; Washington Savannah River	Transportation Management
Stephanie Jacquez	DOE Los Alamos National Laboratory	AIT: Industrial and Chemical Safety
George Detsis	DOE Office of Quality Assurance Programs	HQ Oversight

An opening meeting was conducted Tuesday, April 15, 2008, to acquaint the DOECAP audit team with ESU organizational counterparts and to coordinate audit activities. A draft summary of audit results was presented to ESU management and staff during the audit exit meeting conducted Thursday, April 17, 2008.

Key ESU personnel contacted during the audit included:

Pam Heckman	Dan Quackenbush	Dan Shrum	Wayne Johns
Terry Davis	Dave Moir	Sean McCandless	Christina Gracia
Emily Martinez	Curtis Kirk	Allan Erichson	Kelly Lewis
Gwen McDonald	Dow Shirley	Justin Lee	Damon Young
Harry Reynolds	Carl Palmer	Jeff Gardner	Dave Squires
Jesse Garcia	Tim Orton	Larry Whatley	Zeke Wilmot
Bill Craig	Dave Brooks	Mike Cantone	Tom Wright
Rick Chalk	Dave Booth	Albert Evans	

3.0 AUDITED FACILITY GENERAL INFORMATION

ESU is a radioactive and mixed waste disposal facility that accepts commercial and government wastes. It is situated on a one square mile parcel of land known as Section 32 in an arid area of Utah's western desert. The facility, located approximately 80 miles west of Salt Lake City, has convenient access to the interstate highway system and major railroad service (Union Pacific). There are currently 202 full-time employees involved in waste operations and support functions. The facility has the capability to unload 60 rail cars and 30 truck shipments in a normal shift. During peak operational periods, ESU is able to dispose 50,000 cubic feet of waste per day. Waste processing and disposal capabilities are discussed in Section 4.2 of this DOECAP audit report.

ESU was originally cited as a disposal location for the Vitro clean up project in Salt Lake City by the State of Utah and the DOE. It began commercial operation in 1988 under the name Envirocare with a license to accept waste containing Naturally Occurring Radioactive Material. In 1991, a Low Activity Radioactive Waste (LARW) license was secured; in 1993, an 11e. (2) license was obtained; and in 2000, the State of Utah granted the facility a full Class A license. In 2006, Envirocare changed its name to EnergySolutions under new ownership that included multiple acquisitions throughout the radioactive waste industry.

Throughout its history the facility has adapted to changing waste streams as well as changing customer needs for waste treatment. Currently the facility holds the following licenses and permits:

- Radioactive Material License (RML): State of Utah, Division of Radiation Control (DRC);
- Mixed Waste (MW) Treatment, Storage Disposal Permit: State of Utah, Division of Solid and Hazardous Waste;

- Toxic Substances Control Act (TSCA) Approval (TD*X Associates, Inc. [TDX] and LARW shredder): U.S. Environmental Protection Agency (EPA), Region 8;
- 11e.(2) Material License: State of Utah, DRC (transferred from the United States Nuclear Regulatory Commission (NRC) August 16, 2004);
- Groundwater Quality Discharge Permit: State of Utah, Division of Water Quality; and
- Air Order: State of Utah, Division of Air Quality (DAQ).

The facility has robust industrial and radiological safety programs as well as an environmental monitoring program that meets applicable regulatory standards. An Environmental Monitoring Report is produced annually and submitted to the state of Utah.

The facility administration consists of a site Vice President who reports directly to the President of the Commercial Facilities Group and is responsible for all site operational and compliance programs. His direct reports are: the Director of MW Operations, the Director of Low Level Radioactive Waste (LLRW) Operations, the Security Manager, the Director of Logistics, the Safety and Health (S&H) Manager, the Director of Engineering and the Director of Health Physics (HP). The Director of HP also reports to the Corporate Radiation Safety Officer. The QA Manager and Environmental Monitoring staff report through management lines in the Regulatory Compliance Group. The ESU QA Program follows the requirements of the American Society of Mechanical Engineers (ASME) Quality Assurance Requirements for Nuclear Facility Applications (NQA-1).

The State of Utah regulates the facility through various divisions within the Department of Environmental Quality. Fourteen full time employees and regulatory staff personnel of varying disciplines evaluate, monitor and inspect various aspects of site operation.

To date, the Clive Facility has disposed of 71,114,445 cubic feet of DOE waste under 250 Generator Identifications encompassing 872 individual waste streams.

4.0 AUDIT RESULTS

Sections 4.1 through 4.7, below, provide an overall summary of the current status of Environment, Safety, Health, Quality (ESH&Q) programs at ESU including conformance to requirements and any noted weaknesses. Each subsection also contains a status of previous findings and identification of any new findings or observations noted in that particular area of review.

In this audit report, findings are designated by letters representing the specific area of review preceding the DOECAP Identification of that item (e.g., QA-080417-A), with observations designated by the letter “O” preceding the DOECAP Identification of that item (e.g., OQA-080417-A).

- Priority I finding: A factual statement issued from a DOECAP audit to document a significant item of concern, or significant deficiency regarding key management/ programmatic control(s), which in and of itself represents a concern of sufficient

magnitude to potentially render the audited facility unacceptable to provide services to the DOE if not resolved via immediate and/or expedited corrective action(s).

- Priority II finding: A factual statement issued from a DOECAP audit to document a deficiency which in and of itself does not represent a concern of sufficient magnitude to render the audited facility unacceptable to provide services to the DOE.
- Observation: A factual statement resulting from a DOECAP audit to document an isolated deficiency, deviation from Best Management Practices, or an opportunity for improvement, which does not warrant issuance of a Priority II finding.

This DOECAP audit concluded that ESU continues to maintain the established management systems and operational activities necessary to meet DOE requirements for the storage, handling, transportation, processing, or final disposition of DOE waste. The submittal of an acceptable Corrective Action Plan (CAP) to address the findings noted in this report will ensure the facility remains in good standing with DOECAP and its DOE customers.

Seven previous Priority II findings were closed, and none remain open. Four new Priority II findings were issued. Eleven new observations were identified.

4.1 Quality Assurance Management Systems

ESU Standard Operating Procedure (SOP) ES-QA-PG-001, the QA program at ESU, is a new program that went into effect on May 31, 2007, to meet the requirements of 10 Code of Federal Requirements (CFR) 50, Appendix B; 10 CFR 71, Subpart H, 10 CFR 72, Subpart G, and 10 CFR 830, Subpart A and comparable industry standards such as American National Standards Institute/ASME NQA-1. The QA Program is well documented and is complemented with associated Quality Assurance Procedures (QAPs). Key areas of improvement observed at ESU include: (1) the Condition Report system, implemented on May 31, 2007, to track conditions adverse to ESH&Q or of importance to safety; and (2) up-to-date training with complete qualification cards. QA Program implementation was observed in the following areas: Program; Training; Design Control; Procurement; Procedures; Document Control; Control of Purchased Items and Services; Identification of Nonconforming Items; Inspection and Acceptance Testing; QA Records; and Assessments. QA Program implementation was verified through document review, interviews, and direct observation.

The QA management system review included the following documents:

- ESU QA Program;
- 20 Training Records;
- Four Purchase Orders;
- Three Receiving Inspection Reports;
- 22 ESU QAPs;
- ESU Qualified Supplier List;
- 12 Condition Reports (CR); and
- 9 Assessments and Surveillances.

It is apparent, based on the documents reviewed and the interviews conducted, that ESU is committed to the implementation of their new QA Program. The QA Program is further complimented with very well defined QAPs that are more specific and detailed in relation to the everyday functions carried out by the facility.

One of many improvements seen at ESU is the CR system. On May 31, 2007, ESU adopted the corporate procedure ESU SOP ES-AD-PR-008, to track conditions adverse to ESH&Q or of importance to safety. This program streamlines ESU's previous employment of eight separate tracking processes (Action Requests, Non-conformance Reports, Problem Reports, Radiological Incident Reports, Emergency Responses, Contingency Plans, Safety issues and Security issues). ESU hired a Quality Assurance Coordinator (QAC), whose primary function is to manage the CR process. The CR process includes but is not limited to file maintenance, tracking open issues, performance tracking, verifying and trending of corrective actions. The QAC coordinates and supports personnel through the process and has established user friendly aides to guide personnel through the completion of a CR. This was a cultural change in how personnel viewed the process. CRs are no longer perceived as a negative, but are now more a management tool and an opportunity for improvement. There has been significant support for the CR process through all levels of management.

When reviewing training records it was apparent that ESU had made improvements in this area. Training was up to date and qualification cards were complete. Section 2 of the Training Manual was revised on March 25, 2008 and consists of seven newly generated or revised training procedures.

One previous Priority II finding was closed, and none remain open. No new findings were issued. No new observations were identified.

4.1.1 Status of Previous Quality Assurance Management Systems Finding

QA-070412-A: A test procedure for the Rotary Dumper was not developed or approved; results were not approved by the Chief Engineer and Director of QA as required by the QAPs. (Priority II) (ESU SOP QAP 11.0) (CLOSED)

Training was completed to the requirements of ESU SOP QAP 11.0 on June 8, 2007, until such time that a new Test Control procedure could be implemented. CR CR07-003 was generated June 8, 2007, and upon review of ESU SOP QAP 11.0 it was determined the procedure along with ESU SOP QAP 3.0 should fall under the control of the Engineering Department. Therefore ESU SOP CL-EN-PR-001 and ESU SOP CL-EN-PR-002 were written and effective October 23, 2007 with training being completed on October 24, 2007. ESU SOP's QAP 3.0 and QAP 11.0 were cancelled. This sequence of actions provided documentation for the closure of the finding.

4.1.2 New Quality Assurance Management Systems Findings and/or Observations

None noted.

4.2 Sampling and Analytical Data Quality

ESU continues to maintain a well organized program of sampling and analytical services for characterization of incoming and treated waste. In-house analytical abilities are in place for fingerprinting analyses and for quantitative measurement of metals and radionuclides. The Quality Control (QC) of all in-house analyses was excellent. It is recommended, however, that the ESU laboratory seek to participate in the DOE Mixed Analyte Performance Evaluation Program (MAPEP) for metals. For analyses that require independent testing or that require analytical methods not available at ESU, contract laboratories are used. The data from these laboratories is verified for adequacy by ESU staff.

The ESU laboratory provides analytical services for characterization of incoming waste. ESU analytical capabilities include chemical screening (fingerprint) analysis of all incoming wastes. The fingerprint analyses includes the use of a photoionizer “sniffer” to determine Volatile organic compound (VOC) vapors in the headspace; paint filter liquids test to determine the presence of free liquids within a sample; liquid pH determination; and oxidizer/reducer determinations (applicable to mixed waste shipments that are intended for Vacuum Thermal Desorption (VTD)). Gamma Spectroscopy (GS) is required for all incoming waste batches. GS is also used to analyze soils and air filters as part of the environmental monitoring program under the RML. As a crosscheck, five percent of GS samples are sent to a commercial analytical laboratory for analysis. GS is also used for screening all shipping containers of samples that are sent to an offsite facility.

Inductively Coupled Plasma (ICP) for metals analysis and Cold Vapor Atomic Absorption for mercury analysis are being utilized. ESU plans to seek accreditation for the ICP metals determination from the State of Utah. Currently the ICP is used for in-house monitoring of radioactive lubricating fluids and for other internal uses. As a part of the accreditation process Performance Testing (PT) samples from a commercial vendor are being analyzed. The ESU laboratory currently participates in the MAPEP PT program for GS. If the ICP is accredited, participation in the MAPEP for inorganic metals will be required.

In 2007 an extensive internal audit was performed of the analytical laboratory by the ESU QA department. Detailed lines of inquiry were prepared that included all areas of the laboratory. As a result of the audit, corrective actions were developed for the findings and are being tracked to completion.

All data generated by the laboratory is peer reviewed by an employee independent of the person that performed the analysis. All Standard Operating Procedures (SOP) are in place and effectively implemented in accordance with promulgated methods or regulatory standards. All samples are controlled under Chain-of-Custody (COC) that is generated at the time of sampling. Complete documentation of all sampling activities is maintained by the sampling personnel and peer review of information is performed. Qualification of the sampling technicians is part of the responsibility of the laboratory personnel. The training program and qualification process for the sampling technicians is commendable. The qualification process includes onsite practical training, surveillances and requalification if discrepancies are observed. The training program includes all phases of the sampling techniques and the required documentation.

ESU uses the Electronic Waste Information System (EWIS), a database with restricted access, for maintaining batch sampling and testing data. Only laboratory personnel have the ability to enter sample information, batch process information, and analytical data. ESU laboratory personnel perform data verification in accordance with project specifications and requirements.

ESU S&H aspects are well implemented, the laboratory was clean and orderly, and laboratory personnel were aware of the S&H requirements of the Chemical Hygiene Plan. Work conducted in the laboratory is performed under a general Radiation Work Permit (RWP). Safety and health inspection programs are implemented with inspections of eyewashes, safety showers, and fire extinguishers being conducted in accordance with ESU SOPs. Access to the laboratory facility is controlled and the facility is locked when not occupied by laboratory staff.

There were no previous Priority II findings. No new Priority II findings were issued. Three new observations were identified.

4.2.1 Status of Previous Sampling and Analytical Data Quality Findings

None noted.

4.2.2 New Sampling and Analytical Data Quality Observations

ODO-080417-A: Data from the Immediate Chemical Screening (Fingerprint) analysis of the incoming batches are documented in a hardcopy logbook. The data is not protected from destruction or loss until the logbook is completed and the pages are scanned into an electronic system for archival. The laboratory is not utilizing the ESU Electronic Waste Information System to protect the data from loss or destruction.

ODO-080417-B: Data received from the offsite analytical laboratories is verified by the laboratory supervisor. The verification only includes review of the QC data and the final report result. Review of raw data is not conducted on an established frequency to determine reproducibility of the data and confirmation of the reported results.

ODO-080417-C: For the most part, excellent logbook keeping practices were observed. However, it is good laboratory practice to initial and date entries that are taped or pasted into logbooks. The initials and date are not being entered across the margins of the entry.

4.3 Waste Operations

This DOECAP audit reviewed the primary work control processes used to manage wastes from receipt through final treatment as well as the quality management systems, which ensure these processes are conducted and documented in a consistent manner.

ESU continues to implement an acceptable and valuable program of waste treatment and disposal services for low level, mixed Resource Conservation and Recovery Act (RCRA), and mixed TSCA wastes. Treatment services include stabilization, size reduction by shredding,

encapsulation, vacuum thermal desorption (VTR), and spray washing. Treatment facilities reviewed were found in good order and operating in accordance with facility procedures. Land disposal facilities also continue to be well maintained for both low level and mixed wastes. A summary of results for this review is provided below.

Waste Treatment Processes

ESU is currently permitted and licensed by the State of Utah to perform the following basic Low-Level Waste (LLW) or MW treatment operations:

- Macroencapsulation;
- Microencapsulation;
- Stabilization (i.e., chemical fixation/binding, chemical oxidation);
- Solidification;
- Spray washing of debris (i.e., consistent with 40 CFR 268.45);
- Foam Injection; and
- VTD.

Each process is summarized below.

Macroencapsulation: Macroencapsulation involves placing waste debris or containers in a form, and extruding Low Density Polyethylene (LDPE) around the waste until it is fully encased. The process was previously performed in the MW Operations building, but is no longer used. ESU is permitted to perform in-cell macroencapsulation. The process involves placement of the waste in the embankment. Standard concrete forming technology is utilized and a proprietary grout mixture is poured under, around and on top of the waste to completely encapsulate the waste. Macroencapsulation treatment was not observed during this DOECAP audit but has been observed during previous DOECAP audits with no issues being identified.

Microencapsulation: Microencapsulation is a process for encapsulating non-debris waste in molten LDPE to render it suitable for land disposal. Microencapsulation may be performed by either an extrusion or kinetic mixing process. The extrusion process involves mixing waste and molten LDPE, followed by extrusion using a rotary screw drive. Kinetic mixing involves combining LDPE and waste in a high-speed mixer and melting the plastic around waste particles (i.e., less than ¼ an inch in size).

Customer demand for these services is infrequent; therefore, ESU has rescinded ESU SOPs MWT-3.1, 3.2, 3.3, 3.4 and 3.5 which describe the microencapsulation process. In the event these services are required in the future, ESU will reinstate the SOPs after a thorough review process. No microencapsulation operations were performed during this DOECAP audit and none have been performed since 2003.

Stabilization: Stabilization involves development of a treatment formula, pre-processing operations (e.g., size reduction, shredding), adding and mixing required amounts of reagents, and performing periodic waste testing to confirm land disposal requirements are met. Decontamination of equipment occurs between different waste stream treatment campaigns.

ESU SOPs MWT-1.1, 1.3, and 1.5 describing the stabilization process were reviewed. Operations in the MW stabilization building were not performed during this DOECAP audit. Specific equipment involved in this process includes the Shredder, mixer, and the Drum Compactor located in the MW Operations Building. No issues were noted, and SOPs adequately describe operations.

Solidification: Solidification is performed to remove free liquids, using a process similar to stabilization but involving addition of reagents such as lime kiln dust and Aquaset. The only required testing for process completion is visual inspection; however, Utah Department of Environmental Quality (UDEQ) has encouraged ESU to perform one paint filter test per treatment run. ESU currently performs a paint filter test on the first batch of each treatment run.

ESU SOP MWT-6.1 adequately describes solidification operations. The SOP requires treatment runs be documented on form EC-98287. No solidification runs were performed during this DOECAP audit.

Spray Washing: Spray washing is used on hazardous debris, such as glass, metal, plastic, and rubber. Spray washing is not used to clean concrete surfaces. The process is performed in the MW Treatment or Operations building.

ESU SOP MWT-6.2 adequately describes spray washing operations. The SOP requires treatment runs to be documented on form EC-98164. No spray washing was performed during this DOECAP audit.

Foam Injection: Foam Injection is a process used to fill void spaces in contaminated glove boxes prior to macroencapsulation. The foam solidifies providing sufficient compressive strength (3000 psi according to ESU staff) to avoid collapse under pressure while in the MW cell.

ESU SOP MWT-2.7 adequately describes foam injection operations. No glove box foaming macroencapsulation treatments were performed during this DOECAP audit. NOTE: Foam injection is not a treatment process; it is a void filling process.

Vacuum Thermal Desorption: VTD is a process for removing organics from MW by heating material in a drying chamber under negative pressure. Organics are removed in the condensate stream while radioactive contaminants remain in the waste in the drying chamber. VTD is performed in the MW storage building, by an ESU subcontractor, TDX, who considers VTD proprietary.

ESU SOPs MWT-7.1, 7.3 and 7.4 were reviewed and found to adequately describe and control the process. ESU combines waste for treatment by VTD, with the most recent treatment having been conducted in February 2007.

Review of the most recently completed treatment records (#9036-05-080312) indicated the process is implemented as required by SOPs. Treatment logs were complete and detailed. Sampling records indicated samples were properly collected, and the sampling log (i.e., form EC-98198A) included reference to the COC number.

Mixed and LLW Cell Operations: Land disposal activities of DOE waste occur in three ESU cells: the Class A cell, the Class A North cell, and the MW cell. All facilities are operated under the same or similar SOPs. ESU is authorized to dispose specified TSCA wastes.

The ESU Engineering QC Section is responsible for performing QC tests of each waste lift to verify proper compaction and obtain elevations and coordinates of waste placement. Testing is performed to document the quality of Controlled Low Strength Material (CLSM) pours.

In-place compaction testing is performed in the field using American Society of Testing and Materials (ASTM) nuclear density gage testing, at a rate of one per lift per type of material placed. That is, if two types of waste are compacted in a lift, two tests are required. Each testing location is randomly selected using a random number generator, with the test requiring wet density, moisture content and dry density. A manual moisture measurement is made at each location by collecting a sample and then using a microwave drying technique. This procedure is performed since ESU determined that Troxler moisture determinations can be inaccurate due to background radiation levels. The oven dried moisture value is used to correct the Troxler dry density value.

To determine whether a lift has achieved proper compaction, standard proctor curves are developed for each waste type placed. Standard proctor testing is performed per ASTM D-698, 1994 version as required by ESU permit. Sieve analysis is performed prior to proctor testing to determine the specific proctor test to perform (i.e., A through D), and to determine if correction factors should be applied for rock content. Field lift compaction is required to be at no less than 90% of the standard proctor value. If the waste lift contains greater than 10% compressible debris (e.g., personnel protective equipment) a compaction of greater than 95% of the proctor value must be achieved.

Testing for CLSM pours is conducted using ASTM D-6023, *Unit Weight*, and ASTM D-6103 *Flow Consistency*. The unit weight test determines the density (i.e., pounds per cubic foot) of the CLSM. The flow-ability test is similar to a concrete slump test and involves two successive measurements of slump. The average slump must be between eight and twelve inches. In accordance with applicable ASTM standards, flow-ability measurements must be made to the nearest ½ inch, averaged to the nearest ¼ inch.

Location of a waste lift is determined both horizontally (i.e., northing and easting) and vertically (i.e., elevation). Elevations for waste lifts built from compactable soil and debris are obtained using level surveys. Northing and easting are determined by distance wheel measurement from the northwest corner of the lift. Horizontal coordinates of the northwest corner are either based upon distance measurement from the previous northwest corner measurement or by Global Positioning System (GPS). No frequency requirement exists regarding how often horizontal control must be established by GPS, as opposed to the less accurate manual distance measurement. ESU has numerous known benchmarks and known control points across the site.

An annual site photography and mapping survey is conducted updating the site map and obtaining recent aerial photos for temporal trending purposes.

A new alternative means of verifying lift compaction is currently in use in the Class A radioactive waste cell. ESU uses a Computer Aided Earthmoving System to place and compact soil/debris materials. This system utilizes GPS technology, machine-mounted components, radio network and office management software to deliver real-time elevation, compaction and grade control information to machine operators on an in-cab display and to QC personnel via workstations in the QC office. By monitoring grade and compaction progress, operators and QC personnel have the information they need to verify and document compliance with applicable specifications.

Waste Acceptance and Rejection

ESU SOP TSC-1.0 defines the method used by ESU to review and accept waste profile information. The process begins with customer submittal of the Radioactive Waste Profile Record (EC-0230) and attachments for special nuclear materials certification and Polychlorinated Biphenyls (PCB) waste certification. Initial information submittal is coordinated by the ESU Business Development staff. The Technical Service Manager coordinates technical review of the profile record to ensure treatment and disposal requirements and potential hazards are evaluated prior to acceptance. Pre-acceptance profile review includes a review for RCRA, radioactive waste, and physical properties concerns. If wastes are considered to present unique health and safety concerns, review by ESU health and safety staff is performed. Results are reviewed in the assignment of a Risk Factor from one to three, with three indicating the highest risk. Review of waste profile and assignment of risk factors are documented on waste profile evaluation forms.

When a generator waste profile has been reviewed and determined acceptable, the generator is required to submit pre-shipment samples for fingerprint range determination and treatability study samples if waste treatment is to be performed. The generator is required to complete a “Pre-Shipment Sample Profile Record” (EC-2000), and “Treatability Samples Certification” (EC-1700) if necessary, for these samples.

Following determination of incoming shipment parameter tolerances using the pre-shipment samples (i.e., fingerprint analysis ranges), and completion of treatability tests if required, the waste profile is accepted and the generator given a “Notice to Transport” (EC-1800). The generator is then required to submit a five day notice of an impending shipment.

Shipping and Receiving performs review of incoming waste manifests and shipping documentation. Once approved, each waste is assigned a unique ESU tracking number (Bates Number), and incoming waste information is entered into the EWIS.

Incoming containers are transferred to the Operations Groups (i.e., MW Group or LARW Group) to unload and conduct incoming waste acceptance sampling. The ESU permit has been modified substantially reducing the number of required fingerprint analyses; only the sniffer test and pH measurement are required. Deferred chemical analysis samples for Hazardous and Solid Waste

Amendments analysis are also collected on a periodic frequency. If waste acceptance samples are satisfactory, waste is accepted, treated and/or dispositioned according to approved ESU generator agreements and contracts.

Should the container waste be nonconforming, attempts are made to reconcile concerns with the generator via issuance of a CR. When reconciliation cannot be made, ESU may reject the waste and request a formal CAP be submitted by the generator describing actions to prevent recurrence. Depending on the severity and repetitive nature of the nonconformance, the “Notice to Transport” may be withdrawn. During the rejection process, waste may remain in the holding area for ten days prior to return, with only rejected liquid waste requiring secondary containment placed into permitted storage.

Waste Tracking

ESU utilizes the EWIS, backed up manually on tape and at the corporate office in Salt Lake City. The EWIS tracks waste receipt, storage locations, waste treatment activities through disposal, and waste cell location. The EWIS provides capability to track treatment activities and daughter drums associated with treatment. The EWIS also tracks curie loading for the site to ensure compliance with radioactive material license limits.

ESU performs a bi-weekly 10% quality verification of EWIS data as well as a quarterly complete physical inventory. Several surveillances were reviewed that were conducted per the MW QA Data Entry Plan for EWIS. No discrepancies were noted with any of the surveillances. Several waste streams were tracked from receipt through treatment with no issues or concerns identified. Several containers were randomly selected during an inspection of the MW storage area and then checked in EWIS. There were no inventory discrepancies noted during this DOECAP audit.

Two previous Priority II findings were closed, and none remain open. One new Priority II finding was issued. No new observations were identified.

4.3.1 Status of Previous Waste Operations Findings

WO-060504-A: ESU has exercised less than adequate adherence to prompt PR closure, generator CAP acceptance by ESU, and evaluation of PRs for negative trends or repetitive conditions adverse to quality. (Priority II) (EC SOP ADMIN 1.0) (CLOSED)

ESU SOP ES-QA-PR-008 has been implemented to address CRs and supplant ESU EC SOP ADMIN 1.0. A new position, QAC, has been created and filled to implement and manage the CR program. Weekly and monthly site compliance meetings are held and updates are provided to management on all open and outstanding CRs. The monthly meetings attendees include personnel assigned open CRs and their applicable manager. The Vice President holds quarterly ESH&Q meetings to review ESH and QA issues including CRs increasing management support. The QAC maintains a spreadsheet to track the status of all CRs and issues a monthly report identifying outstanding CRs.

WO-070412-A: CAPs submitted by generators in response to PRs are inconsistent and lacking detail required and requested by the ESU QA Group. (Priority II) (ESU SOP ADMIN 1.0) (CLOSED)

CAPs reviewed during this audit included those for CR07-089, CR07-042, CRSD08-001, CRSD-006, CR07-116 and CR07-060. The CAPs were consistent and detailed, describing root causes and corrective actions for the incidents involved. ESU Quality has prepared an aide and given additional training to involved site personnel in how to complete the CR form.

4.3.2 New Waste Operations Finding

WO-080417-A: ESU Operations personnel procured bulk fly ash material for use in the batch plant without verifying that the quality level met the requirements of the internal SOP. (Priority II) (ESU SOP ES-QA-PR-009)

The audit team noticed a cloud of dust coming from the batch plant during the facility walkdown on April 15, 2008. Follow-up investigation on April 16 revealed that the fly ash was procured on Purchase Order PO-003818 for bulk fly ash from Headwaters Resources. Based on the fact that information from the EnergySolutions Q-List (Q-Level III Procurement Code 44- Bulk Raw Materials) was not attached to the PR, it does not appear that the individual initiating the PR adequately verified that the item had been evaluated for quality level. This was a Quality Level III material procurement according to SOP ES-QA-PR-009 for which an approved vendor was not required. The person ordering the material was responsible for including required quality information with the procurement documents and for verifying the quality of the material was appropriate for its intended use. QA issued a CR (CR08-056) for this incident.

4.4 Environmental Compliance/Permitting

ESU maintains a well implemented environmental compliance program that has fostered a good working relationship with regulatory agencies. ESU continues to have a proactive attitude among the compliance groups by self-reporting permit violations. Notices of Violation (NOV) that are received are managed and closed in a timely manner.

The assessment of environmental compliance and permitting was conducted by:

- (1) Performing an agency review including interviews with State of Utah regulators and review of their permitting, licensure, and compliance files, and
- (2) Performing an onsite evaluation of compliance through walkthroughs of waste treatment, storage, and disposal areas, interviews with ESU operations and compliance staff, and review of onsite operating records.

The following sections provide a summary of the results of this review including a discussion of conformance to requirements and any observed strengths or weaknesses.

Agency Review

A regulatory agency review was conducted by visiting the UDEQ in Salt Lake City on April 14, 2008. Specific UDEQ divisions included in this review were the Division of Radiation Control, Division of Solid and Hazardous Waste and DAQ. Results of this review are summarized below:

UDEQ Division of Radiation Control

Interviews were conducted with the lead health physicist and hydrogeologist responsible for ESU compliance enforcement. Record reviews included all inspection and enforcement files for Calendar Year (CY) 2007 and 2008 to date.

DRC conducts numerous routine site inspections to verify RML compliance with one or more inspections conducted each month. Inspections are generally conducted by dividing the license requirements into “modules” and reviewing one or more modules during each inspection, e.g. module 7 includes the dosimetry program. The DRC goal is to complete reviews of all license modules on a triennial cycle. Other inspection activities include document reviews of license required submittals such as quarterly environmental monitoring reports and routine split sampling of environmental and waste matrices. DRC uses a subcontractor, URS Corporation, as staff augmentation to assist in inspection and review activities.

Interviews and record reviews noted the following issues that were of recent concern:

- 1) A NOV was issued on April 9, 2007, relating to the ESU waste profile acceptance process. The NOV cited two violations relating to waste stream 0813-02, a treatability study waste shipment. This waste was received at ESU without an approved Waste Profile Record and without having received a Notice to Transport. Also when received, the waste was not subject to license required receipt sampling protocol. ESU had forgone these approval and notification processes as they had erroneously considered that treatability study waste shipments did not have to include these processes. In response to the NOV, ESU revised their Waste Characterization Plan (WCP) to require these processes for incoming waste for treatability studies. DRC closed this NOV on March 11, 2008, following review and acceptance of the revised WCP.
- 2) A NOV was noted following a June 20, 2007, inspection of incoming waste shipments. The NOV was based on the inspector’s observation that eleven incoming shipments were received that did not display all Department of Transportation (DOT) required marking. Specifically, the containers did not have identification number markings on all four sides. ESU did not detect these errors during their receipt inspection.
- 3) DRC exercised “enforcement discretion” on October 11, 2007, based on technician errors in QC procedures for E-PERM readings. On this same date, “enforcement discretion” was also exercised based on the disturbance of a soil sampling station (S-74/A-36) without prior DRC notification.

- 4) An August 6, 2007, DRC inspection noted a large number of ESU and ESU subcontractors had been terminated without obtaining a termination bioassay sample. Such termination samples are required by ESU procedures. No enforcement actions were initiated; however, DRC recommended corrective actions.

Division of Solid and Hazardous Waste (DSHW)

Interviews were conducted with the lead compliance inspector for DSHW. Record reviews included all inspection and enforcement files for CY 2007 and 2008 to date.

DSHW conducts bi-weekly inspections at ESU. These inspections are scheduled such that most permit requirements are reviewed over a two year period. Inspection reports are generated for each inspection. Issues noted during inspections are periodically evaluated and NOVs are generated, if warranted.

The review indicated that an NOV was issued to ESU on January 24, 2008. This NOV was based on four issues including: an instance of failure to reject a shipment (container Y12C9918836) that contained free-liquids; treatment and disposal of waste stream 9307-14 without providing the treatment formula and schedule to DSHW in advance; use of a treatment formula that had a treatment mix to waste ratio of greater than 2 without prior approval by DSHW; and failure to send copies of the April 23, 2007 revision to the contingency plan to response agencies. NOTE: This issue was also noted by the DOECAP audit team during the April 2007 audit.

Division of Air Quality

Review at the Division involved a file review only. All enforcement and compliance inspection files were reviewed for CY 2007 and 2008, to date. Review indicated that the last DAQ inspection was performed on December 4, 2007. The report for this inspection noted that ESU was in compliance with all conditions of their air permit.

Facility Audit

Using the DOECAP checklist and facility permits and licenses as assessment tools, an audit was conducted of ESU's implementation of various environmental and radiological compliance regulations including:

Resource Conservation and Recovery Act Compliance

ESU operates under a DSHW issued Part B permit (UTD982598898). The permit allows ESU to receive, treat, store, and dispose of MW and provides specific limitations and requirements for these processes. To assess compliance with this permit, numerous documents were reviewed including MW operations procedures, operating records for treatment and disposal operations, training and qualification records, and permit-required reports. Walkthroughs were conducted of each waste treatment building, storage pads, waste tanks and ponds, and the perimeter of the

MW disposal cell. Interviews were also conducted with ESU compliance staff regarding recent regulatory issues noted during the agency reviews (see section 4.4.1).

Review of procedures indicated all waste operations and required permit processes were adequately covered by ESU specific instructions. Procedures were maintained under document control and were updated when permit conditions changed. The only central RCRA operating record is located in a computer system called *OnBase*. Online review indicated there can be a time lag of a couple of months before records get scanned into this system. However, this is not considered an issue since hard copies of records can be obtained from waste operations staff when needed.

Review of inspection records for the last several months indicated all required inspections were performed as necessary according to the permit, including daily, weekly, and monthly site and waste operations inspections and annual engineering inspections of tank integrity. Records of site and waste operations inspections indicated that deficiencies were noted and corrective actions were taken and documented. An observation was noted because many inspection reports reviewed lacked sufficient detail to understand the specific location where the deficiency occurred. Annual engineering tank integrity inspection reports were reviewed for two ESU tanks. These inspection reports were prepared by G&A Engineering of Salt Lake City and showed the tanks were acceptable for operation.

Review of financial surety records indicated the appropriate documents have been received and accepted by DSHW including the cost estimate for closure, the financial surety for closure costs, and the closure plan. Currently, the closure cost estimate for the MW facility and disposal area is approximately \$18M. This estimate includes an update for closure of the VTD facility. Closure costs are bonded through Zion Bank with an irrevocable letter of credit.

The site contingency plan was reviewed and an inspection was conducted to verify accuracy of the plan's drawings. Site drawings were compared to actual field conditions and no problems were noted (e.g., field locations of eyewashes and fire extinguishers matched conditions as shown in the plan). During the FY 2007 DOECAP audit, a finding identified the lack of submittal of the contingency plan to the local response organizations as required by the Part B permit. Corrective actions have been completed for this issue and included formal submittal of the contingency plan to the required agencies and addition of these agencies to the document control list. NOTE: ESU self-reported this issue to DSHW and, as a result, was issued an NOV.

A walkthrough of the MW portion of the ESU site indicated the following:

- Site security was adequate with required fencing, access controls, postings, and security staffing in place.
- Haul roads were well maintained and were kept wet to prevent excess dust release.
- MW cell embankments were in good condition with adequate erosion control.

- Waste containers on pads were properly stored with adequate aisle spacing and displayed all required labels.
- MW treatment units were adequately maintained and posted.
- Required emergency and response equipment including exit signs, eyewashes, spill kits, and emergency lighting were in good order. One exception noted by the S&H assessor was a safety shower in the VTD facility located above an energized electrical source (see section 4.6.2, OSH-080417-A).
- RCRA waste storage tanks were properly labeled as required by the part B permit and were in good condition.
- Landfill leachate collection/detection systems were in good condition.

A review was conducted to determine if permit requirements for minimizing wind borne releases during bulk waste processing were met. The permit requires these operations cease when the 5-minute sustained wind speed average is greater than 35 miles per hour. ESU HP technicians routinely check wind speed statistics displayed on the site Cisco phone system stations. It was very windy during the first day of the DOECAP assessment and on the previous day. Records were reviewed for February 14, 2008 showing that wind speed had exceeded criteria and a notation was made in the HP log that work was stopped.

A review was also conducted of the site implementation of RCRA Subpart BB (40 CFR 264.1030) compliance concerning monitoring of the VTD system for VOC organics. An observation was issued relating to this issue.

Toxic Substances Control Act Compliance

There are two different EPA Region 8 approvals for TSCA waste treatment that included an approval to shred PCB wastes in the LARW large shredder and another approval to treat PCB wastes in the mobile TDX VTD unit located in the mixed waste treatment area. ESU also has a TSCA Coordinated Approval for storage and onsite disposal of PCB waste. Records for operation of both treatment facilities were reviewed, interviews were conducted with operations managers and operators, and facility walkthroughs were conducted of TSCA waste storage areas and of the two TSCA waste treatment facilities.

Walkthroughs of the waste storage area indicate that storage facilities and waste containers were properly labeled with the PCB M_L (large) marking format. However, several drums were observed not labeled with the “Date Removed from Service” as required by 40 CFR 761.65(c)(8). A finding was noted with respect to this issue. It should also be noted, a similar issue was reported as a finding during a September 12, 2006 inspection by EPA Region 8.

A finding is issued concerning the use of ESU’s MW tertiary shredder to size reduce incoming TSCA waste without proper regulatory approval. This is a compliance issue and has not been formally resolved.

Walkthrough and records review of the LARW shredder indicates the conditions in the TSCA approval were met. All required monitoring is being performed and limiting conditions for operation are captured in procedural requirements. ESU appears to utilize appropriate signage, etc. ESU indicated this facility operates only at night due to lower power costs. The two tanks used to store process wastewater were in good condition. At the time of the audit, one of the tanks was filled with process water (wash water, sump water) and was awaiting testing results to assure it complied with TSCA approval limits (<5 ug/L) before discharge to the evaporation ponds. Review of compliance with the requirement to cease operations in the event of instantaneous wind gusts exceeding 35 mph was evaluated. Interviews with HP staff indicate that the HP night staff does not utilize the HP operations reports as done during day shift hours. Therefore, there is presently no method or procedure for recording instances when work is ceased due to wind speed. An observation was issued related to this concern.

Clean Air Act

ESU is not subject to Title V air permit requirements, but operates under an Air Approval Order (DAQE-AN0717015-06) from the state of Utah. ESU is located in Tooele County which is an attainment area for National Ambient Air Quality Standards for all pollutants. New Source Performance Standards, National Emissions Standards for Hazardous Air Pollutants and Maximum Available Control Technology regulations do not apply to this facility.

An observation was noted regarding the opacity of the air during the operation of the batch plant which appeared to be emitting significant amounts of dust such that the opacity appeared to be well above 10%.

Clean Water Act

ESU is a zero discharge facility; therefore, no National Pollution Discharge Elimination System permit is required. The facility does have a Groundwater Quality Discharge Permit (UGWW450005) from the state of Utah. ESU is located in an arid desert environment with no navigable waters of the United States to which ESU could potentially discharge storm water. Therefore, a Storm Water Runoff Permit and a Spill Prevention Control and Countermeasure Plan are not required. The storm water determination is documented in a memo to file.

The latest semi-annual groundwater monitoring reports for ESU issued since the last DOECAP audit were reviewed, no compliance issues were noted.

Comprehensive Environmental Response Compensation Liability Act (CERCLA)

EPA Region 8 and UDEQ/DSHW representatives inspected ESU on July 11, 2007, and found the facility in compliance and approved for treatment, storage and disposal of CERCLA waste in accordance with the CERCLA "Off-Site Rule" (40 CFR 300.440.).

Emergency Planning and Community Right to Know Act (EPCRA)

Review of files indicated EPCRA 311 (hazardous chemical notifications) and 313 (Toxic Chemical Release Inventory) reports were submitted in a timely manner to the EPA.

Radioactive Materials License

No specific issues were noted with license compliance during the facility audit. Most key requirements of the license for radiation protection were reviewed during the Radiological Control section of the DOECAP audit. At the request of DOE waste generators, a special review emphasis was given to the ESU process for disposition of VTD condensate waste that is produced from the treatment of DOE mixed wastes. ESU and TDX sampling results and process knowledge indicate that radioactive contaminants are not partitioned into the condensate but remain with the waste portion sent to the ESU mixed waste cell. The Utah DRC does not have provisions in their regulatory authority to allow ESU to declare this condensate as non-radioactive waste and thereby ship it directly to a non-licensed RCRA/TSCA waste treatment facility. However, ESU is allowed to ship the condensate waste as mixed waste to the TDX facility in South Carolina where state regulations allow for volumetric free release. The TDX facility in South Carolina has an RML issued by the State of South Carolina. This license was issued to TDX after State review of VTD operations. Condensate free release is only allowed on material that has been specifically generated by the VTD unit currently at the Clive facility and that meets all radiological criteria. The assessment team considers this to be a compliant method for condensate disposition. Other alternatives included shipment to the DOE TSCA Incinerator or to Diversified Scientific, Inc. in Oak Ridge (a licensed facility). It is up to the customer to decide which route they want their waste condensate to go.

One previous Priority II finding was closed, and none remain open. Two new Priority II findings were issued. Four new observations were identified.

4.4.1 Status of Previous Environmental Compliance/Permitting Finding

EC-070412-A: ESU failed to provide copies of the Contingency Plan to the response agencies identified on the emergency list following revision of the Plan. (Priority II) (RCRA Permit Attachment II-6 (7)) (CLOSED)

Corrective actions have been completed for this issue and include formal submittal of the contingency plan to the required agencies and addition of these agencies to the document control list. NOTE: ESU originally self-reported this issue to DSHW and was subsequently issued an NOV.

4.4.2 New Environmental Compliance/Permitting Findings and Observations

EC-080417-A: ESU used a shredder for processing of DOE TSCA wastes without EPA approval. (Priority II) (40 CFR Part 761.77)

Review of records and interviews with regulatory staff indicated that ESU used their mixed waste tertiary shredder to size reduce incoming TSCA waste without proper approval. Size reduction was needed to meet the operational VTD debris size restriction of four inches or less for some waste streams; therefore, ESU used their MW tertiary shredder for this purpose. ESU indicated they believed that shredding was allowed since the application for the VTD TSCA approval stated that size reduction might be needed before VTD treatment. However, EPA Headquarters personnel, who were coming to ESU to observe VTD Demonstration Testing, raised a concern about the need for TSCA approval for shredding. Given the regulatory concern, ESU voluntarily stopped the use of the MW shredder for size reducing PCB wastes. Although they have not used the shredder for TSCA wastes since this time, DOECAP interviews with ESU compliance staff indicated ESU still maintained that use of the shredder was acceptable based on the VTD TSCA application. However, a DOECAP audit team interview with the EPA Region 8 TSCA regulator indicated the EPA TSCA approval was issued to TDX for their mobile unit operation and does not apply to use of ESU facilities for pre-treatment. EPA Region 8 also indicated that ESU should file an application for a TSCA approval for the MW shredder.

EC-080417-B: PCB waste containers are not labeled with the “Removed from Service” date. (Priority II) (40 CFR 761.65(c)(8))

Walkthroughs of waste storage areas indicate that storage facilities and waste containers were properly labeled with the PCB M_L marking. However, several drums were not labeled with the “Date Removed from Service” as required by 40 CFR 761.65(c)(8).

OEC-080417-A: During a field walkthrough, the concrete batch plant was observed to be emitting significant amounts of dust such that the opacity appeared to be well above 10%. This was noted during the first day of the audit. A representative of ESU management, who was present with the DOECAP audit team, observed this condition and indicated that opacity was high. Later the same day, ESU management indicated they had talked to operations staff and remained convinced that the opacity limit was being exceeded. The next day, ESU management indicated there was a qualified opacity reader at the batch plant during the event but they provided no data to show what this person had recorded with respect to actual readings. ESU management also stated the opacity reader had informed them that compliance was based on a 20-minute average. Review of the State of Utah requirements for opacity indicates that compliance must be based on a 6-minute average. On the next day, ESU again provided no information on what actual opacity readings were observed.

In an April 28, 2008 factual accuracy response for this assessment report, ESU indicated “The (batch plant) operator observed the batch plant during the upset condition and based on his training and requirements set forth in Method 9, it was determined that the upset condition did not exceed those opacity limits identified in the Permit.” However, the factual accuracy response offered no data to substantiate this statement. It is unclear why operations did not bring this

information to the attention of the auditor during the course of the audit given that there was DOE and ESU management consensus that elevated opacity was a concern.

OEC-080417-B: RCRA inspections do not consistently contain the level of detail needed to document issues. Records of site and waste operations inspections indicated that deficiencies were noted and corrective actions were taken and documented. However, many of the reviewed inspection reports lacked sufficient detail to understand the specific location where the deficiency occurred. The reports also did not clearly delineate which of the issues were “Notable Observations.”

OEC-080417-C: RCRA subpart BB monitoring has not been conducted for positive pressure locations of the VTD Unit. Review was conducted of the site implementation of RCRA Subpart BB (40 CFR 264.1030) compliance. This section of RCRA regulations requires waste processing and treatments systems with a potential to leak VOC organics be checked for leak tightness. Interviews with ESU staff and the owner of the VTD system indicated they were not aware if monitoring had been done or if subpart BB was applicable. During factual accuracy review for this audit report, ESU compliance staff indicated that subpart BB regulations do not apply since, “The entire VTD unit is recorded in the operating record as a vacuum unit.” However, review of process details indicates a portion of the condensate collection system is under a positive pressure.

OEC-080417-D: ESU does not have a process to demonstrate compliance with TSCA requirements for cessation of LLW shredder operations during high wind conditions. The TSCA approval for the LLW shredder contains a requirement to cease operations when instantaneous gusts exceed 35 mph. This shredder operates only at night due to the lower costs of electricity during non-peak hours. Review of wind speed data indicates that instantaneous gusts exceeding 35 mph do occasionally occur at night at ESU even though they are more prevalent during the daylight hours.

During daylight hours, HP operations reports are used to demonstrate that landfill operations are suspended during high winds. HP operation reports for the day were reviewed and clearly indicate that HP staff were monitoring wind speed and ceasing operations when excessive gusts occurred. However, interviews with HP staff indicate that they do not complete HP operations reports at night. Interviews with shredder operations staff noted that work stoppage when instantaneous winds exceed 35 mph is not documented in shredder operations logs. Without a method or procedure for recording instances when work is ceased due to wind speed, it is difficult to demonstrate compliance with the TSCA requirement.

4.5 Radiological Control

An agency review with Utah State DRC personnel was conducted on April 14, 2008. Several inspection reports completed by DRC personnel in 2007 specific to radiological inspections at the ESU facility were reviewed. One NOV issued October 11, 2007, was issued to ESU regarding a self-reported issue involving a technical deficiency with environmental radiological monitoring instrumentation (E-PERM® Monitoring System). Another DRC-identified issue regarding the In-Vitro bioassay monitoring system resulted in a letter requesting that ESU

improve administration of the employee termination portion of the bioassay program. Each issue is being worked for resolution with the State. DRC did not have any issues regarding the path forward concerning resolution of these deficiencies.

Routine monitoring is appropriate in type and frequency. Worker and public exposure is well below regulatory limits. A random selection of radiological survey records, radiological incident-specific CRs from CY 2007 and 2008 were reviewed with no issues identified. The content and technical requirements of all RWPs reviewed were sufficiently detailed and appropriately implemented to ensure the safety of ESU personnel conducting work in radiological areas and they complied with regulatory requirements. All work observed during the current assessment was performed in accordance with RWPs.

The ESU radiological control program is implemented in accordance with requirements in ESU RMLs UT 2300249 and UT 2300478. The program is implemented through the ESU Radiation Safety Manual, which includes the As Low as Reasonably Achievable (ALARA) Program and SOPs. During this DOECAP audit, a number of SOPs were reviewed and compared to applications in the field. Additional radiation safety procedures were reviewed along with the 2007 Annual ALARA Audit (81 in-vitro samples and 177 in-vivo lung counts with no internal dose assignments resultant from the analysis). A random selection of radiological survey records, radiological incident-specific CRs from CY 2007 and 2008 were reviewed with no issues identified.

Review of RWPs was given special emphasis and resulted in one new observation as listed below. The content and technical requirements of all RWPs reviewed was sufficiently detailed and appropriately implemented to ensure the safety of ESU personnel conducting work in radiological areas and adherence to regulatory requirements. The RWPs covering work observed in-progress by the DOECAP team were 08L-001 (MW general area), 08M-153 (VTD treatment) and 08M-111 (MW Treatment Building). No deficiencies were observed relative to work conducted under these RWPs.

A previously issued Priority II finding regarding waste container labeling not in compliance with Utah State Regulations was closed. Documented evidence supporting closure included Action Request AR07-029 and ESU surveillances 0705-007, 0707-013, 0708-008, 0709-21, 0710-005, 0711-018, 0712-024 and 0802-006. Additionally, training was conducted for all HP Inspectors on May 1, 2007 and May 3, 2007 re-emphasizing radiological dose rate posting requirements. An independent surveillance was conducted by the QA department to verify satisfactory implementation of corrective actions and closure of the Action Request.

For 2007, the average worker radiation dose at LLRW was 9 mrem; at the Contaminated Waste Facility the average employee radiation dose was 251 mrem; and at the MW facility, the average employee radiation dose was 10 mrem. The site collective personnel dose was 5.056 rem. The highest individual annual Total Effective Dose Equivalent (TEDE) dose was 297 mrem, less than 10% of the 5000 mrem/year limit. While the average and total TEDE dose for 2007 increased from the previous year, the highest individual annual TEDE dose decreased. Average TEDE dose to the public in 2007 was calculated as 10 mrem, significantly less than the 100 mrem/year limit. There were no overexposures noted during 2007. Effectiveness of the contamination

control program is noteworthy, as less than 1% of the restricted area entries resulted in skin or clothing contamination.

Training records for two HP Inspectors and a MW Operations Facility Operator were reviewed. Training was current and qualifications were commensurate with employee responsibilities for each individual reviewed.

In preparation for a tour of the MW facility several DOECAP auditors were given an RWP briefing. The conduct and content of the briefing was less than adequate in regards to proper notification and preparation for potential hazards and anticipated dose rates and contamination levels for the areas to be toured. The deficiency was noted as an observation listed below.

One previous Priority II finding was closed, and none remain open. No new Priority II findings were issued. One new Observation was identified.

4.5.1 Status of Previous Radiological Control Finding

RC-070412-A: Container labeling is not done in compliance with Utah State Regulation. (Priority II) (Utah State Regulation R313-15-904) (CLOSED)

Upon notification of the deficient condition ESU initiated action request AR07-029 to take immediate corrective action for inspecting all waste containers in storage and correct any labels lacking dose rate information. Long-term corrective actions included training of all HP staff re-emphasizing the dose rate posting requirements (classroom setting on May 1, 2007, and May 3, 2007) and instituting weekly waste container inspections with emphasis on compliance to applicable posting & labeling requirements. On March 19, 2008, the QA department conducted an independent surveillance to verify implementation of corrective actions. The surveillance concluded that corrective actions were complete and effective.

4.5.2 New Radiological Control Observation

ORC-080417-A: Formality of RWP briefings for visitors/non-facility personnel should be enhanced to ensure adherence to applicable requirements. On April 15, 2008, several DOECAP auditors conducted a walk down of the MW Operations facility. In preparation for entry into the radiological controlled area, team members were briefed by the HP Technician at the Control Point concerning RWP requirements.

Briefing content and conduct was less than adequate in that the HP Technician neglected to cover key aspects of the RWP including expected dose rates and contamination levels for the areas visited, Personal Protective Equipment requirements, specific hazards that may be encountered (and to avoid) such as high radiation areas, etc. Self-reading dosimeters were issued to each auditor but no information was given relative to use and actions to be taken if the dosimeter alarmed. Additionally, the auditors were not given the opportunity to personally review the RWP they would be working under.

Pointing out an opportunity for improvement however, does not mean the briefing was wholly inadequate to the point where safety was compromised. Several ESU facility personnel who ensured compliance to all applicable radiological and safety requirements during the tour escorted the auditors. It is important however, for personal accountability and knowledge of facility-specific hazards and requirements which reiterates the need for greater formality of RWP briefings.

4.6 Industrial and Chemical Safety

The S&H program at ESU is currently defined in the ESU S&H Program ES-SH-PG-100, Rev. 0 and the S&H Manual with associated SOPs. The S&H program at ESU continues to be very visible and proactive. The S&H Manager and the Industrial Hygienist are qualified, competent, and provide a solid foundation for implementation of program initiatives. ESU continues to use the Safety Action Team composed of field personnel, applicable foremen, and S&H personnel. On the job injuries continue to remain low; ESU had no Lost Time Injuries/Illnesses in 2007 and 8 total recordable cases. The ESU 2008 Industrial Hygiene (IH) sampling plan lists several goals and strategies, demonstrating a proactive approach to exposure monitoring for chemicals that are present in high concentration. ESU currently has implemented the Chronic Beryllium Disease Prevention Program including medical examinations, training, and personnel monitoring.

As noted in the ESU 2007 DOECAP Audit, many S&H procedures will need changes addressing the reassignment of responsibilities of the Risk Manager to the S&H Manager. According to ESU staff, duties of the Risk Manager and Site Safety Supervisor have been incorporated into the S&H Manager duties.

Occupational S&H Administration Requirements, IH, Exposure Monitoring, Respiratory Protection, Hearing Conservation Program, Chemical Hygiene Program, Injury/Illness Management and Recordkeeping, Emergency Management, Safety Training and the Beryllium Program were reviewed. A site tour and walk-downs of randomly selected areas were conducted along with interviews of the S&H program personnel and other employees.

A new rotary rollover has been installed that enables rail cars to be sprayed while inverted without requiring entry by employees, thereby substantially reducing employee exposure to fall hazards and eliminating a number of repetitive motions. The construction of the inter-modal decontamination facility is a major improvement with its seven bays, and safety incidents have decreased here as well. Safety signs were evident including being noted on buildings and vehicles throughout the facility. The S&H program uses an independent self-assessment to monitor overall effectiveness. Employees have been trained in safe work practices, and management provides a strong example.

ESU has implemented the Chronic Beryllium Disease Prevention Program, ESU SOP ES-SH-PR-302. The Beryllium Protection Program provided medical examinations and training for beryllium workers per the "Be Rule." Personnel monitoring is ongoing for processing of Beryllium impacted waste streams. Examples of exposure monitoring reports were provided.

One Priority II finding was issued related to Confined Space Labeling. Field observations showed the wash pit (a confined space) was not properly labeled on the west side of the VTD Building (MW wash pad tank farm). The second and third such occurrences of inadequate labeling involved one open manhole leading to a nine foot deep sump and one closed sump on the northeast side of the Shredder. The manholes are noted on the Confined Space inventory list being maintained by the S&H Department.

One observation was identified for an unsafe electrical practice where a plugged in extension cord was laying below the safety shower posing an electrical shock hazard.

There were no previous Priority II findings. One new Priority II finding was issued. One new observation was identified.

4.6.1 Status of Previous Industrial and Chemical Safety Findings

None noted.

4.6.2 New Industrial and Chemical Safety Finding and Observation

SH-080417-A: Confined spaces are not consistently posted. (Priority II) (29 CFR 1910.146(c)(2))

Field observations showed the wash pit (a confined space) was not properly labeled on the west side of the VTD Building (MW wash pad tank farm). The second and third such occurrences of inadequate labeling involved one open manhole leading to a nine foot deep sump and one closed sump on the northeast side of the Shredder. The wash pit and manholes are noted on the Confined Space inventory list.

OSH-080417-A: An energized and ungrounded electric cord was located beneath the safety shower/eyewash in the VTD facility creating a shock potential. The safety shower/eyewash station was in good working order; however, there was a plugged in electrical extension cord sitting below the safety shower. This poses an electrical shock hazard should the shower and eyewash be activated. The same electrical cord had the grounding prong removed (cut off). This appeared to be an isolated incident. The extension cord was removed from the outlet and disposed.

4.7 Transportation Management

The ESU transportation management program is clearly defined and consists of personnel who are extremely knowledgeable of the process. Transportation personnel are well trained and interviews conducted with these employees indicate their knowledge of the DOT and Dangerous Goods regulations are above average. All ESU personnel were professional, team oriented and very responsive to auditor inquiries.

ESU is registered with DOT as a HAZMAT shipper and this certification does not expire until June 30, 2010. Shipments of DOT and Air Transportation Association regulated material are usually limited to activities associated with laboratory samples and waste materials shipped for disposal. ESU uses DOT registered carriers that have been approved by DOE under the Motor Carrier Evaluation Program process.

Review of several procedures that referenced 49 CFR, shipping and receiving, loading and unloading and transportation were easy to follow and were consistent with applicable DOT and Dangerous Goods Regulations. There was one observation pertaining to the definition of the word "Overpack" in ESU SOP OPC-2.4. Although, this was not a compliance issue, ESU has started the process to clarify the procedure.

During the audit, the shipping documentation for four mixed waste shipments from the past year was reviewed. The review noted one observation for the incorrect usage of an abbreviation for kilograms on the Uniform Hazardous Waste Manifest (UHW) as required by 40 CFR Appendix to Part 262 (Item 14). During the audit ESU made two outbound air shipments of laboratory samples as Limited Quantity of Radioactive Material. These two shipments were made in compliance with applicable regulation. Also reviewed were two inbound shipments of mixed waste. During the inspection of the shipping containers performed by ESU transportation personnel, a bolt used for the closure of the accepted package was loose and the discrepancy was noted on the Uniform Low-Level Radioactive Waste Manifest. The loose bolt did not cause the package to be non-compliant, therefore no further action needed to be taken.

Overall, this is a successfully implemented program. However, discrepancies were noted in one procedure and the completion of one UHW of a previous MW shipment. The deficiencies, which resulted in two observations, do not impact the ability of ESU to perform work for the DOE.

Two previous Priority II findings were closed, and none remain open. No new findings were issued. Two new observations were identified.

4.7.1 Status of Previous Transportation Management Findings

TR-070412-A: Shipping papers/UHW for several shipments were not completed correctly. (Priority II) (49 CFR 172.202(b)); 49 CFR 172.202(a)(6); 49 CFR 172.202(d); and 49 CFR 172.203(k)(1) (CLOSED)

Review of training records indicates that key ESU Transportation Compliance Department employees have attended broker training. ESU now ships under the requirements of this broker program. ESU has incorporated the broker program into the shipping procedure. Reviews of four shipments made during the past year were in compliance with the above referenced regulations.

TR-070412-B: The address and certification that HAZMAT employees have been tested are not indicated on each HAZMAT employee's training certificate. (Priority II) (49 CFR 172.704(d)(4), (5)) (CLOSED)

A memo has been placed in each HAZMAT employee's training record file that certifies employees have been tested and includes the address of the company providing the training. Review of training records indicates training certificates for training made during the past year are in compliance with the above referenced regulation.

4.7.2 New Transportation Management Observations

OTR-080417-A: A container management procedure for the Containerized Waste Facility (CWF) had an incorrect definition for "Overpack." During review of ESU SOP OPC-2.4, Rev. 4, it was noted that the word "Overpack" is defined in the procedure as, "A container into which another package is placed due to failed package integrity." The definition in DOT 49 CFR 171.8 states that an "Overpack" is "except as provided in subpart K of part 178 of this subchapter, means an enclosure that is used by a single consignor to provide protection or convenience in handling of a package or to consolidate two or more packages. Overpack does not include a transport vehicle, freight container, or aircraft unit load device. Examples of overpacks are one or more packages:(1) Placed or stacked onto a load board such as a pallet and secured by strapping, shrink wrapping, stretch wrapping, or other suitable means; or (2) Placed in a protective outer packaging such as a box or crate."

ESU SOP OPC-2.4 is a procedure used at the CWF and waste from DOE sites is not currently processed through this facility. This is a site-specific procedure governing onsite waste handling and is not used in the offsite shipment of waste. Although, this is not a compliance issue, ESU has started the process to clarify the procedure.

OTR-080417-B: A UHWM had an incorrect abbreviation. Review of shipment 07-766 indicated an inappropriate abbreviation for kilograms "Kg" was used on the UHWM instead of the correct abbreviation of "K" as required in 49 CFR 172.205(b) and 40 CFR Appendix to Part 262 (Item 14). ESU now has a process in place that allows UHWM to be printed out electronically instead of having to handwrite each UHWM. The new process also electronically inputs the correct abbreviation for the unit of measure.

ACRONYMS

(This acronym list may contain items that are site-specific.)

Acronym	Definition
ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineering
ASTM	American Society of Testing and Materials
CAP	Corrective Action Plan
CERCLA	Comprehensive Environmental Response Compensation Liability Act
CFR	Code of Federal Regulations
CLSM	Controlled Low Strength Material
COC	Chain-of-Custody
CR	Condition Reports
CWF	Containerized Waste Facility
CY	Calendar Year
DAQ	Division of Air Quality
DOE	Department of Energy
DOECAP	Department of Energy Consolidated Audit Program
DOT	Department of Transportation
DRC	Division of Radiation Control
DSHW	Division of Solid and Hazardous Waste
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
ESH&Q	Environmental, Safety, Health and Quality
ESU	EnergySolutions, LLC
EWIS	Electronic Waste Information System
GPS	Global Positioning System
GS	Gamma Spectroscopy
HP	Health Physics
ICP	Inductively Coupled Plasma
IH	Industrial Hygiene
LARW	Low Activity Radioactive Waste
LDPE	Low Density Polyethylene
LLRW	Low-Level Radioactive Waste
LLW	Low-Level Waste
MAPEP	Mixed Analyte Performance Evaluation Program
MW	Mixed Waste
NOV	Notice of Violation
NQA-1	Quality Assurance Requirement for Nuclear Facility Applications
NRC	Nuclear Regulatory Commission
PCB	Polychlorinated Biphenyls
PR	Problem Report
PT	Performance Testing
QA	Quality Assurance
QAC	Quality Assurance Coordinator
QAP	Quality Assurance Procedures

Acronym	Definition
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RML	Radioactive Materials License
RWP	Radiation Work Permit
S&H	Safety and Health
SOP	Standard Operating Procedure
TDX	TD*X Associates, Inc
TEDE	Total Effective Dose Equivalent
TSCA	Toxic Substances Control Act
UDEQ	Utah Department of Environmental Quality
UHMW	Uniform Hazardous Waste Manifest
VOC	Volatile Organic Compound
VTD	Vacuum Thermal Desorption
WCP	Waste Characterization Plan

SOPs Referenced in this Report

Document Number	Revision No.	SOP Title
ESU SOP ADMIN 1.0	Cancelled	Problem Reports
ESU SOP CL-EN-PR-001	1	Design Control
ESU SOP CL-EN-PR-002	0	Test Control
ESU SOP ES-AD-PR-008	0	Condition Report
ESU SOP ES-QA-PG-001	0	Quality Assurance Manual
ESU SOP ES-QA-PR-008	1	Auditor and Lead Auditor Qualification and Certification
ESU SOP ES-QA-PR-009	0	Quality Levels
ESU SOP ES-SH-PG-100	0	Safety and Health Program
ESU SOP ES-SH-PR-302	0	Chronic Beryllium Disease Prevention
ESU SOP MWT 1.1	4	Stabilization Pre-Operational Briefing
ESU SOP MWT 1.3	7	Waste Stabilization
ESU SOP MWT 1.5	1	Stabilization Formula Development
ESU SOP MWT 2.7	3	Foaming of Internal Void Spaced
ESU SOP MWT 6.1	2	Waste Solidification
ESU SOP MWT 6.2	3	Spray Wash Operation
ESU SOP MWT 7.1	1	Thermal Desorption Pre-Operational Briefing
ESU SOP MWT 7.3	2	Thermal Desorption Operations
ESU SOP MWT 7.4	1	Thermal Desorption Waste Sampling
ESU SOP OPC-2	4	Overpacking and Repair Containers
ESU SOP QAP 11	Cancelled	Test Control
ESU SOP QAP -3	Cancelled	Design Control
ESU SOP TSC-1.0	3	Generator Certification

Appendix C

Certificate of Insurance

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MARSH

CERTIFICATE OF INSURANCE

CERTIFICATE NUMBER
SEA-001021294-08

PRODUCER

Marsh USA Risk & Insurance Services
15 West South Temple, Suite 700
Salt Lake City, UT 84101
Attn: Chris Brimhall (801) 533-3627

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER OTHER THAN THOSE PROVIDED IN THE POLICY. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES DESCRIBED HEREIN.

COMPANIES AFFORDING COVERAGE

- COMPANY
A COMMERCE & INDUSTRY INSURANCE COMPANY
- COMPANY
B INSURANCE CO. OF THE STATE OF PA
- COMPANY
C N/A
- COMPANY
D NATIONAL UNION FIRE INS CO OF PA

INSURED

Duratek Services, Inc.
Bear Creek Facility
1560 Bear Creek Road, P.O. Box 2530
Oak Ridge, TN 37923

COVERAGES

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE DESCRIBED HEREIN HAVE BEEN ISSUED TO THE INSURED NAMED HEREIN FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THE CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, CONDITIONS AND EXCLUSIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
A	GENERAL LIABILITY	GL2702800	05/01/08	05/01/09	GENERAL AGGREGATE \$ 2,000,000
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY				PRODUCTS - COMP/OP AGG \$ 2,000,000
	<input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR				PERSONAL & ADV INJURY \$ 1,000,000
	<input type="checkbox"/> OWNER'S & CONTRACTOR'S PROT				EACH OCCURRENCE \$ 1,000,000
					FIRE DAMAGE (Any one fire) \$ 100,000
					MED EXP (Any one person) \$ 10,000
D	AUTOMOBILE LIABILITY	CA2703094	05/01/08	05/01/09	COMBINED SINGLE LIMIT \$ 2,000,000
	<input checked="" type="checkbox"/> ANY AUTO				BODILY INJURY (Per person) \$
	<input type="checkbox"/> ALL OWNED AUTOS				BODILY INJURY (Per accident) \$
	<input checked="" type="checkbox"/> SCHEDULED AUTOS				PROPERTY DAMAGE \$
	<input checked="" type="checkbox"/> HIRED AUTOS				
	<input checked="" type="checkbox"/> NON-OWNED AUTOS				
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT \$
	<input type="checkbox"/> ANY AUTO				OTHER THAN AUTO ONLY: \$
					EACH ACCIDENT \$
					AGGREGATE \$
	EXCESS LIABILITY				EACH OCCURRENCE \$
	<input type="checkbox"/> UMBRELLA FORM				AGGREGATE \$
	<input type="checkbox"/> OTHER THAN UMBRELLA FORM				\$
B F E	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	WC7209309 (AOS)	05/01/08	05/01/09	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER \$
		WC7209310 (FL & TX)	05/01/08	05/01/09	EL EACH ACCIDENT \$ 1,000,000
		WC7209311 (CA)	05/01/08	05/01/09	EL DISEASE-POLICY LIMIT \$ 1,000,000
	THE PROPRIETOR/PARTNERS/EXECUTIVE OFFICERS ARE: <input checked="" type="checkbox"/> INCL <input type="checkbox"/> EXCL				
	OTHER				

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

CERTIFICATE HOLDER

Evidence of Insurance

CANCELLATION

SHOULD ANY OF THE POLICIES DESCRIBED HEREIN BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE INSURER AFFORDING COVERAGE WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED HEREIN, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER AFFORDING COVERAGE, ITS AGENTS OR REPRESENTATIVES, OR THE ISSUER OF THIS CERTIFICATE.

AUTHORIZED REPRESENTATIVE
Marsh USA Risk & Insurance Services
BY: Chris Brimhall

Chris Brimhall

MM1(3/02)

VALID AS OF: 05/05/08

ADDITIONAL INFORMATION

SEA-001021294-08

DATE (MM/DD/YY)

05/05/08

PRODUCER

Marsh USA Risk & Insurance Services
15 West South Temple, Suite 700
Salt Lake City, UT 84101
Attn: Chris Brimhall (801) 533-3627

COMPANIES AFFORDING COVERAGE

COMPANY

E NEW HAMPSHIRE INSURANCE COMPANY

COMPANY

F ILLINOIS NATIONAL INSURANCE CO.

INSURED

Duratek Services, Inc.
Bear Creek Facility
1560 Bear Creek Road, P.O. Box 2530
Oak Ridge, TN 37923

COMPANY

G N/A

COMPANY

H

TEXT

CERTIFICATE HOLDER

Evidence of Insurance

Marsh USA Risk & Insurance Services

Chris Brimhall

Chris Brimhall

Appendix D

NEPA Review

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U.S. Department of Energy
Office of Legacy Management
National Environmental Policy Act Action Review

Site/Title: Modify height of selected dams on North and South Walnut Creeks, Rocky Flats Site, CO.	Date: June 9, 2008
Proposed Action: DOE-LM proposes to modify the heights of Dams A-1 and A-2 on North Walnut Creek and Dams B-1, B-2, B-3, and B-4 on South Walnut Creek by constructing a notch in each dam that would effectively reduce the height of the dam. Part of this proposed action includes approximating original stream configurations and preserving existing habitat and wetlands. The dams were constructed during the operation of the Rocky Flats Site to form detention ponds to hold surface water for monitoring prior to release. The remediation has been completed and the dams are no longer necessary. Modifying these dams would reduce costs associated with maintenance and management.	
EXCLUSION CRITERIA	
Is the action authorized under CERCLA?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Is the proposed action(s) within the scope, location, and duration of activities identified and assessed in a previous CX, EA, or EIS, interim action, supplemental analysis?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Is the action addressed and assessed under another Federal agency's NEPA documentation?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Does the action qualify for emergency exemption (10 CFR 1021.343)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Will the proposed action comply with regulations, requirements, mitigation, etc. identified in the previous documentation?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Explanation/Justification: An environmental assessment (DOE/EA-1492) was prepared in 2004 that evaluated the impacts related to modifying the height of the dams created during operation of the facility. A Finding of No Significant Impact was issued in October 2004.	
Additional requirements/comments: All required permits and notifications would be obtained prior to commencing work.	
Contractor NEPA Specialist Sandra Beranich	Signature <i>Sandra Beranich</i> Date 06/09/2008
Contractor Task Order Manager Linda Kaiser	Signature Linda L. Kaiser Date Digitally signed by Linda L. Kaiser, cn=L. Kaiser, ou=U.S. Government, ou=Department of Energy, public key, postalCode=80502 Date: 2008.06.10 09:53:32 -0600
DOE Project Manager Scott Surovchak	Signature <i>Scott Surovchak</i> Date 2008.06.10 10:54:15 -06'00'
LM NEPA Compliance Officer Richard Bush	Signature <i>Richard Bush</i> Date 6/10/08
DOE Decision <input checked="" type="checkbox"/> No further NEPA documentation required <input type="checkbox"/> Environmental Checklist required <input type="checkbox"/> Supplemental Analysis required <input type="checkbox"/> FONSI or ROD Amendment required	

Distribution upon signature:

Richard. Bush, LM NEPA Compliance Officer
 Scott Surovchak, DOE Site Lead
 Sandy Beranich, Stoller NEPA Specialist
 Richard DiSalvo, Stoller Assistant Manager
 Linda Kaiser, Stoller Task Order Manager

Site Files: RFS 120.02 (Thru S. Willson)

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Appendix E

**Notification Letter to Northwest Interstate Compact and
Utah Department of Environmental Quality, Division of
Radiation Control**

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Kaiser, Linda

From: Kaiser, Linda
Sent: Thursday, October 30, 2008 3:47 PM
To: 'jamg461@ecy.wa.gov'; 'dfinerfrock@utah.gov'
Cc: Surovchak, Scott; DiSalvo, Rick; Depinho, Darlene; 'lgol461@ecy.wa.gov'
Subject: Notification to Dispose of Low Level Radioactive Waste at the Energy Solutions Facility, Clive, Utah

Michael Garner
Executive Director of Northwest Interstate Compact jamg461@ecy.wa.gov
Cc: Lawrence Goldstein
lgol461@ecy.wa.gov

Dane Finerfrock
UDEQ
Director, Division of Radiation Control
Phone: (801) 536-4257
E-mail: dfinerfrock@utah.gov

Subject: Notification to Dispose of Low Level Radioactive Waste at the Energy Solutions Facility, Clive, Utah

Dear Mr. Garner and Mr. Finerfrock:

The following information serves as a notification to your agencies that S.M. Stoller Corporation, contractor to the U.S. Department of Energy (DOE) Rocky Flats Site (RFS), is intending to ship low level radioactive waste (LLW) to the Energy Solutions facility (ESU) in December of 2008 and during the first quarter of 2009. In addition, a second LLW shipment is planned for the summer of 2010.

DOE RFS is in the process of requesting a permanent exemption from DOE Order 435.1 in accordance with Section 3.d.(7) to allow commercial disposal of LLW at ESU. The main waste streams targeted for disposal at the ESU facility consist of demolition debris generated during the dam breach project (PVC and metal pipe, miscellaneous metal valves, concrete pieces, etc.) that may contain residual contamination levels of plutonium-239/240 and americium-241, and spent groundwater treatment media (zero valent iron, pea gravel, and woodchips) contaminated with low levels of uranium from the Solar Pond Plume Treatment System (SPPTS). Ancillary wastes associated with project radiological controls, such as used personal protective equipment, could also be generated and may require disposal as radioactive waste.

The volume of dam breach demolition debris that may need to be dispositioned as LLW is estimated to be 200 cubic yards (yd³), depending on characterization results. However, it is likely that much of the demolition debris will be free-released and disposed as solid waste at the local municipal landfill. The dam breach project began in October 2008 and is expected to end sometime in April 2009. Depending on the volume of LLW generated, off-site disposal could occur periodically beginning in December, through the duration of the project.

The SPPTS spent treatment media totals approximately 300 yd³ and will be generated in early to mid-2010. Also, approximately 1 yd³ of SPPTS treatability study media, consisting of gravel and plastic rings from tests conducted on the same treatment system in the spring of 2007, will be disposed with the SPPTS media. Off-site disposal of SPPTS LLW will occur shortly after project completion. Spent media change out is currently anticipated to occur every 4 to 5 years of operation. However, reconfiguration of the treatment system is being planned for phased installation in 2009 and 2010. The goal of reconfiguration is to significantly reduce the volume of the uranium contaminated treatment media and potentially decrease the frequency of spent media replacement to every 10 years.

Please respond with questions, concerns, or concurrences at your earliest convenience.

Sincerely,

Linda Kaiser
Site Manager,
S.M. Stoller, Legacy Management Services Rocky Flats Site
(720) 377-9679

Cc: S. Surovchak
R. DiSalvo
D. DePinho
File