



April 10, 2009

CD09-0096

Mr. David D. Brown, Project Manager  
Environmental Protection and Performance Assessment Directorate  
Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and Environmental Management Programs  
Mail Stop T-8F5  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Re: EnergySolutions Exemption from Licensing Requirements of 10 CFR 70 (TAC J00827)

Dear Mr. Brown:

Enclosed please find a partial response to your Request for Additional Information (RAI), dated February 5, 2009. As you discussed with Mark Ledoux, EnergySolutions, LLC (EnergySolutions) is still in the process of acquiring the detailed, waste stream-specific information necessary to respond to some of the RAIs. Our response to RAIs 1, 2, 5 and 6 is enclosed. We anticipate having the data needed to prepare the responses to RAIs 3 and 4 no later than May 18, 2009. We believe there may be some benefit in meeting to discuss our proposed responses to the outstanding RAIs as well as the path forward once you have had an opportunity to review the enclosed responses.

If you have any questions, please call me at (301) 957-3770 or Mark Ledoux at (801) 649-2152.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Magette".

Thomas E. Magette, PE  
Senior Vice President  
Nuclear Regulatory Strategy

Enclosures:

Response to Request for Additional Information, including attachments

Cc: Ms. Patricia Bubar, NRC  
Mr. Dane L. Finerfrock, Director, Utah Division of Radiation Control

## Response to Request for Additional Information

1. *A site, facility, and process description for the Clive Disposal Facility (CDF) that includes the proposed Clive Processing Facility (CPF). This description should include scaled drawings showing the locations of the CDF and proposed CPF buildings and major structures, processing equipment, and a narrative description of the flow of waste through these facilities. The CPF process description should be particularly focused on any processes that could increase the concentration of SNM in treated waste following receipt of waste at the CDF. Staff also requests a copy of the EnergySolutions' June 7, 2007 radioactive material license application to the State of Utah, including all application page changes, revisions and supplemental information provided during the State of Utah's review of this application.*

### EnergySolutions Response

**CDF Process Description.** The CDF is comprised of three different facilities, not including the proposed CPF: (1) Bulk Waste Facility (BWF), (2) Containerized Waste Facility (CWF) and (3) the Mixed Waste Facility (MWF). The BWF consists of waste disposal embankments and Unloading/Transfer Facilities for removal of waste or waste containers from rail or truck and transfer to embankments for disposal. The majority of the BWF waste is removed from its waste container and placed in the disposal embankment in accordance with approved engineering practices. For ALARA reasons, some BWF waste may be disposed in its containers with controlled low strength material (CLSM) to meet engineering requirements. Special Nuclear Material (SNM) is controlled in accordance with the SNM Exemption Order authorized by the U.S. Nuclear Regulatory Commission (NRC) and the DRC.

The CWF is a special disposal area within the BWF that receives high dose waste, typically in Type A or B transportation casks. Unlike waste at the BWF, waste at the CWF is not removed from the container. SNM at the CWF is controlled by the 350 gram limits as defined in 10 CFR 150. Although the NRC has granted EnergySolutions an exemption from 10 CFR 70 to manage SNM disposal across the entire site on a concentration basis (see Attachment B, *Exemption to Requirements of 10 CFR 70 for Receipt, Storage and Disposal of Waste Containing Special Nuclear Material*), SNM at the CWF is managed in accordance with the mass limits in 10 CFR 150.

The last facility is the MWF, which allows for: 1) the receipt and disposal of radioactive waste that has been processed in accordance with RCRA requirements and meets Land Disposal Requirements (LDR); or 2) receipt of radioactive waste to be treated at Clive for its hazardous constituents and then disposed. SNM is controlled in accordance with the SNM Exemption Order authorized by the NRC and the DRC.



Radioactive waste for the BWF, CWF, or MWF may be received by truck or rail. Figure 2 of the CPFLA, Site Layout and Facility Legend, provides a scaled drawing of the CDF, including the location of the CPF. The flow of waste on to the CDF is as follows (numbers in parentheses indicate locations on the drawing):

- Rail
  - Rotary Dump Facility (#67)
  - Rail Car Rollover (#10)
  - Intermodal Unloading Facility (#16)
  - Rail Car Digging Facility (#14)
  - Large Component Unloading Pad (#49)
- Truck
  - Administration Building (#1)
  - East LLRW Truck Unloading Facility (#41)
  - Mixed Waste Unloading Dock (#34)
  - Large Component Unloading Pad (#49)
  - Class A North CWF (#71)

Waste received at the CDF may go directly to disposal embankment, to storage, to the shredder (LLRW only, #75), or into one of the three Mixed Waste Buildings for processing prior to disposal (#32, #35, #37). The Mixed Waste Operations Building (#32) is the proposed location for the CPF.

**Process Flow for CPF.** CPFLA Figure 3, Site Layout, and Figure 5, Remodeled Floor Plan, describe the proposed CPF. As shown on Figure 3, the CPF will have its own license-restricted area to control specific license limits, including but not limited to volume, SNM, and dose rate. As described in CPFLA, EnergySolutions may use the CDF facilities for unloading waste or waste containers from conveyances and transferring to the CPF. Waste for the CPF that is unloaded at a CDF facility will not be unpackaged or processed at the CDF but transferred to the CPF for processing. This may also include the return of CPF processed waste conveyances for shipment to other disposal facilities, return of waste or processed waste to customer(s) or return of empty packages.

**CPF Processes.** There are four proposed waste processes at the CPF as described in the CPFLA. The first process is “liquid solidification,” a process that was approved with the current CDF SNM exemption. The second process is “Overfill and Repackage,” defined in CPFLA, section IV.4. This process is the end result of the sort and segregation/segmentation processes. The remaining two processes, described below, are the only CPF processes that have the potential for concentrating SNM.

Sort and segregate as defined in CPFLA, section IV.2 is:

“Sorting is defined as separating material into different categories in order to optimize packaging or processing of radioactive material with respect to chemical



and physical properties. Segregating is similar to sorting except this process is specific to removing non-conforming or difficult material. In these processes, containers are opened, contents removed, sorted/segregated and prepared for disposal or further processing.”

Segmentation is defined in CPFLA, section IV.3, as follows:

“Because materials received for processing have varying physical dimensions, the items often need to be reduced in size to allow processing. Welding and joining of contaminated materials is also a common maintenance need for equipment repair or container repair or lid closure. A wide variety of cutting, sectioning and joining tools may be used. Examples are, hydraulic cutter/shears, chop saws, table saws, other power saws, air arc and other cutting or welding torches, a log splitter used primarily to break fuel racks, bolt cutters and miscellaneous other mechanical, hand, and power cutting and joining tools.”

The CPF License Application (CPFLA), Revision 5, December 18, 2008, is enclosed as Attachment A. This is the current revision and contains the latest changes as a result of interrogatory responses to the Utah Division of Radiation Control (DRC). The application includes scaled drawings showing the locations of the CDF and proposed CPF buildings and major structures, processing equipment, and a narrative description of the flow of waste through these facilities. We also have enclosed a CD that contains all drawings.

2. *A description of the nuclear criticality safety (NCS) technical practices that will be relied upon at the CPF, including operational sampling procedures (i.e., mass and concentration controls) or other NCS safety parameters and procedures that will be used to ensure criticality safety, or a description of why no additional NCS safety parameters and procedures are necessary.*

### **EnergySolutions Response**

The current SNM Exemption for the CDF has specific nuclear criticality safety (NCS) practices that are required in addition to the actual SNM concentration limits at receipt, as stipulated in the Order. EnergySolutions proposes to follow the same system(s) already in place for the SNM Order as established for the CDF, specifically, Condition's 1-9. The CPFLA, Section V.4, Special Nuclear Material, will be updated with the applicable requirements of the CPF SNM Order.

As described in the CPFLA, section V.3, Waste Acceptance Criteria, a waste acceptance procedure will establish requirements that a customer must meet. Each shipment of waste to the CPF is authorized prior to the shipment leaving the customer's facility. Part of this authorization will include the requirements as defined in the above paragraph.

After the details of the CPF SNM exemption have been established, specific operating procedures will be written for each waste process (sort and segregating/segmentation). Similar to SNM condition 5, tracking of SNM mass for the CerOx process, EnergySolutions will establish protocols for tracking SNM mass for the final waste packages, using sample data and manifest/customer information to control SNM concentrations at or below limits.

The SNM concentration limits were established for homogenous waste streams but the CDF SNM exemption does have criteria for non-homogenous waste when averaged over a contiguous mass of 600 kilograms. These criteria may be used when processing potentially non-homogenous waste streams for the sort and segregation/segmentation to ensure that each package meets the homogenous and non-homogenous criteria. As stated above, sort and segregation/segmentation are not explicitly listed in the CDF SNM exemption; however, other processes that separate waste into multiple waste streams are (Thermal Desorption and CerOx). These waste streams are checked to ensure that the SNM concentrations are within approved limits. Currently, the Clive Facility is only using the Thermal Desorption process.

During the SNM exemption discussion, the NRC indicated that SNM concentrations could be verified by either sampling or calculation. Enclosed are two operating procedures, Pre-Processing Waste, CL-MT-PR-101, (Attachment C) and Thermal Desorption Operations, CL-MT-PR-501, (Attachment D) that are used to verify SNM concentrations. Also enclosed is the spreadsheet, VTD Solid Waste Stream, used to determine SNM concentrations prior to Thermal Desorption processing (Attachment E).

EnergySolutions believes that current SNM practices and approvals from the NRC, which address homogenous and non-homogenous SNM concentrations provide adequate controls. As previously stated, detailed operating procedures for sort and segregation/segmentation have not been completed but will include pre-process SNM analyses similar to the approved Thermal Desorption process. It is also important to note that the waste must comply with the SNM exemption at receipt and may not exceed Class A concentrations.

3. *An evaluation of NCS at the CPF that demonstrates that under normal and credible abnormal conditions, all nuclear processes will remain subcritical, and maintain an acceptable margin of subcriticality.*

### **EnergySolutions Response**

EnergySolutions is still gathering information to provide a response to this RAI.

4. *A description of how the design and operation of the CPF ensures that no single credible event or failure can result in a criticality accident (i.e., double contingency protection). This description should include an analysis of whether double-batching of SNM is possible during treatment.*

### **EnergySolutions Response**

EnergySolutions is still gathering information to provide a response to this RAI.

5. *For both the CDF and CPF, a description of the physical and chemical characteristics of the radionuclides in environmental discharges; known or expected radionuclide concentrations in effluents; discharge locations; environmental monitoring plans; and a description of local, State, and Federal permits.*

### **EnergySolutions Response**

Both the CDF and the CPF are and/or will be zero discharge facilities. The CDF, as described in Attachment A, is 80 miles west of Salt Lake City, Utah in an approved hazardous material zone. Liquids, as a result of precipitation, decontamination water and contact-waste water are collected in retention ponds and tanks within the Clive restricted area and controlled as potentially-contaminate. Completed disposal embankment runoff is collected in an offsite retention pond in accordance with the Clive radioactive material license. All human waste facilities are outside of the restricted area and Clive does not have a sanitary sewer system.

All solid radioactive material, such as, waste, equipment, and soil, are controlled by the radioactive material licenses. All airborne releases from the CDF or CPF are and/or will be monitored per the Clive Environmental Monitoring Plan. Please find enclosed the current CDF Environmental Monitoring Plan (Attachment F) and the proposed revisions to Attachment F to include the CPF (Attachment G). The CPF particulate, gaseous and tritium effluents are monitored downstream of a HEPA-ventilation system prior to exiting the stack.

Also enclosed is a copy of the current Clive Radioactive Material License UT 2300249, Amendment 4 (Attachment H).

6. *The physical security plan for the CPF, including a description of the physical security organization for the CPF, access controls, means of detecting unauthorized intrusion, provisions for monitoring access to controlled areas, communication systems related to security, intrusion alarm systems, arrangements with law enforcement authorities to provide assistance, and implementation schedule of the security plan.*

### **EnergySolutions Response**

To support the licensing and operation of the CPF, we have prepared a security plan, *Physical Protection Plan for the Protection of Special Nuclear Material of Low Strategic Significance*. A draft of the plan is enclosed as Attachment I.