



040-08989

February 28, 2011

CD11-0047

Mr. Rusty Lundberg
Executive Secretary
Utah Radiation Control Board
195 North 1950 West
Salt Lake City, UT 84114-4850

Mr. Arthur T. Howell, Director
Division of Nuclear Material Safety
U.S. Nuclear Regulatory Commission Region IV
612 East Lamar Blvd.
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Arlington, TX 76011-4125

Subj: *EnergySolutions* Causal Analysis relating to notifications to the U.S. Nuclear Regulatory Commission, Region IV concerning Special Nuclear Material Exceedances of Utah Radioactive Material License UT 2300249.

Dear Sirs:

In an e-mail from Robert Evans (NRC) to Mark Ledoux (ES) provided on December 22, 2010, Mr. Evans requested that *EnergySolutions* complete a causal analysis on the four non-conforming shipments that arrived at the Clive disposal facility in 2010. The causal analysis was performed to identify factors which led to the receipt of the four separate shipments, in which, radioactive waste containing special nuclear material (SNM) exceeded authorized limits at the Clive Disposal Facility in 2010. As part of the correspondence (e-mail) with the NRC and discussions with Clive management, Condition Report CL-CR11-001 was initiated to evaluate causal factors and trends.

Condition Report CL-CR11-001 issued January 3, 2011 documents and tracks a commitment to the U.S. Nuclear Regulatory Commission (NRC) to evaluate causal factors and trends for four separate radioactive waste shipments received at Clive in 2010, which required notification to the NRC for exceedances of SNM concentrations. A summary description of each waste shipment and its' associated Clive Condition Report, is provided below.

1. Clive Condition Report CRSD10-021 issued June 4, 2010
 - a. Shipment arrival date: March 1, 2010

- b. Receiving Facility: Clive Mixed Waste Treatment Facility (Bulk Waste Facility)
- c. Customer: Department of Energy – Brookhaven National Laboratory
- d. Shipper: Brookhaven National Laboratory. 5th Ave. Bldg 860, Upton, NY, 11973
- e. Contact: Mike Clancy 631-344-7851
- f. DOE permit number: DOE M 470.4-6
- g. Waste volume: one 55-gallon drum (4 ft³)
- h. Waste description: scale/sediment
- i. Intended Treatment/Disposal: mercury amalgamation/stabilization then disposal at the Mixed Waste Facility
- j. Non-compliance:
 - i. SNM > Clive radioactive material license – plutonium-239/240 concentration of 269 nCi/g (license limit is 10 nCi/g)
 - ii. Waste was Greater than Class C since plutonium-239/240 concentration was > 100 nCi/g
 - iii. Strontium-90 was Class B waste with a concentration of 0.17 Ci/m³
- k. Shipment rejected: June 28, 2010 – total of 119 days onsite

2. Clive Condition Report CRSD10-050 issued November 18, 2010

- a. Shipment arrival date: November 16, 2010
- b. Receiving Facility: Clive Mixed Waste Treatment Facility (Bulk Waste Facility)
- c. Customer: Department of Energy – Separations Process Research Unit (SPRU)
- d. Shipper: EnergySolutions
- e. Contact: Melinda Soest 865-919-7165
- f. DOE permit number: DOE M 470.4-6
- g. Waste volume: shipment total – approximately 150 ft³ (actual non-compliant waste – four 55-gallon drums (14 ft³))
- h. Waste description: resin (non-compliant waste - assorted bags of resin, dirt, sludge, lab material, hoses)
- i. Intended Treatment/Disposal: liquid solidification
- j. Non-compliance:
 - i. SNM > Clive radioactive material license – plutonium-239/240 concentration of 75 nCi/g (license limit is 10 nCi/g)
 - ii. Plutonium-239/240 concentration was Class C waste @ 75 nCi/g (license limit is 10 nCi/g)
 - iii. Strontium-90 concentration was Class B waste
- k. Shipment rejected: Partial shipment rejected on January 14, 2011 – total of 59 days onsite

3. Clive Condition Report CRSD10-053 issued December 9, 2010
 - a. Shipment arrival date: December 3, 2010
 - b. Receiving Facility: Clive Mixed Waste Treatment Facility (Bulk Waste Facility)
 - c. Customer: Department of Energy – LATA/Parallax Portsmouth (M&EC)
 - d. Shipper: Material & Energy Corporation. East Tennessee Technology Park, 2010 Highway 58, Suite 1020, Oak Ridge, TN 37830
 - e. Contact: Kimberly Holt 865-574-0335
 - f. License number: TN R-01088-G09
 - g. Waste volume: shipment total – three 85-gallon drums (34.8 ft³)
 - h. Waste description: filter media, hazardous waste
 - i. Intended Treatment/Disposal: thermal desorption
 - j. Non-compliance:
 - i. SNM > Clive radioactive material license – uranium-235 concentration in drums was 1441, 5456 and 2057 pCi/g (license limit is 1190 pCi/g)
 - ii. No SNM Certification with manifest as required by the Clive radioactive material license
 - k. Shipment rejected: December 7, 2010 – total of 4 days from initial discovery to rejection.
4. Clive Condition Report CRSD10-060 issued January 20, 2011
 - a. Shipment arrival date: October 19, 2010
 - b. Receiving Facility: Clive Bulk Waste Facility
 - c. Customer: Department of Energy – Sandia National Laboratory and Material & Energy Corporation process waste (M&EC)
 - d. Shipper: Material & Energy Corporation. East Tennessee Technology Park, 2010 Highway 58, Suite 1020, Oakridge, TN 37830
 - e. Contact: Kimberly Holt 865-874-0335
 - f. License number: TN R-01088-G09
 - g. Waste volume: shipment total – nine 55-gallon drum (67.5 ft³)
 - h. Waste description: filter media, hazardous waste
 - i. Intended Treatment/Disposal: thermal desorption treated solid for Mixed Waste Facility disposal
 - j. Non-compliance:
 - i. SNM > Clive radioactive material license – plutonium-238 concentration of 21 nCi/g (license limit is 10 nCi/g)
 - ii. Plutonium-238 concentration was Class C waste @ 21 nCi/g (license limit is 10 nCi/g)
 - k. Shipment rejected: February 7, 2011 – total of 111 days onsite

Once each of the four non-compliant shipments was identified by manifest review or waste sample results to be non-compliant, the shipment was placed on hold or otherwise isolated until final disposition was determined. Notifications were made to the proper regulatory agencies (NRC and Utah Division of Radiation Control), EnergySolutions management (1st Notification), and the customer.

In 2010, the EnergySolutions Clive disposal facility received 6,969 waste shipments for disposal. Of the 6,969 shipments, 3,229 shipments contained SNM. The 4 non-conforming shipments detailed above represent 0.001% of the SNM shipments received at Clive in 2010.

Causal Analysis. The incidents involved in this causal analysis span a period of eleven months. The first of the four non-compliant shipments arrived at Clive on March 1, 2010 and the most recent shipment was rejected on February 7, 2011. Many components were reviewed for each of the four non-compliant shipments, including the Clive radioactive material license, programs, procedures, documents, and e-mails. Some of the details specific to the customer's site, such as operating procedures, organization charts and other site-specific information, was not available for this causal analysis. In three of the four Clive condition reports - CRSD10-021 (Brookhaven), CRSD10-050 (SPRU) and CRSD10-053 (M&EC) - corrective action plans were provided to the Clive Quality Assurance manager. These corrective action plans were reviewed and provide some of the customer site-specific information. A corrective action plan is pending for Condition Report CRSD10-060 (M&EC) but was not available at the close of this report.

Root Cause. The Customer did not adequately characterize their waste for its' radiological constituents. There were several causal factors specific to each customer (as explained in their individual corrective action plans) which resulted in inadequate characterization. As previously stated, three of the four Clive condition reports - CRSD10-021 (Brookhaven), CRSD10-050 (SPRU), and CRSD10-053 (M&EC) – have provided corrective action plans that were, in summary, consistent with the root cause statement above.

Contributing Causal Factors. Even though it is the customer's ultimate responsibility to ensure that low level radioactive waste shipments to Clive meet all license and regulatory requirements, EnergySolutions also has an implicit responsibility to ensure customers meet these same requirements. During this causal analysis, several contributing causal factors were identified that indicate a need for Clive Facility management to strengthen programmatic customer response mechanisms, trending practices and documentation requirements triggered by the arrival of non-compliant

shipments. Condition report CL-CR11-001 will remain open to track corrective actions associated with these causal factors.

Please let me know if I can provide any additional information or if I can answer any questions or concerns at (801) 649-2179.

Sincerely



Rick Chalk
Director of Health Physics, Clive, UT.

Cc: Mr. John Hultquist, Utah DRC
Mr. Robert Evans, U.S. NRC