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June 6, 2016

Mr. Tony Hatton, Director  
Division of Waste Management  
Department for Environmental Protection  
200 Fair Oaks Lane, 2<sup>nd</sup> Floor  
Frankfort, KY 40601

Ms. Kathy Fowler, Director  
Division of Public Health, Protection and Safety  
Department for Public Health  
275 East Main Street, Mail Stop HS1E-B  
Frankfort, KY 40621

Re: Advanced Disposal Services Blue Ridge Landfill  
Waste Removal Plan for Areas with Elevated Surface Radioactivity

Dear Mr. Hatton and Ms. Fowler:

On behalf of Advanced Disposal Services Blue Ridge Landfill, please find enclosed our plan to relocate and permanently dispose of two small waste areas having elevated surface radioactivity. The plan summarizes the work performed to date, our findings based upon the data, conclusions reached with respect to this particular waste, and a plan to remove and **dispose of the waste on site**. We discussed this plan briefly in our meeting on May 31, 2016. You will note we propose to implement the plan no later than June 15, 2016. If you have any comments regarding the plan we will appreciate your forwarding them to us at your earliest convenience.

Sincerely,  
Cornerstone Environmental Group, LLC

James R. Wade, PE  
Project Manager

cc: David Rettell, PE  
Philip Comella

# Waste Removal Plan for Areas with Elevated Surface Radioactivity

## Blue Ridge Landfill

Estill County, KY – Permit #033-00004  
AI #998

June 2016

**Prepared for:**

Advanced Disposal Services, Inc.  
2700 Winchester Rd.  
Irvine, KY 40336



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**ADVANCED DISPOSAL SERVICES BLUE RIDGE LANDFILL  
WASTE REMOVAL PLAN FOR AREAS WITH  
ELEVATED SURFACE RADIOACTIVITY  
MAY 24, 2016**

**Background**

Advanced Disposal Services Blue Ridge Landfill (BRL) was issued a Notice of Violation (NOV) by the Kentucky Energy and Environment Cabinet (CABINET) on March 9, 2016. The NOV alleged, among other things, that Blue Ridge improperly accepted for disposal unpermitted out-of-state NORM/TENORM waste between July 2015 and November 2015. The waste was brokered by BES LLC (BES) located in West Liberty, Kentucky.

BRL subsequently began an internal investigation to characterize the waste. BRL engaged Cornerstone Environmental Group LLC (CEG) and Chase Environmental Group LLC (CHASE) to assist in the investigation which included the following goals:

- review the profile and accompanying information provided by the generator/transporter to determine whether the waste was probably characterized
- determine the dates BES waste was brought to the landfill
- determine the quantity of BES waste brought to the landfill
- determine the horizontal extent of the BES waste in the landfill
- determine the depth of cover over top the BES waste
- perform a gamma survey primarily over the area of landfill were BES waste was disposed and background areas

A summary of the results of this inquiry is as follows:

- the waste was not characterized or represented to BRL as NORM/TENORM waste
- four generators sent waste to the landfill: Fairmont Brine, Cambrian Well Services, Greenhunter, and Nuverra
- a total of eight waste profiles were submitted, five by Greenhunter and one apiece by the other generators
- ninety-two loads were hauled to the landfill by BES, totaling 1,157.25 tons
- the final load of BES waste was in fact hauled to the landfill on February 3, 2016

This report describes the investigative procedures employed, the findings of the investigation, and a plan to remove certain waste which, although elevated radioactivity is indicated, is unrelated to the BES waste.

## Investigative Procedure

CEG reviewed Detail Customer Activity Reports generated by BRL. These reports show, among other things, the customer name, type of waste, and quantity of waste brought to the landfill each day. The first load of BES waste was brought to the landfill on July 20, 2015 and the final load was brought to the landfill on February 3, 2016. A total of 92 loads were brought to the landfill totaling 1,157.25 tons.

The landfill site plan is overlain with a grid which divides the site into 100' x 100' blocks. Each day the Landfill Manager notes which grid block received waste that particular day, and the grid block name is entered into a spreadsheet titled Cover Report. CEG reviewed the Cover reports alongside the Detail Customer Activity Reports in order to determine which grid blocks received waste on the days BES was hauled to the landfill. These grids block were color coded on a drawing of the landfill.

CEG reviewed all available waste profiles, waste manifests, and scale tickets in an attempt to corroborate the information contained in the Detail Customer Activity Reports and the Cover Reports. The information from all these sources correlated very well.

CEG interviewed the landfill operators on March 29, 2016 and asked them for their recollections of the waste description, hauler, waste container details, and where the BES waste was placed. CEG compared the interview responses to the data. The operators' recollections were consistent with the results of the data review.

CEG and BRL reviewed site mapping, various drawings, aerial photography, waste delivery dates, survey data, and historic waste placement data to determine the approximate depth below soil cover of the waste. The depth below cover ranged from a minimum of 1 foot to a maximum of 19 feet.

CEG prepared an isopach map using the 2015 and 2016 aerial topographic maps. The isopach maps reflects areas of cut and fill between March 15, 2015 and March 22, 2016.

CHASE performed gamma surface scans with encompass nearly all the areas in which BES waste was placed and much of the surrounding area. In addition, CHASE performed gamma surface scans at various locations around the perimeter of the landfill which could be considered background data.

CHASE determined that a limited area was found to contain elevated areas of radioactivity, elevated being defined as greater than 60,000 gross counts per minute. This will hereafter be noted as the 'elevated area' and is located on a flat spot on top of the landfill where certain materials (e.g., stone and petroleum contaminated soil) are stored temporarily for later use in operations.

CHASE collected 6 soil samples from the landfill area, including 3 samples from the 'elevated area.' CHASE collected 4 soil samples from background areas. CHASE collected 2 surface

water samples from the inflow of 2 of the sediment control ponds. Finally, CHASE collected a sample from a filter sock found on the landfill surface near the 'elevated area.' Soil samples and the filter sock were analyzed for Ra-226 and Ra-228. The water samples were analyzed for gross alpha and gross beta.

CEG plotted the 'elevated area' and the BES waste placement data on maps for the purpose of determining whether or not the 'elevated area' could be BES waste.

### **Findings Regarding BES Waste and the 'Elevated Area'**

- Sheet 1 presents the BES waste placed in seventeen different grid blocks between July 2015 and February 2016.
- Sheet 2 presents an isopach map which clearly shows where filling occurred between March 15, 2015 and March 22, 2016.
- The top of the landfill where the 'elevated area' is located did not change in elevation from March 15, 2015 to March 22, 2016.
- Some piles of material that were located at the top of the landfill as of March 15, 2015 were removed prior to March 22, 2016.
- The volume of the piles as of March 22, 2016 is approximately 741 cubic yards.
- The daily placement logs show that BES waste was placed in grid block K16. This is an obvious error, as the isopach map clearly shows that no waste was placed in that grid block between March 15, 2015 and March 22, 2016.
- The daily placement logs show that BES waste was placed in grid block L15. It appears, based upon the isopach map, that no waste was placed in grid block L15 between March 15, 2015 and March 22, 2016.
- Grid block K16 should likely have been shown as grid block K15.
- Grid block K15 is the one nearest the 'elevated area' that received waste between March 15, 2015 and March 22, 2016.
- The only portion of grid block K15 that was filled is the northernmost edge of the block.
- Laboratory analysis of the filter sock indicates the sock had concentrations of Ra-226 and Ra-228 lower (less than one third) than was found in the nearby soil samples, indicating the sock is not the source of residual radioactivity.
- The three samples from the 'elevated area' showed activity concentrations of Ra-226 ranging from 69-118 pCi/g and activity concentrations of Ra-228 ranging from 50-86 pCi/g.
- Surface water samples indicate the gross alpha concentrations are significantly higher in the pond which is located adjacent to the exposed shale in the borrow area.

### **Conclusions**

No fill was placed within approximately 100 feet of the 'elevated area' between March 15, 2015 and March 22, 2016. Therefore, the 'elevated area' is not comprised of BES waste and is not subject to the "...shall not disturb..." provision of the NOV.

The activity concentrations of Ra-226 and Ra-228 are significantly lower than the 2000 pCi/g threshold which may require disposal at a low-level radioactive waste site.

### **Waste Removal Plan**

Waste will be removed by Chase Environmental (Contractor) from the 'elevated area' and disposed directly into the Blue Ridge Landfill in accordance with the following procedures:

- Contractor will remove protective tarp over 'elevated area' only on areas that can be relocated within working day.
- Elevated Area waste will be relocated within area presented on Sheet 3. This area is located 50 feet from final grade elevation.
- Excavation will be guided by 2" x 2" NaI measurements on the material surface. Materials exhibiting an audible increase in the count rate will be excavated and disposed directly into relocation area.
- Contractor will place a minimum of 12 inches of soil immediately over area by end of day.
- Final relocation area will be surveyed for as built documentation.
- If all 'elevated area' waste is not relocated within the working day, the protective tarp will be replaced over any remaining material in the 'elevated area' and secured.

This procedure will continue until there is no distinguishable increase in the count rate in the 'elevated area.'

After the materials have been removed, a gamma surface scan survey will be performed to verify completion of removal.

Six soil samples will be collected and sent for analysis by gamma spectroscopy to verify that the removal was complete.

After relocation and cover material placement, a gamma surface scan survey over the relocation area will be performed to verify, at a minimum, background count rate is observed before continuation of waste placement over this area occurs.

Equipment used in the removal process will be decontaminated prior to demobilizing from the site or at the completion of the removal process.

Waste will not be relocated during precipitation events or on days with high winds.

BRL intends to begin implementation of the waste removal plan no later than June 15, 2016.

CEG will document and record all activities and test results for a final report to the CABINET and placement into the BLR operation record.

There will be no other impact on site operations.