U.S. ENVIRONMENTAL PROTECTION AGENCY
POLLUTION/SITUATION REPORT
Bennett Landfill Fire - Removal Polrep

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region IV

Subject: **POLREP #11**
Clay Cap Continues - Completing Third Layer
Bennett Landfill Fire
B44Y
Chester, SC
Latitude: 34.7874300 Longitude: -81.4502500

To:
From: Matthew Huyser, OSC
Date: 7/31/2015
Reporting Period: 7/24/2015 - 7/31/2015

1. Introduction

1.1 Background

Site Number:	B44Y	**Contract Number:**	EP-S4-07-02
D.O. Number:	0134	**Action Memo Date:**	4/30/2015
Response Authority:	CERCLA	**Response Type:**	Time-Critical
Response Lead:	EPA	**Incident Category:**	Removal Action
NPL Status:	Non NPL	**Operable Unit:**	
Mobilization Date:	5/26/2015	**Start Date:**	5/26/2015
Demob Date:		**Completion Date:**	
CERCLIS ID:	SCN000402727	**RCRIS ID:**	
ERNS No.:	1100014	**State Notification:**	11/2/2014
FPN#:		**Reimbursable Account #:**	

1.1.1 Incident Category
Time-critical removal action.

1.1.2 Site Description
The Bennett Landfill Fire Site is a former construction debris and nonhazardous industrial waste landfill (defined by state regulations as a Class II landfill) that was additionally permitted to accept certain types of asbestos waste.

The landfill ceased accepting waste in 2014. On November 2, 2014, the landfill was found to be on fire and was believed to have been extinguished by November 7th. Due to increasing smoke concentrations in January 2015, SCDHEC requested that the EPA conduct a Removal Site Evaluation (RSE). EPA signed an Action Memorandum on April 30, 2015 to conduct a Time-Critical Removal Evaluation and mobilized to the Site to begin removal activities on May 26.

Additional information for this section is available in POLREP #4 from 6/5/2015.

1.1.2.1 Location
The Site is located at 4399 Pinkney Road, Chester, Chester County, South Carolina. The geographic coordinates of the Site are 34.7874300 degrees north and 81.4502500 degrees west.

Additional information for this section is available in POLREP #4 from 6/5/2015.

1.1.2.2 Description of Threat
The fire at the Bennett Industrial Landfill is actively releasing chemical compounds into the air, including benzene and formaldehyde, which are measured near the fire at concentrations exceeding industrial RMLs for air and concentrations within the surrounding community that are greater than three times the residential RSL. Conditions at the Site, if not addressed, will continue to deteriorate over time and resulting in increasing quantities of exposed asbestos which are susceptible to transport by wind and other weather conditions to the nearby population.

Additional information for this section is available in POLREP #4 from 6/5/2015.

1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results
Additional information for this section is available in POLREP #4 from 6/5/2015.

2. Current Activities

2.1 Operations Section

2.1.1 Narrative

ERRS crews continued installation of the third 6” clay layer on 7/27 and 7/28 reaching 50% completion by the end of the work day on 7/28. Excavation of sediment in the detention pond at the southwest corner continued during this time as well and had removed approximately 3 vertical feet of soil by the end of 7/28.

A rainfall of 0.2” fell on the Site overnight on 7/27 and cracking conditions on the cap were noticeably improved with the increased moisture. A significant and intense rainfall of 2” fell on the afternoon of 7/28; a majority of the storm water fell within a window of less than 60 minutes. The storm water caused rill erosion throughout the Site and filled the detention pond with more than 3 feet of water. The clay cap on the burn area remained mostly intact with moderate to light rill erosion throughout the face and gully formation near the southwest corner of up to 10” deep, 8” wide, and 20’ long. A stand of sediment formed at the toe of the northwest corner at depths of up to 2’. The face will be repaired as cover operations continue. Due to the wet conditions that remained on 7/28, Site operations were shut down for one day and resumed on 7/30.

A representative from the Clemson University Extension Office visited the Site on 7/29 to provide consultation on soil conditions and vegetation strategies. Three soil samples were collected and will be analyzed for soil quality and nutrient content to provide recommendations for best native species for habitat and erosion control. The samples include sandy soils at the northeast corner of the Site, clay soil at the southwest corner of the Site, and topsoil which was removed from the northeast corner of the Site and stockpiled.

From 7/30-2/31, installation of the third 6” clay layer continued reaching 90 completion by the end of the work day on 7/31. Sediment that had been removed from the detention pond is being used to backfill areas where clay was removed in the Bottom Hill Borrow Zone in order to establish a stable low grade slope from landfilled waste to the detention pond.

On 7/30, a layer of soil containing asbestos waste was removed from near the road way alongside the Bottom Hill Borrow Zone; approximately 100 CY were moved in total. The soil was wetted prior-to and during loading, it was then transported via off-road dump truck to the southern toe of the asbestos cell where it was dumped. All operators were confined to the cabs of their vehicles during this operation and air sampling was collected throughout the day on the exterior of the vehicle. The sample will be analyzed for fibers using PCM analysis and further assessed for asbestos content using TEM if fibers are present.

EPA OSC Huyser and START measured the air monitoring wells during the week of 7/27 to 7/31. Results appear to be consistent with results from previous week with few exceptions. Elevated temperatures were observed in Wells 1 and 2 on 7/30 which were nearly 30% higher than previous measurements. The temperature patterns during the measurement collection appear to be different than previous measurements taken in the well, requiring a much longer time of 5-10 minutes to develop and come to a stabile point whereas previous measurement were supposedly stable within a matter of seconds. The change could be a result of water infiltration from the storm event on 7/28. This could be the result of air infiltration since the well head is opened for temperature measurements (but not for gas measurements). Furthermore, it is possible that previous measurements did not allow the temperature to adequately stabilize.

2.1.2 Response Actions to Date

- May 25-29: ERRS mobilization, site preparation (access roads, entrance, trailer, work zones)
- June 1-2: Grading and wetting burned area
- June 3: First record of no morning smoke observed
- June 3-5: Continue grading and wetting burned area. Moved cover soils from borrow area to burned area
- June 5-26: Continue grading and covering operations.
- June 16: Exhausted stockpile of cover soil at top center of Site
- June 26 Initial cover soil installation completed.
- June 29 Initial six inches of clay cap begun. Completed on July 3rd.
- July 2nd Three additional gas monitoring wells installed to monitor landfill carbon monoxide and temperatures near former burn area.
- July 13-17: Began removal of trees and topsoil from West Ridge Borrow Zone
- July 14: Exhausted Old Yard Stockpile at the south side of the Site
- July 14-17: Begin installation of second 6" clay layer on burn area
- July 20-22 Complete second 6" clay lift on burn area
- July 22 Conducted compaction testing by PSI Inc - 30 of 34 grids passed
- July 23 Begin installation of third clay layer on landfill face area
- July 28 Complete excavation of 3 vertical feet of sediment from detention pond
- July 29 Consultation with Clemson University Extension Office for Soil quality and vegetation
- July 27-31 Continue installation of third clay layer on landfilled face area reaching 90% completion

2.1.3 Enforcement Activities, Identity of Potentially Responsible Parties (PRPs)

Information for this section is available in POLREP #4 from 6/5/2015.

2.1.4 Progress Metrics

Waste Stream	*Medium*	*Quantity*	*Start Date*	*Treatment*	*Est. % Complete*
Burning Area	Debris	Approx 3.0 acres	6/1/2015	Cover	18" of cover soils completed on 6/26. Initial clay cap completed 7/3. Second clay layer completed by 7/22. Third layer started.

Asbestos Cell	Debris	Approx 19,500 CY	n/a	Regrade & Cover	n/a

2.2 Planning Section

2.2.1 Anticipated Activities

The first priority of the removal action will be to address the burning debris pile by installing a soil cover. Isolation of the burning material and reduction of oxygen supply will significantly reduce emissions from the smoldering fire. The second priority of the removal action will be to address the eroding asbestos disposal cell by re-grading and covering the area.

Air sampling and monitoring activities will be conducted on-site for worker health and safety and continued site investigation purposes. Air monitoring for respirable particulate matter (PM2.5) will continue off-site outside the fenceline and in downtown Lockhart, SC for the duration of the action.

Soil for cover and encapsulation will be obtained from on-site sources to the greatest extent possible. The disturbed areas of the Site will be secured with vegetation to provide a stable erosion-resistant surface. Total project time is estimated at approximately 3 months.

2.2.1.1 Planned Response Activities

- Isolation of burning material by removal and relocation of available fuel path and installation of earthen cover; ***(ONGOING)***
- Isolation of designated asbestos disposal cell through the installation of earthen cover;
- Re-grading waste materials and native soils for purpose of cover installation; ***(ONGOING)***
- Installation of temporary measures to prevent off-site migration of dust or contaminants as removal operations are conducted; and, ***(ONGOING)***
- Continue sampling and monitoring, as needed, for site safety purposes and to further delineate or identify contaminants. ***(ONGOING)***

2.2.1.2 Next Steps

- Continue landfill slope grading and cover operations
- Finalize landfill design plans
- Begin evaluating extent of asbestos cell for covering operations
- Continue clay capping of 3 acre face area
- Continue monitoring 4 well locations

Consultations on air monitoring results in the wells were received from EPA and SCDHEC officials with experience with air quality monitoring for landfills. Several recommendations were included and are addressed below:

Add shallow gas wells:
Shallower wells could monitor for O2 infiltration. Locations could be targeted at cracks in the clay liner or anywhere H2S or CH4 are detected at the surface. However, this recommendation is outside the current scope of the response and may be implemented at a later time depending on the duration of the removal project and SCDHEC's ability to conduct future monitoring.

Measure wells twice per day:
Wells were measured twice per day from 7/13 to 7/14. Only small variations were observed from morning to afternoon measurements. The most notable was H2S readings in Well3 which increased by 5-10ppm from morning to afternoon but decreased by 3-7ppm for the next morning with fair regularity. In the interest of time for personnel responsible for collecting readings, the measurements were reduced to 1/day on 7/27/2015. Twice per day measurements could resume at any time to determine whether the low degree patterns are still persistent.

Conduct a Bar Hole Survey to map the Methane Plume:
The scale of the landfill does not suggest that there would be significant variation across the Site and information gained from the survey is unlikely to alter decisions on the removal action design at this point. The burn area that is of primary concern covers less than 3 acres and the location of smoldering material is sufficiently documented.

For ideal and stable conditions, O2 and CO concentrations should be near zero and remaining "Balance Gas" (anything other than CH4, CO2, or O2) should be less than 20% by volume. Temperature should be stable:
The presence or increase in CO, O2 (>2%) and/or BALANCE (>40-50%) may indicate ambient air intrusion into the landfill. With BALANCE<20%, then the remaining 80% should ideally be composed of Methane and Carbon Dioxide. These goals are met, so far, in Wells 2, 3, and 4. Well 1 shows signs of possible ambient air intrusion (BALANCE concentrations in Well 1 are greater than 30%) which is likely from the uncovered and usealed top of the landfill.

Carbon Monoxide concentrations are generally below 30ppm (0.003%) and more often below 15ppm (0.0015%) with lowest consistent readings in Well1. CO measurements made by the RAE Systems MultiRAEpro instrument are generally higher than the Landtec GEM2000 instrument and both are lower than the RAE Systems MultiRAE+ instrument. It is believed that the true value is likely near or between the MultiRAEpro and the GEM2000 values. Increases in CO concentrations may indicate continued smoldering but this trend has not yet been observed.

Temperatures are generally stable but migration of smoldering, if it were to occur, will likely take several weeks or months.

Monitor CH4 and H2S for short term and long term exposure concerns:
Hydrogen Sulfide will be monitored for in low lying areas. The SC air standard for H2S at property line would be 100ppb. Methane and Hydrogen Sulfide concentrations in the well are high and would present a Health & Safety issue if a trench or pit were dug into the ground. Hydrogen Sulfide generation is indicative of anaerobic digestion with high moisture content; these conditions are confirmed in the field in Wells 3 and 4 where high H2S readings are accompanied by excessive condensation found in those wells.

Seasonal variation in gas generation can be expected and settling over time may create pathways for gas and moisture infiltration:
The removal project will likely terminate by the fall of 2015. Any further monitoring would be conducted by the property owner or state or county agencies. EPA assistance could be requested in the future if necessary.

2.3 Logistics Section

The “sheep’s foot” compactor was damaged on 7/30. A replacement compactor was mobilized to the Site on the same evening and was operational on 7/31.

2.4 Finance Section

No information available at this time.

2.5 Other Command Staff

OSC Matthew Huyser
OSC Perry Gaughan

3. Participating Entities

SCDHEC continues to provide technical assistance and information regularly

South Carolina Forestry Commission has offered to provide assistance with tree removal, if necessary

Chester County EMA and Union County EMA will provide technical assistance and information, as needed

Clemson Chester County Extension Office will provide technical assistance for soil amendment and seeding needs regarding final cover and vegetation

4. Personnel On Site

EPA (1)
SCDHEC (varies)
County EMA (varies)
ERRS (11)
START (1)

5. Definition of Terms

µg/m3	Micrograms per cubic meter (= 0.001 mg/m3)
AEGL	Acute Exposure Guideline Levels
AQI	Air Quality Index
C	Celsius
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Conc	Concentration
ConcHR	Hourly (HR) average value recorded by an EBAM instrument
ConcRT	Real time (RT) concentration recorded by an EBAM instrument based on a rolling four-minute average
DHEC	South Carolina Department of Health and Environmental Control
EMA	Emergency Management Agency
EPA	U.S. Environmental Protection Agency
ERRS	Emergency and Rapid Response Services
mg/kg	Milligram per kilogram (= 1 ppm)
mg/L	Milligram per liter
mg/m3	Milligram per cubic meter (= 1000 µg/m3)
NAAQS	National Ambient Air Quality Standard (primary and secondary NAAQS for PM2.5 24-hour average is 35 µg/m3)
NPL	National Priorities List
OAQPS	EPA Office of Air Quality Planning and Standards
OSC	On-Scene Coordinator
PM2.5	Airborne particulate matter with particle diameters below 2.5 microns
ppb	Part per billion (cannot be used to describe a mass per volume unit such as µg/m3)
ppm	Part per million (cannot be used to describe a mass per volume unit such as mg/m3)

RML	Removal Management Level
RSL	Regional Screening Level
SCDHEC	South Carolina Department of Health and Environmental Control
START	Superfund Technical Assessment and Response Team
TWA	Time-weighted average

5.1 Regional Screening Levels (RSL) and Removal Management Levels (RML)
Regional Screening Levels (RSL) are conservative risk-based screening values developed by the U.S. EPA to help identify contaminants of potential concern. Contaminants that exceeded a RSL in at least one sample are then screened against industrial air Removal Management Levels (RML) that were calculated for this evaluation. RMLs are risk-based screening values developed by the U.S. EPA to determine whether sample concentrations are sufficiently elevated that they may warrant a removal action. Exceedance of a RML by itself does not require a removal action, nor does it imply that adverse health effects will occur.

6. Additional sources of information

6.1 Internet location of additional information/report
Site updates will be provided to the "Bulletins" section of epaosc.org/bennettlandfill

Documents, reports, and videos for public release will be posted to the "Documents" section of epaosc.org/bennettlandfill

The Agency for Toxic Substances and Disease Registry (ATSDR) has reviewed chemical constituent and other sampling and monitoring data collected at the Bennett Landfill Fire Site as part of EPA's Removal Site Evaluation. A final version of at Health Consultation Letter and Fact Sheet were released on June 19, 2015. These materials are posted to the documents section of the epaosc.org/bennettlandfill webpage. ATSDR is currently in the finalization process of a Health Consultation Letter and Fact Sheet for particulate monitoring results. The data for the particulate monitors was released on June 11, 2015 and is also posted to the documents section of the epaosc.org/bennettlandfill webpage.

6.2 Reporting Schedule
New POLREPS will be issued weekly on Fridays for the duration of on-site activities.

Daily photos of site conditions and progress are being posted to the "Images" section of epaosc.org/bennettlandfill. These photos are collected from the same general locations each day.

7. Situational Reference Materials

No pertinent information to report at this time.