

**SITE SUMMARY AS OF AUGUST 25, 2016**  
**ELLISVILLE SUPERFUND SITE – CALLAHAN SUBSITE**  
**WILDWOOD, MISSOURI**

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- 1) ***Site soil/waste sampling and testing setup was incomplete and inadequate.***
  - a. No site-wide valid pre-removal and post-removal geophysical testing (terrain conductivity/deep metal) was completed to identify drum/metallic debris/waste/non-native material locations for sampling. Pre-removal geophysical testing occurred only in a limited area.
  - b. Composited sampling occurred at many locations, which is not suitable for future site development of residences on a lot division basis.
  - c. Only shallow sampling/testing was conducted; deeper soil (below 2 ft) sampling/testing was not conducted during pre-2012 removal activities.
  - d. Analytical testing – not completed fully for dioxin based area contaminants; incomplete for lead.
  
- 2) ***Post-2012 Removal Action confirmation sampling and testing was inadequate.***
  - a. No confirmation sampling and testing occurred at adequate depths.
  - b. Inappropriately used composite sampling along excavation walls, and then compared results to ‘average’ exposure conditions. This is not suitable for future exposure conditions as noted above.
  - c. No post-removal geophysical survey was completed to confirm all wastes/soil contamination was removed from the site.
  
- 3) ***Groundwater/surface water assessment was incomplete and inadequate.***
  - a. No reliable groundwater sampling or monitoring programs were completed as part of the site characterization to assess the severity, nature and extent of impacts.
  - b. No consideration was given for the potential for present and future vapor intrusion into nearby residences from shallow groundwater contamination. No assessment was completed of the potential for deeper groundwater contamination to move off-site.
  - c. Groundwater sampling activities have only included a few ‘grab’ samples in very shallow groundwater and surface water.
  - d. Only one groundwater monitoring well was installed on Site. It was placed directly in the waste area and not downslope in the direction of groundwater flow. The well was sampled only one time and only for a limited number of chemicals.
  - e. No downslope monitoring wells were installed at suitable depths to groundwater (shallow/deep) within the karst (bedrock) system.
  - f. No evaluation of bedrock karst development and the potential for preferential flow pathways through it was undertaken.

- 4) **Risk assessment evaluation was based on numerous assumptions which may or may not prove to be inaccurate.**
- a. Target cancer risk level was set too high ( $1 \times 10^{-4}$ ) to be adequately protective for future residents or others that may be onsite.
  - b. The default assumption for the exposure period was set at 30 years instead of 70 years in the Site Reassessment Report (Appendix G, Section 3.0, p. 5).
  - c. The analytical testing results reporting limits in many instances exceeded the U.S. EPA project Level of Concern (LOC). In addition, the LOC selected by the U.S. EPA does not satisfy either the  $1 \times 10^{-5}$  or  $1 \times 10^{-6}$  conservative residential target excess cancer risk level (by a factor of 10 to 100). This reduces the number of chemicals appearing to exceed risk-based cleanup levels.
  - d. "Average" composite field testing results were used and compared to target cancer risk levels, resulting in an acceptable "average".

## RECOMMENDATIONS

### 1) *Geophysical Surveys*

a. **Surface Electromagnetic/Terrain Conductivity Survey – Area of Entire Property**

The purpose of this is to confirm that, under post-2012 removal action conditions now present at the site, no other harmful waste/metallic debris/drum fill areas are present that have not yet been explored, or, where necessary, removed. This is necessary because of the uncertainty of previous geophysical surveys that were not completed in such a way as to disclose non-natural materials.

b. **Two-Dimensional Electrical Resistivity Imaging (2D-ERI) – Areas Downslope of Drum Disposal/Drum Storage**

The purpose of this is to accurately map the soil thickness/bedrock interface and to provide the locations of potential "karst development" groundwater features in the bedrock, such as fractures, solution-channels, and voids through which contaminated groundwater would likely pass on the way off-site and near possible residents. This would allow the selection of appropriate locations and depths of a downslope groundwater monitoring network to determine if leaching of chemicals exists. It is estimated that between five to seven 2D-ERI profile lines would be needed.

c. **Post-Removal Electromagnetic/Terrain Conductivity Survey**

The purpose of this is to provide definitive confirmation that all harmful waste/metallic debris/drum fill areas have been removed across the site. This will be completed in the areas of any future removal areas.

- 2) ***Additional Soil Borings for Sample Collection*** – Around 2012 Removal Action Excavation and into any Other "Anomalous Areas" identified by Recommendation (1)(a) above.

**a. 2012 Removal Action Excavation Perimeter**

The purpose of this is to sample outside the backfilled area in native soil both shallow and at depth near the bedrock surface to determine the actual residual concentrations without compositing the samples. Soil samples will be screened with a PID and XRF in the field. Borings will be drilled down to the soil-bedrock interface until refusal, and samples taken and tested for VOCs, SVOCs, heavy metals, dioxin and PCBs.

**b. Any “Anomalous Areas” Identified by Recommendation (1)(a) above**

The purpose of this is to sample those locations that are identified by the geophysical survey in Recommendation (1)(a) above that indicate non-native materials are present. Borings will be drilled down to the soil bedrock interface, soil samples screened with a PID and XRF, and samples taken and tested for VOCs, SVOCs, heavy metals, dioxin and PCBs. Any areas with potential health level impacts should be targeted for additional removal action.

**3) Downslope Monitoring Well Network (as indicated by Recommendation (1)(b) above)**

The purpose of this is to fully evaluate whether groundwater impacts are present in the areas downslope from the identified drum disposal/storage areas. These wells will be located at the locations and depths of identified groundwater flow pathway features from Recommendation (1)(b) above, either at the soil/bedrock interface or within the bedrock. It is expected that monitoring wells would be installed at approximately five to seven locations, and be monitored on a quarterly basis for a period of at least two years.