



March 26, 2010

Mr. Jeff Crowley  
On-Scene Coordinator  
U.S. Environmental Protection Agency  
61 Forsyth Street, SW 11<sup>th</sup> Floor  
Atlanta, Georgia 30303

**Subject: Removal Action Report, Revision 0  
Oak Haven Lead Removal  
775 Airport Road  
Salisbury, Rowan County, North Carolina  
EPA Contract No. EP-W-05-053  
Technical Direction Document (TDD) No. TNA-05-001-0099**

Dear Mr. Crowley:

Oneida Total Integrated Enterprises (OTIE) Superfund Technical Assessment and Response Team (START) is submitting one copy of the Removal Action report (RA) for the Oak Haven Lead Removal Site located in Salisbury, Rowan County, North Carolina.

Please contact me at (678) 355-5550 ext. 5708 if you any questions or comments regarding this report.

Sincerely,

Jerry Partap  
START Environmental Scientist

Enclosure

cc: Katrina Jones, EPA Project Officer  
Darryl Walker, EPA Project Officer  
Greg Kowalski, START Program Manager (w/o enclosure)  
START File

# **REMOVAL ACTION REPORT**

## **OAK HAVEN LEAD REMOVAL SALISBURY, ROWAN COUNTY, NORTH CAROLINA**

**Revision 0**

### **Prepared for:**

U.S. ENVIRONMENTAL PROTECTION AGENCY  
Region 4  
61 Forsyth Street  
Atlanta, Georgia 30303

### **Prepared by:**

Oneida Total Integrated Enterprises  
Superfund Technical Assessment and Response Team  
1220 Kennestone Circle, Suite 106  
Marietta, Georgia 30066

Contract No.	:	EP-W-05-053
TDD Number	:	TNA-05-001-0099
Date Submitted	:	March 26, 2010
EPA OSC	:	Jeff Crowley
Telephone No.	:	404-562-9587
Prepared by	:	Jerry Partap
Telephone No.	:	678-355-5550 ext. 5708

# CONTENTS

<b><u>Section</u></b>	<b><u>Page</u></b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>2.0 SITE BACKGROUND.....</b>	<b>2</b>
2.1 SITE DESCRIPTION.....	2
2.2 PREVIOUS INVESTIGATIONS .....	3
<b>3.0 REMOVAL ACTIVITIES.....</b>	<b>5</b>
3.1 PLANNING .....	5
3.2 SITE CLEARING AND SET-UP ACTIVITIES .....	5
3.3 EXCAVATION AND RESTORATION ACTIVITIES .....	6
<b>4.0 FIELD SAMPLING ACTIVITIES.....</b>	<b>7</b>
4.1 POTABLE WELL SAMPLING .....	8
4.2 CONFIRMATION SOIL SAMPLING .....	8
4.3 SURFACE WATER SAMPLING .....	9
4.4 RUNOFF WATER / EXCAVATION PIT WATER SAMPLING .....	9
4.5 ADDITIONAL SOIL ASSESSMENT INVESTIGATION .....	10
4.6 GLOBAL POSITIONING SYSTEM (GPS).....	10
4.7 QUALITY ASSURANCE/QUALITY CONTROL.....	11
<b>5.0 DISPOSAL SUMMARY.....</b>	<b>11</b>
<b>6.0 SUMMARY AND CONCLUSIONS.....</b>	<b>12</b>
<b>7.0 REFERENCES .....</b>	<b>14</b>

## **APPENDICES**

### **APPENDIX A – FIGURES**

Figure 1	Topographical Map
Figure 2	Aerial Map
Figure 3	Approximate Locations of Sample Depths
Figure 4	Confirmatory Soil Sample Locations
Figure 5	Hand Auger Soil Locations

### **APPENDIX B – TABLES**

Table 1	Summary of Samples
Table 2	Potable Well Sample
Table 3	Laboratory Analytical Results – Excavation Confirmation Soil Laboratory Samples
Table 4	Laboratory Analytical Results – Surface Water Samples
Table 5	Laboratory Analytical Results – Runoff/Excavation Pit Water Samples
Table 6	XRF and Laboratory Analytical Results – Additional Solil Assessment Samples

### **APPENDIX C – PHOTOGRAPHIC LOG**

### **APPENDIX D – FIELD LOGBOOK NOTES**

### **APPENDIX E – ANALYTICAL REPORTS**

### **APPENDIX F – MISCELLANEOUS SITE REPORTS**

Notification of an Inactive Hazardous Substance or Waste Disposal Site (13 pages)  
Soil Excavation and Disposal Report for the Oak Haven Lead Removal Site (25 pages)  
Oak Haven Mobile Home Park Frac-tank Water Disposal Approval (1 page)  
Arboriculturist Report (1page)  
Free Flow Material Safety, Data and Specification Sheet (6 pages)

### **APPENDIX G – SOIL DISPOSAL MANIFESTS**

## 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) tasked the Oneida Total Integrated Enterprises (OTIE) Superfund Technical Assessment and Response Team (START), under Contract Number (No.) EP-W-05-053, Technical Direction Document (TDD) No. TNA-05-001-0099, to provide technical support during the removal of lead contaminated soils at the Oak Haven Lead Removal Site (the site) located in Salisbury, Rowan County, North Carolina. The general purpose of a Time-Critical Removal Action (RA) is to remove or minimize any potential threats to human health or the environment.

Under this TDD, START was tasked to:

- Develop a site-specific Health and Safety Plan (HASP) and Quality Assurance Project Plan (QAPP)/Site Sampling Plan (SSP) (Ref. 1; 2);
- Conduct oversight of on-site removal activities performed by the Emergency Response and Removal Services (ERRS) contractor;
- Document removal activities with written logbook notes and digital photographs;
- Procure a non-Contract Laboratory Program (CLP) laboratory for sample analysis;
- Collect soil samples from excavated areas for confirmation of adequate removal of contaminants; and,
- Collect multi-media samples for laboratory analysis, as needed.

Additionally, START was tasked with preparing a comprehensive report summarizing the site conditions, field sampling activities, removal activities, screening results, and analytical results following the conclusion of the RA.

This Removal Action Report (RAR) describes the existing conditions at the site; the removal actions performed by the ERRS contractor (Environmental Restoration), the field investigation activities conducted by START, and the excavation confirmation field screening and analytical results. All sampling activities and field Quality Assurance/Quality Control (QA/QC) procedures described in this RAR were conducted in accordance with the EPA Science and Ecosystems Support Division (SES) Region 4 *Field Branches Quality System and Technical Procedures* (FBQSTP), and the site-specific QAPP, dated December 3, 2009 (Refs. 2; 3).

The following sections provide the details of this RAR:

- Section 2 – Describes the site and previous investigations.
- Section 3 – Describes the removal and site restoration activities.
- Section 4 – Describes the sampling activities and associated analytical results.
- Section 5 – Summarizes the disposal of excavated materials.
- Section 6 – Provides the summary and conclusion.
- Section 7 – Provides the references.

Figures and tables are provided as Appendices A and B, respectively. A photographic log is provided as Appendix C and a complete copy of the field logbook notes is presented as Appendix D. The laboratory analytical reports are provided as Appendix E. Miscellaneous site reports are included as Appendix F and the waste manifests are included as Appendix G.

## **2.0 SITE BACKGROUND**

This section discusses the site characteristics and previous investigations.

### **2.1 SITE DESCRIPTION**

The site is located in the Town of Salisbury, Rowan County, North Carolina. The geographic coordinates for the center of the excavation is 35° 38' 12.9474" North latitude and 80° 31' 46.9158" West longitude (see Appendix A, Figure 1). The site is currently the location of the Oak Haven Mobile Home Park. The property is owned by Lakeside Investment Property, Inc. The contacts for the property are Kevin and Patricia Davidson, P.O. Box 4344, Mooresville, North Carolina 28117. The mobile home park comprises approximately 31 acres, with the projected impacted area to be approximately 3 acres. There are a total of 63 mobile homes in the community. None of the homes in the community were affected by the excavation activities.

The site is bordered by Airport Road to the north, woods to the east and south, and industrial buildings to the west (see Appendix A, Figure 2). The surface water runoff from the site drains into a storm sewer that flows to the northeast and transects the middle of the community. The storm drain empties into an unnamed tributary of Grants Creek.

## **2.2 PREVIOUS INVESTIGATIONS**

In October 2008, the City of Salisbury and the property owner discovered battery casings and miscellaneous material during the installation of a sanitary sewer along the western edge of Tall Oaks Circle (Ref. 4).

The site was referred to the North Carolina Department of Environment and Natural Resources (NC DENR). NC DENR conducted an investigation of the property in October 2008 and determined that the storm sewer transecting the site was built using battery casings and that battery chips had been mixed with the fill material.

In April 2009, NC DENR tasked Solutions-IES to conduct an initial soil assessment using a Geoprobe<sup>®</sup> drill rig to advance 27 soil borings to depths of approximately 5 feet (ft) to 10 ft below ground surface (bgs). Subsurface soil samples were collected and the resulting analysis indicated some soils with concentrations above the site remediation goal (SRG) of 400 milligrams per kilogram (mg/kg) as established by the NC DENR, Superfund Section. Based on the results, it was determined that an area of approximately 1,100 square feet (ft<sup>2</sup>) required excavation (Ref. 5).

In June 2009, Solutions-IES contracted EVO Corporation to conduct excavation and disposal activities at the site. Solutions-IES personnel screened the excavated soils using a Niton<sup>®</sup> XL3 X-Ray Fluorescence instrument (XRF) to help guide the excavation. Approximately 324.86 tons of lead contaminated soil was excavated and disposed off site. Field observations and laboratory analytical data indicated that the excavation activities had not adequately removed all soils contaminated with battery chips and lead. Based on this information NC DENR decided to backfill the excavated areas and to restore the site pending further evaluation (Ref. 5).

In July 2009, Solutions-IES returned to the site to conduct an expanded subsurface soil investigation using a Geoprobe<sup>®</sup> drill rig. Thirty seven (37) soil borings were advanced at the property to depths of approximately 8 to 12 ft bgs. Based on the XRF screening and laboratory analytical results, Solutions-IES developed a plan for further remediation at the site. The remediation plan included excavation and stockpiling of 'clean' overburden soil followed by excavation and disposal of the deeper soils containing battery chips/casings and associated lead contamination (Ref. 5).

In September 2009, NC DENR commenced excavation activities based on the remediation plan proposed by Solutions-IES. Approximately 250 tons of 'clean' soils were segregated and stockpiled for backfilling purposes. The excavation was approximately 90 ft long and 8 to 12 ft bgs. The excavation concentrated between Storm Drain #2 and Storm Drain #3 and proceeded until there was no visual evidence of chips and casings. Approximately 419.04 tons of lead impacted soil was classified as hazardous and removed to Max Environmental Technologies Yukon facility in Pennsylvania for disposal. Confirmatory soil samples were collected from 15 locations. One soil sample collected along the storm sewer pipe and Storm Grate #2 exceeded the SRG of 400 mg/kg. Due to budgetary constraints, NC DENR was unable to adequately complete the removal activities. Therefore, NC DENR referred the site to the EPA Region 4 Emergency Response and Removal Branch (ERRB) for a RA based on the elevated levels of lead present from the battery casings/battery chips in the site soils (Ref. 5).

EPA On-Scene Coordinators (OSCs) conducted a site visit during the September 2009 excavation activities and noted a large number of battery chips in the bottom of the 10 foot deep excavation pit. The pit was lined with plastic and filled in with clean soil, leaving the battery casings at the bottom. EPA OSCs also noted whole battery casings stacked along the storm sewer pipe.

In September 2009, the EPA tasked START to perform XRF screening of surface and subsurface soils, and to collect soil samples for analysis in order to identify the nature and extent of lead contamination in the on-site soils. START utilized a Niton<sup>®</sup> XRF to screen the on-site soils ex situ for lead to a maximum depth of 24 inches bgs. Surface soil grab samples (0 to 6 inches bgs) and subsurface soil grab samples (6 to 24 inches bgs) were collected from locations specified by the EPA OSC and screened using the XRF. START collected a total of 236 surface soil samples, which included 68 samples from residences of the trailer park, 57 samples from the site perimeter, and 111 samples from general site areas within the trailer park; and 66 subsurface soil samples from various locations near the area that NC DENR excavated in early September 2009. XRF ex situ screening results indicated 18 subsurface locations with lead concentrations above the EPA Region 4 residential Removal Action Level (RAL) of 400 parts per million (ppm), with values ranging from 459 ppm to 16,628 ppm. Only one surface soil sample indicated a lead concentration exceeding the residential RAL. Based on the XRF screening results, 25 of the 66 subsurface soil samples screened were submitted to Accutest Laboratories (Accutest), Orlando, Florida for total lead analysis by SW846 Method 6010B. Results of the laboratory analyses indicated that 16 subsurface soil samples exceeded the residential RAL for lead, with values ranging from 673 milligrams per kilogram (mg/kg) to 23,200 mg/kg. Based on the results of the investigation, the EPA developed a removal action plan to address site conditions (Ref. 6).



### **3.0 REMOVAL ACTIVITIES**

RA activities were conducted from November 30, 2009 to February 26, 2010. START provided oversight and technical support to EPA during the RA. Specifically, START conducted the following activities:

- Performed oversight during the removal of lead-contaminated soils from the site;
- Performed soil screening of excavated areas using a XRF;
- Collected confirmatory soil samples, surface water samples, and potable water samples for laboratory analysis;
- Performed oversight during the backfill and restoration of the excavated areas at the site;

Planning activities are summarized in Section 3.1, site and set-up activities are summarized in Section 3.2, and soil excavation and restoration activities are summarized in Section 3.3.

#### **3.1 PLANNING**

On November 23, 2009, Representatives from the EPA, START, and the Emergency and Rapid Response Services (ERRS) contractor Environmental Restoration (ER), met at the site for a walk-through and planning visit. During the meeting, a site plan was devised which included:

- Define work zones
- Mark areas to be excavated
- Designate area for stockpile soils, backfill material and topsoil

#### **3.2 SITE CLEARING AND SET-UP ACTIVITIES**

Prior to commencement of excavation activities, ERRS secured the work area with safety barricades. An area northeast of the proposed excavation area was used to stockpile lead impacted soils for disposal. This area was lined with at least 5-mils plastic sheeting designed to prevent water runoff and secured with safety barricades and security tape. ERRS contacted the North Carolina One Call Center for locating underground utilities prior to the beginning excavation activities. An office trailer and sanitary facilities were brought on site for the duration of the project. A secured Conex trailer box was also brought on site to secure tools and equipment during the duration of the project. The office trailer, Conex box and sanitary facilities were located on the south side of the excavation.

### 3.3 EXCAVATION AND RESTORATION ACTIVITIES

Excavation activities began on December 2, 2009 and were completed January 12, 2010. The extent of the excavation was determined based on the findings from the September 2009 field investigation performed by START on behalf of EPA. A detailed description of the September 2009 assessment activities including analytical data, sample locations, and sampling methods is available in the *Removal Site Evaluation Report, Oak Haven Lead Investigation* dated November 2009 (Ref. 6).

The excavation focused on the areas north and south of the storm drain pipe, and directly beneath the storm drain. Figure 2 in Appendix A shows the location of the excavation area relative to the Oak Haven Mobile Home Park property.

An area measuring approximately 11,000 square feet was removed to depths ranging from 3 feet bgs to 12 feet bgs using an excavator. The depth and extent of the excavation was based on XRF screening of grab soil samples collected from the excavator bucket at one foot depth intervals. XRF screening results for these samples were recorded in the logbook notes. The soil texture observed during the excavation activities was dense red clay with trace amounts of silt. There were isolated areas of soil that were discolored due to buried trash piles. The soil at the base of the excavated areas was dense red clay with trace amounts of silt. Excavated soils were segregated and stockpiled on plastic sheeting based on the amount of battery casings visually observed and the XRF screening results. Figure 3 in Appendix A shows the approximate locations of sample depths.

Care was taken in removing soils around trees to prevent exposing the root system. However, the roots of a yellow poplar tree located southeast of the storm drain pipe and west of Tall Oaks was exposed during excavation operations. The EPA OSC requested that a local arborist make an assessment on the future condition of the tree. On December 11, 2009, START contacted Alexander Arboriculture, LLC. The arborist assessed the tree and determined that it should be removed to avoid any future hazard to the community (Ref. 7). A copy of the arborist report is included in Appendix F. C&C Tree Service, a local tree removal company, was contracted by ERRS to remove the yellow poplar tree. Tree removal photographs are included in Appendix C.

START collected confirmatory 5-point composite soil samples from the floor of the excavated area for laboratory analysis when XRF screening results indicated adequate removal. An approximate 15-by-15 foot grid was established over the excavated area. The confirmatory soil sampling locations are

illustrated on Figure 4 located in Appendix A. The soil samples were labeled OHLR##, where OHLR stands for Oak Haven Lead Removal and the ## identifies the stations, numbered sequentially. Confirmatory soil sampling is discussed in Section 4.2.

Following confirmation sampling and no further excavation was required, ERRS backfilled the excavated area with approximately 2,161 tons of native clay soil from a local borrow source. During backfilling operations the soil was compacted, graded, and leveled to allow proper surficial water runoff. Following the completion of backfill operations, an environmental matting layer was placed over the excavation area for stabilization purposes followed by a layer of topsoil (432 tons) to provide a base for hydro-seeding operations. Backfill and topsoil materials were sampled and analyzed by ERRS prior to use. Analyses of the soils indicated all results below the residential RAL for all analytes. Backfill and topsoil laboratory results are presented in Appendix E.

Of special note, on December 9, 2009, heavy rains and spring water collected in the excavation area. At EPA's request, START sampled the water contained within the excavation area to determine appropriate methods for removal. Based on the laboratory results, EPA tasked ERRS to contain the water in a frac-tank for future disposal. Approximately 20,000 gallons of water was pumped out of the excavation area and into the frac-tank. The 21,000 gallon tank was placed on site and secured to prevent tampering. The water from the frac-tank was later sampled for disposal purposes. Runoff water sampling is discussed in Section 4.4.

In addition, Storm Grate #3 collapsed during the removal of the battery casings discovered stacked around it. As a result, ERRS replaced the entire storm grate and components to allow for proper drainage. Photographs located in Appendix C show the battery casings stacked around Storm Grate #3 and the replacement storm grate and components.

In February 2010, ERRS decontaminated all equipment and demobilized the office trailer and all personnel from the site.

#### **4.0 FIELD SAMPLING ACTIVITIES**

During this RA, START collected soil and water samples for screening and laboratory analysis. The following sections describe sample collection activities conducted by START in support of the RA. Soil, potable water, and surface water samples were submitted to Accutest for laboratory analysis; the complete

analytical data packages are presented in Appendix E. Table 1 provided in Appendix B presents a summary of the samples collected with corresponding location information.

#### **4.1 POTABLE WELL SAMPLING**

On December 3, 2009, a potable water sample (Oak Haven Private Well) was collected from the active community well supplying water to the Oak Haven Mobile Home Park. The well is located upgradient from the excavation area and was sampled to determine a background level. The potable water sample was analyzed for total lead in accordance with SW846 Method 6010B. The laboratory results for the potable well sample indicated total lead concentrations of 0.002 milligrams per liter (mg/L), below the Federal Drinking Water Standard Maximum Concentration Level (MCL) of 0.015 mg/L. Table 2 presented in Appendix B provides a summary of the potable water sampling results.

#### **4.2 CONFIRMATION SOIL SAMPLING**

Confirmation soil sampling was conducted to determine the adequate removal of lead contaminated soils within the excavation area of the site. Confirmation soil samples consisted of a minimum of 5 aliquots collected from the base of the excavation within each designated 15 foot by 15 foot grid. A total of 98 confirmation soil samples were collected from the excavated areas (the areas north and south of the storm drain pipe and beneath the storm drain) and submitted to Accutest for total lead analysis in accordance with SW846 Method 6010B. For the purposes of evaluating sample results, lead results were compared to the RAL for residential soil (400 mg/kg).

Analytical results indicated that total lead concentrations were below the residential RAL of 400 mg/kg in all confirmation soil samples except OHLR-15, OHLR-17, OHLR-46 (near the tree line at 3.0 ft bgs), OHLR-36 (sidewall sample at 9.0 ft bgs), OHLR-43 (near storm drain pipe at 9.0 ft bgs), OHLR-61 (next to the storm drain pipe at 7.0 ft bgs) and OHLR-72 (next to the storm drain pipe at 6.0 ft bgs)] (see Appendix A, Figure 4). Laboratory analysis of these soil samples indicated concentrations above the RALs. Based on depth below ground surface and restoration activities, EPA determined that the locations were unlikely to pose a threat to human health and the environment and no further excavation was conducted. The laboratory analytical results for confirmation samples are summarized in Table 3 located in Appendix B.

### **4.3 SURFACE WATER SAMPLING**

On December 3, 2009, prior to the start of excavation activities, two surface water samples were collected from the location of Storm Grate #2 (Storm Drain #2) and the outfall of the storm sewer (Outfall to Creek) that transects the property and empties into an unnamed tributary of Grants Creek. The surface water samples were submitted to Accutest for total lead analysis in accordance with SW846 Method 6010B. Laboratory results for Storm Grate #2 indicated total lead concentrations of 0.0048 mg/L and the outfall to the unnamed tributary contained 0.0111 mg/L of lead. Laboratory analysis confirmed that total lead concentrations were below the North Carolina Water Quality Standard (NCWQS) of 0.025 mg/L for lead in Class C waters for both sampling locations.

On December 4, 2009, a second surface water sample (Outfall to Creek) was collected from the storm sewer outfall, during excavation activities, to determine whether lead impacted surface water was being discharged to the unnamed tributary. The sample was submitted to Accutest for total lead analysis in accordance with SW846 Method 6010B. Outfall to Creek sample had total lead concentrations of 0.0142 mg/L, below the NCWQS of 0.025 mg/L.

The laboratory analytical results for surface water samples are summarized in Table 4 located in Appendix B.

### **4.4 RUNOFF WATER / EXCAVATION PIT WATER SAMPLING**

On December 10, 2009, START sampled the spring and rain water that had collected in the excavation area after a heavy rainfall. Sample Excavation Base #1 was submitted to the Statesville Analytical laboratory located in Statesville, North Carolina for total lead analysis in accordance with SW846 Method 6010B. Laboratory analytical results indicated a total lead concentration of 2,387 mg/L for sample Excavation Base #1. Based on the laboratory results, the water was contained in a frac-tank for future disposal.

On January 12, 2010, a sample (Frac-Tank) of the entire water column within the frac-tank was collected and submitted to Accutest for total lead analysis in accordance with SW846 Method 6010B. Laboratory analytical results for the sample indicated total lead concentrations of 0.0088 mg/L, below the NCWQS of 0.025 mg/L.

The laboratory analytical results for the runoff water / excavation pit water samples collected are summarized in Table 5 located in Appendix B.

#### **4.5 ADDITIONAL SOIL ASSESSMENT INVESTIGATION**

On December 16-17, 2009 and January 13, 2010, EPA tasked START to collect additional subsurface soil samples for XRF screening and laboratory analysis. START used stainless steel, hand augers and stainless steel spoons to collect 31 grab subsurface soil samples from 6 to 30 inches bgs in designated areas. Soil samples were collected along the gravel entrance to the pump house of the community well, an area along the western property boundary, and the open area south of the excavation area (see Appendix A, Figure 5). The soil samples were labeled OHHA##, where OHHA stands for Oak Haven Hand Auger and the station numbering was continued from the hand auger locations recorded during the September 2009 Removal Site Investigation.

Soil samples were placed into zip top bags, homogenized, and screened for lead concentrations using the XRF. At the discretion of the EPA, 13 of the 31 screened samples were submitted to Accutest for total lead analysis to correlate XRF results. The samples were containerized, placed on ice, packaged for shipment in accordance with FBSQTP Packing, Marking, Labeling, and Shipping of Environmental and Waste Samples (SESDPROC-209-R1).

Total lead was detected in sub-surface soils at concentrations ranging from 5.2 to 435 mg/kg. Soil sample OHHA-90, collected from 0 to 6 inches bgs, contained lead concentrations above the residential RAL. This sample bordered the excavation to the southeast near the tree line. Based on the laboratory analysis, soils from this area were excavated for disposal. Approximately two cubic yards of soil was removed from the area. After excavation, the area was re-screened using the XRF and the screening results indicated readings below the RAL.

XRF screening and laboratory analytical results for each additional soil assessment samples collected are summarized in Table 6 located in Appendix B.

#### **4.6 GLOBAL POSITIONING SYSTEM (GPS)**

Geographic positioning information was collected using a Trimble™ GeoXT™ Global Positioning System (GPS) from all sampling locations. All locations were geographically referenced using ArcView

after the files were uploaded from the hand-held Trimble™ unit. GPS coordinates were collected from the exact sampling location with the following exceptions. The coordinates for composite soil sample locations were collected from the center of the grid. Additionally, if a station was in an area where a GPS signal could not be received, sampling stations were collected from the nearest point where a signal was received and noted in the field logbook.

#### **4.7 QUALITY ASSURANCE/QUALITY CONTROL**

Field duplicates were collected and analyzed for total lead to measure the cumulative uncertainty (i.e., precision) of the sample collection, splitting, handling, storage, preparation and analysis operations, as well as natural sample heterogeneity that is not eliminated through simple mixing in the field. Field duplicates are two samples prepared by mixing a volume of sample and splitting it into two separate sample containers that are labeled as individual field samples. Field duplicate samples were submitted at a rate of one duplicate per 10 samples per matrix per analysis. All samples were collected, containerized, preserved, handled and documented in accordance with the EPA FBQSTP. A total of 111 soil samples and 12 duplicate samples were collected and analyzed by Accutest Laboratories for total lead analysis by SW846 Method 6010B. The duplicate samples were identified with a sequential sample number and identified in the logbook notes so that there was no indication to the laboratory that the sample was a duplicate (see Appendix D). The complete laboratory data package containing the analytical results for the field duplicate samples is provided as Appendix E.

#### **5.0 DISPOSAL SUMMARY**

According to the certified weight certificates, 2,758 tons of soil were excavated and stockpiled for disposal. Copies of the waste manifests and weight certificates are presented as Appendix G. Three representative soil samples were collected by ERRS from the stockpiled soils at the site and submitted to a laboratory for Toxicity Characteristic Leaching Procedure (TCLP) metals, volatile organic compounds, semi-volatile compounds, Total Petroleum Hydrocarbon (TPH) as Gasoline Range Organics (GRO), and TPH as Diesel Range Organics (DRO) analyses. Laboratory analytical results indicated concentrations of TCLP lead above the Resource Conservation Regulatory Act (RCRA) limit for hazardous waste in one sample (Casing Pile 2<sup>nd</sup> Sample). Subsequently, 870 tons of stockpiled material was treated with 23 tons of Free Flow 200®, a chemical used to stabilize lead in soil and sludge (Ref. 8), prior to disposal. Product information for Free Flow is included in Appendix F. The soil was re-sampled prior to disposal. The laboratory analytical reports of these samples are included in Appendix E. The soils were loaded on

trucks and transported to the CMS Landfill in Concord, North Carolina for disposal as non hazardous waste.

On January 28, 2010, at the request of the EPA, START submitted a request to the NC DENR for permission to discharge the contents of the frac-tank to the intermittent stream to Grants Creek. Laboratory analysis indicated the concentration of total lead in the water sample was below the NCWQS for lead in Class C waters. On January 29, 2010, START received electronic mail (e-mail) notice from the NC DENR Division of Water Quality – Surface Water Protection Group approving the discharge of the water fraction (Ref. 9). Approximately 19,000 gallons of water were released under diffuse flow to the stream. The remaining sludge (less than 1 cubic yard) within the frac-tank was disposed with the remaining impacted soil from the RA.

## **6.0 SUMMARY AND CONCLUSIONS**

An EPA-funded RA was conducted at the site from November 30, 2009 to February 26, 2010. During the RA, START conducted oversight and documentation of all site activities with written logbook notes and digital photographs; collection of confirmation soil samples to ensure adequate removal of lead contaminated soils, soil screening using a XRF to delineate vertical and horizontal extent of excavation; surface water sampling to assess when excavation activities were impacting the surface water pathway from the site, and provided technical support to the EPA, as needed.

Soil excavation activities began on December 2, 2009 and were completed January 12, 2010. A total of 2,758 tons of soil were excavated from an area approximately 11,000 square feet in size. Excavation depths ranged from 3 ft bgs to 12 ft bgs. START collected 98 composite soil samples from the excavated areas (the areas north and south of the storm drain pipe and the area beneath the storm drain) for confirmation purposes. Contaminated soils exceeding RALs remained present onsite after the excavation; however, based on the depth bgs, EPA deemed that the locations are unlikely to pose a threat to human health and the environment.

On December 16 through 17, 2009 and January 13, 2010, at the request from EPA, START conducted additional subsurface soil investigation activities. Specifically, START collected subsurface soil samples (6 to 30 inches bgs) from along the gravel entrance to the pump house of the community well, an area along the western property boundary, and the open area south of the excavation area. Samples were screened using the XRF and a subset was submitted to a laboratory for total lead analysis. Based on the



analytical results, approximately two cubic yards of impacted soil was removed prior to backfilling the area.

During the site activities, water samples were collected from the community well, Storm Grate #2 (prior to and during excavation activities), the outfall of the storm sewer that transects the community, runoff water that had collected in the excavation pit during heavy rains, and the water in the frac-tank used to contain the rain water. Samples were submitted to a laboratory for analysis. Analytical results did not indicate any exceedances of applicable regulatory levels.

Laboratory analysis confirmed the removal of source material from the assessed areas as documented in the November 2009 *Removal Site Evaluation* report. At the direction of EPA, any areas where concentrations of total lead were still detected above the RAL will not require any additional excavation due to the low probability of exposure to human health. The EPA will determine if further actions at the site are necessary.

## 7.0 REFERENCES

1. Oneida Total Integrated Enterprises (OTIE). Health and Safety Plan for the Oak Haven Lead Removal Site. November 2009.
2. OTIE. Quality Assurance Project Plan and Sampling and Analysis Plan (QAPP/SAP) for the Oak Haven Lead Removal Site. December 2009.
3. EPA Region 4 Science and Ecosystem Support Division (SESD). *Field Branches Quality System and Technical Procedures*. Accessed online at: <http://www.epa.gov/Region4/sesd/fbqstp>. December 2009.
4. North Carolina Department of Environment and Natural Resources (NC DENR). Notification of an Inactive Hazardous Substance or Waste Disposal Site. October 2008.
5. Solutions-IES, Inc. (Solutions-IES). Soil Excavation and Disposal Report for the Oak Haven Lead Removal Site. October 2009.
6. Oneida Total Integrated Enterprises. Removal Site Evaluation Report for the Oak Haven Lead Removal Site. November 2009.
7. Alexander Arboriculture, LLC. Arboriculturist Report. December 2009.
8. Free Flow Technologies, Inc. Free Flow Material Safety Data and Specification Sheet. January 2010.
9. NC DENR. Oakhaven Mobile Home Park Frac-tank Water. January 2010.

**APPENDIX A**  
**FIGURES**

**APPENDIX B**  
**TABLES**

**APPENDIX C**  
**PHOTOGRAPHIC LOG**

**APPENDIX D**  
**FIELD LOGBOOK NOTES**

**APPENDIX E**  
**LABORATORY ANALYTICAL REPORTS**

## **APPENDIX F**

### **MISCELLANEOUS SITE REPORTS**

(Notification of an Inactive Hazardous Substance or Waste Disposal Site)  
(Soil Excavation and Disposal Report for the Oak Haven Lead Removal Site)  
(Oak Haven Mobile Home Park Frac-tank Water Disposal Approval)  
(Arboriculturist Report)  
(Free Flow Material Safety, Data and Specification Sheet)



**APPENDIX G**  
**WASTE MANIFESTS**