

G-7

01-02861-05

03017584

**DRAFT FINAL  
REMEDIAL ACTION REPORT  
FINAL INTERIM REMOVAL ACTION AT  
LAGARDE PARK,  
ANNISTON, ALABAMA**

*August 2005*

Submitted to:  
U.S. Army Corps of Engineers  
Mobile District  
109 St. Joseph Street, P.O. Box 2288  
Mobile, AL 36628-0001

Prepared by:  
STEP, Inc.  
1006 Floyd Culler  
Oak Ridge, TN 37830  
Contract No. DACA01-01-D-0007  
Delivery Order No. 0009

137017





August 24, 2005

District Engineer  
US Army Engineer District, Mobile  
Attention: Jeffery Devine  
Post Office Box 2288  
Mobile, Alabama 36628-0001

**Subject:** Contract No. DACA01-01-D-0007, DO No. 0009  
*Draft Final Remedial Action Report, Final Interim Removal Action  
at LaGarde Park, Anniston, Alabama*

Dear Mr. Devine:

Please find enclosed one copy of the *Draft Final Remedial Action Report, Final Interim Removal Action at LaGarde Park, Anniston, Alabama* for your review and comment. All reviewers are requested to provide comments or approval on or before Friday, September 23, 2005.

If you have any question, please call me at 865-481-7837, extension 279.

Sincerely,  
STEP, Inc.

Roy Hoekstra, PE  
Project Manager

Enclosure

cc: J. Clement (USACE, Omaha) 1 copy  
T. Williams (ADPH) 1 copy  
R. Button (USEPA) 1 copy  
O. Bailey (FM-NLD)  
Project Files

**Draft Final  
Remedial Action Report  
Final Interim Removal Action at LaGarde Park,  
Anniston, Alabama**

**August 2005**

**Submitted to:  
U.S. Army Corps of Engineers  
Mobile District  
109 St. Joseph Street, P.O. Box 2288  
Mobile, AL 36628-0001**

**Prepared by:  
STEP, Inc.  
1006 Floyd Culler Court  
Oak Ridge, TN 37830  
under  
Contract No. DACA01-01-D-0007  
Delivery Order No. 0009**

## Table of Contents

	<u>Page</u>
List of Acronyms .....	iii
<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
<b>2. BACKGROUND .....</b>	<b>1</b>
<b>3. INITIAL SITE INVESTIGATION .....</b>	<b>5</b>
<b>4. TIME CRITICAL REMOVAL ACTION .....</b>	<b>6</b>
<b>5. EXPANDED SITE INVESTIGATION/REMEDIAL INVESTIGATION.....</b>	<b>6</b>
5.1 SURFICIAL RADIATION SURVEY .....	8
5.2 SOIL SAMPLING .....	8
5.3 DERIVED CONCENTRATION GUIDELINES LEVELS .....	8
5.4 DOWNHOLE RADIATION SURVEY .....	9
5.5 EXPANDED SITE INVESTIGATION/REMEDIAL INVESTIGATION CONCLUSIONS AND RECOMMENDATIONS..	10
<b>6. FINAL INTERIM REMOVAL ACTION.....</b>	<b>11</b>
6.1 RADIOLOGICAL INSTRUMENTATION .....	11
6.2 EXCAVATION.....	13
6.3 RADIATION SCANNING .....	14
6.4 CONFIRMATORY SOIL SAMPLING .....	17
6.5 SHIPPING WASTE MATERIAL AND SOILS .....	20
6.6 SITE RESTORATION.....	20
6.7 CONCLUSIONS AND RECOMMENDATIONS .....	20
<b>7. REFERENCES.....</b>	<b>21</b>

### List of Figures

Figure 1 LaGarde Park Location Map .....	2
Figure 2 Previously Investigated Areas at LaGarde Park .....	4
Figure 3 Areas Previously Excavated and Confirmatory Samples Exceeding Screening Values.....	7
Figure 4 Proposed Areas for Additional Removal Action .....	12
Figure 5 Areas Excavated and Previous Sampling Locations Exceeding Screening Values.....	15
Figure 6 Scanning Configurations for Radiation Detector .....	16
Figure 7 Confirmatory Sampling Locations and Detected Concentrations of Radionuclides.....	19

### List of Tables

Table 1 Radionuclide Analytical Results.....	18
--	----

### Appendices

Appendix A	Copy of Field Logbook
Appendix B	Photographs of Removal Action
Appendix C	Instrument Calibration Forms
Appendix D	Data Validation Report and Laboratory Forms
Appendix E	Bill of Lading and Waste Manifests

## List of Acronyms

bgs	below ground surface
BRAC	Base Realignment and Closure Commission
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
Co <sup>60</sup>	cobalt-60
cpm	count per minute
CRDL	contract required detection limit
CRQL	contract required quantitation limit
Cs <sup>137</sup>	cesium-137
DCGL	derived cleanup guideline level
DUP	duplicate sample
ESI	expanded site investigation
FUDS	Formerly Utilized Defense Site
G-M	Geiger-Mueller
IMPACT	Impact Services, Inc.
keV	kiloelectron volts
LLRW	low-level radioactive waste
MDC	minimum detectable concentration
mrem	milliroentgen equivalent man
NRC	Nuclear Regulatory Commission
pCi/g	picocuries per gram
RCT	radiological control technician
RI	remedial investigation
RSSSL	residential surface soil screening level
STEP	Solutions To Environmental Problems, Inc.
TCRA	Time Critical Removal Action
U	result validated as not detected
USACE	U.S. Army Corps of Engineers
UXO	unexploded ordnance

## **EXECUTIVE SUMMARY**

Solutions To Environmental Problems, Inc. (STEP) was contracted by the U.S. Army Corps of Engineers, Mobile District, to perform a removal action at LaGarde Park in Anniston, Alabama. The removal action included the excavation and off-site disposal of low-level radioactive waste (LLRW), confirmation/closure sampling, transportation and disposal of radioactive wastes, and restoration of the site. This report describes the activities conducted during the removal action, the results of the laboratory analyses of samples collected from the excavations, and recommendations for future activities at the site.

### **Initial Site Investigation**

In February 2003, STEP performed a site investigation (characterization survey) that included a surficial site radiation survey, surface and subsurface soil sampling, and vegetation sampling of areas identified with radiological contamination. Based on the results of the site investigation, STEP proposed a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Time Critical Removal Action (TCRA) to excavate and dispose of the soil and debris at the site contaminated with cesium-137 ( $\text{Cs}^{137}$ ) and cobalt-60 ( $\text{Co}^{60}$ ). For the removal action, contaminated areas exceeding the Nuclear Regulatory Commission residential surface soil screening levels and areas three times the background radiation count of 6,040 counts per minute (cpm) were planned for removal.

### **Time Critical Removal Action**

In September 2003, STEP mobilized to the site to conduct the CERCLA TCRA to excavate and dispose of the contaminated soil and debris located at the site. Based on the site investigation, the estimated volume of contaminated soil to be removed was approximately 30 cubic yards. As the removal action progressed, some of the areas had higher radiation levels below the ground than at the surface. Excavation continued until the available project funding for removal and disposal was expended. During this removal action, a total of 170 cubic yards of contaminated soil was removed and shipped off site for disposal. The presence of radioactive contamination beneath the ground surface and the unexpected lateral extent of contamination indicated that the conceptual model of discrete surface radiation sources was inaccurate. Therefore, based on the unexpected volume of contaminated material, the presence of radioactive contamination at depth, and the possibility that this site corresponded to the former "Rattlesnake Gulch" laboratory site, a CERCLA Expanded Site Investigation (ESI)/Remedial Investigation (RI) was recommended to fully define the lateral and vertical extent of the contamination.

The site conceptual model was revised to indicate that the residual radioactive material was left when the former "Rattlesnake Gulch" laboratory building was removed prior to 1971.

### **Expanded Site Investigation/Remedial Investigation**

STEP personnel mobilized to the site on July 12, 2004, to conduct the CERCLA ESI/RI. The results of the ESI/RI were used to determine whether an additional interim removal action was necessary to move the site to "no-further-action" status required for closure of the site. The ESI/RI activities included conducting a surficial site radiation survey, establishing a regular grid array over the site, sampling surface and subsurface soil, and performing downhole (subsurface) radiation screening.

The surficial radiological survey identified an area roughly 65 feet by 95 feet in the western end of the fenced area that exceeded 9,900 cpm. Based on an examination of historical aerial photographs, this area corresponded to the location of the former "Rattlesnake Gulch" laboratory.

The material from the Rattlesnake Gulch laboratory was reportedly transported to the burial mound at Rideout Field, Pelham Range, Area 24C at Fort McClellan for disposal. Derived Cleanup Guideline Levels (DCGLs) were developed during the remediation and decommissioning process for the Pelham Range Burial Mound [*Burial Mound Decommissioning Plan, Appendix 6 – Development of Derived Cleanup Guidelines for the Pelham Range "Burial Mound"*, Allied Technology Group, (September 1999)]. The DCGL process evaluated receptor exposures for different land-use scenarios. The land use scenario that was judged to produce the greatest exposure potential was the residential scenario with backyard garden and cow. This scenario was used to evaluate the exposures from unrestricted release at the site. The soil concentrations that would not exceed the 25 millirem per year allowable exposure limit for Co<sup>60</sup> and Cs<sup>137</sup> were found to be:

- 2.3 picoCuries per gram (pCi/g) for Co<sup>60</sup> (Resulting Risk  $6 \times 10^{-5}$ ) and
- 9.2 pCi/g for Cs<sup>137</sup> (Resulting Risk  $9 \times 10^{-5}$ ).

Because the contaminants were identical and the same exposure scenario applied to both sites, the DCGLs developed for the Pelham Range Burial Mound, were selected for the purposes of evaluating the soil concentrations at the LaGarde Park site. The analytical results for the soil samples collected at the LaGarde Park site were compared to the DCGLs of 9.2 pCi/g for Cs<sup>137</sup> and 2.3 pCi/g for Co<sup>60</sup>.

A regular grid array (grid nodes spaced at 25-foot intervals) was established at the site. Surface and subsurface soil samples were collected at selected grid nodes to determine the extent of surface and subsurface radiological contamination. Continuous soil cores were collected at each sampling location and scanned using a gamma scintillater probe. Soil samples for laboratory analyses were collected at the surface in each boring and a biased soil sample was collected at the corresponding depth in each boring where the highest gamma measurement was recorded in the downhole radiation scan. If the gamma measurements along the boring were uniform, then a soil sample was collected at the bottom of the hole. Laboratory analyses consisted of isotopic analyses for Cs<sup>137</sup> and Co<sup>60</sup>. None of the soil samples collected during the ESI/RI had concentrations exceeding the corresponding DCGLs for Cs<sup>137</sup> or Co<sup>60</sup>.

A downhole radiation scan was performed in each of the borings. A gamma spectrum was collected at the depth exhibiting the highest gross gamma count to provide a real time determination of the nature of any elevated measurements observed in the borehole. No discernible activity indicating the presence of Cs<sup>137</sup> could be identified in these spectra or in the raw data curves provided by the analytical laboratory. A comparison of the raw data curves to the incremental gamma log of the boreholes indicated that the elevated gamma readings tended to occur when radium-226 and/or radium-228 were above 1 pCi/g. Therefore, the elevated gamma measurements encountered downhole were attributable to naturally occurring radium isotopes.

Based on the results of the surface radiation scan and surface soil analytical data collected during the ESI/RI, the CERCLA TCRA had reduced the overall surface concentrations of Co<sup>60</sup> and Cs<sup>137</sup> below the corresponding DCGLs. No further action was proposed for the surface soils at the site.

Based on the results of the confirmatory samples collected during the CERCLA TCRA and the subsurface soil samples and downhole radiation scans conducted during the ESI/RI, only two areas of subsurface contamination remained. The ESI/RI proposed an additional interim removal action to address these two areas. The first area corresponded to the location of confirmatory soil sample LPRA18 (40.3 pCi/g Cs<sup>137</sup>) from the initial removal action and measured roughly 10 feet by 10 feet to a maximum depth of 6 feet below ground surface (bgs). The second area corresponded to the location of confirmatory soil sample LPRA16 (113 pCi/g Cs<sup>137</sup>) from the initial removal action and measured roughly 10 feet by 10 feet to a maximum depth of 12 to 15 feet bgs.



## **Final Interim Removal Action**

STEP personnel mobilized to the site on March 28, 2005, to conduct the recommended final interim removal action. A radiological control technician (RCT) from Auxier & Associates, Inc. of Knoxville, Tennessee, was on site during all activities.

### Excavation

An unexploded ordnance (UXO) technician from EOD Technologies, Inc. of Lenoir City, Tennessee, scanned the work areas with a magnetometer prior to any intrusive activities. No magnetic anomalies were identified that indicated the presence of UXO. The UXO technician remained on site throughout the field activities.

The first area excavated corresponded to the location of confirmatory soil sample LPRA18 from the CERCLA TCRA. As the area was excavated, each bucket of dirt removed was laid out in a thin layer adjacent to the excavation and scanned by the RCT using a portable survey instrument. The RCT slowly moved the gamma-ray scintillation probe over the excavated dirt as near as practical to the ground surface. When soil in the scanned area was at or above background count of 7,000 cpm, the suspected soil was removed by the excavator, placed in the bucket of a skid steer loader and deposited in a metal LLRW container (B-25 box) for off-site disposal. The area of the soil pile was then re-scanned for contamination. This process was repeated until excavation was completed. The final dimensions of the excavation for the first area were 18 feet (east to west) by 16 feet (north to south) by 7 feet deep. Radiation screening identified two skid steer buckets of contaminated soil that were removed from the excavated soil and placed in an LLRW container for off-site disposal.

The second excavation area corresponded to the location of confirmatory soil sample LPRA16 from the TCRA. During initial excavation, radiation screening was conducted using the scanning method described above for Area 1. Plastic sheeting (left in place to mark the excavation bottom from the previous removal action) was encountered at 8 feet bgs. As potentially contaminated soil and the surrounding backfill were removed, a radiation scan was conducted on the removed material while it was still in the excavator bucket. If no contamination was observed, the excavated material was spread and scanned as described above for Area 1. If elevated counts (i.e., equal to or greater than the background of 7,000 cpm) were observed in the bucket, the material was placed directly into the LLRW container. The first bucket of the material beneath the plastic had radiation counts as high as 60,000 cpm (approximately

8.5 times the background count of 7,000 cpm) and was deposited directly into the LLRW container.

Successive buckets were scanned as they were removed from the excavation, and buckets of soil that had elevated gamma counts (i.e., equal to or greater than the background count of 7,000 cpm) were deposited directly into the LLRW container. Excavation continued until all previously disturbed material had been removed and undisturbed material was encountered in the base of the excavation and on the north, east, and west sidewalls. The south wall of the excavation showed disturbed material to a depth of 8 to 10 feet bgs indicating the actual total depth of the excavation from the CERCLA TCRA. The final dimensions of the second excavation were 13 feet (east to west) by 10 feet (north to south) by 10 feet deep. Radiation screening identified approximately 4 cubic yards of contaminated soil and material that was placed in the LLRW containers for off site disposal.

### Radiation Scanning

When excavation was complete in each area, a radiological scan of the base and sidewalls of the excavation was conducted. To eliminate interference from background radiation and to focus the "viewing" area of the radiological scanning instrument, the RCT placed the instrument in a lead shield with a directional opening (orifice). The shielding reduced background radiation levels and allowed the scan to pinpoint the locations of measurements. The lead shielded instrument was placed in a sheet metal casing mounted with a hanging bracket on a swivel assembly. This allowed the viewing orifice to be directed downward (for scanning the base of the excavation) or to the side (for scanning the sidewalls of the excavation). The survey instrument was attached to the bucket of the excavator using a nylon rope.

To scan the base of the excavation, the instrument was placed in the "base scanning" configuration and lowered into the excavation to within 6 inches of the foundation floor. The instrument was then moved across the floor of the excavation so that the entire floor of the excavation was scanned by the instrument. If an area showed elevated gamma counts (i.e., at or above background), additional soil was removed, and the area was re-scanned until the entire floor of each excavation was below background.

To scan the sidewalls of the excavation, the instrument was rotated 90 degrees in the vertical plane to the "sidewall" configuration and secured in place by a nylon rope and duct tape. The excavator then moved the scanning instrument from top to bottom of the sidewalls until all of the vertical walls of the excavation had been scanned. If the sidewall scan showed readings at or above background counts on the excavation walls, additional soil was removed, and the area was re-scanned until all of the sidewalls of the excavation were below background.

Once the excavations were completed, all equipment and personnel were frisked by the RCT to check for radiological contamination before exiting the site. No contamination was found on any personnel or equipment.

#### Confirmatory Soil Sampling

Once the radiation scan indicated that all contaminated material had been removed, confirmatory soil samples were collected from each excavation. One sample was collected from the base of the excavation at each of the four corners, and one sample was collected from the center of the excavation. The soil for the samples was scanned in the excavator bucket by the field screening instrument, collected in the sample container, and placed in a plastic cooler for shipment to the analytical laboratory.

The RCT also screened the samples on site for radiological activity. Each sample was counted for a minimum of 30 minutes. The samples were scanned for the presence of cesium and/or cobalt with a multi-channel analyzer. None of the samples showed activity that exceeded background radiation levels.

A total of 11 soil samples were submitted for analyses. Five samples (LPSS01, LPSS02, LPSS03, LPSS04, and LPSS05) were collected from the first excavation and five samples and a duplicate (LPSS06, LPSS06DUP, LPSS07, LPSS08, LPSS09, and LPSS10) were collected from the second excavation. All of the samples were sent to General Engineering Laboratory, LLC of Charleston, South Carolina, and analyzed for cesium and cobalt. The resulting analytical data were then subjected to third party data validation.

The DCGLs for Cs<sup>137</sup> (9.2 pCi/g) and Co<sup>60</sup> (2.3 pCi/g) are based on radionuclide concentration of surface soils. These cleanup goals are highly conservative and protective of human health and the environment. The highest concentration for both Cs<sup>137</sup> (5.93 pCi/g) and Co<sup>60</sup> (0.228 pCi/g) detected in the soil samples were in soil sample LPSS07 collected at the base of the southeast corner of the second excavation. Therefore, the highest concentration of Cs<sup>137</sup> and Co<sup>60</sup> remaining at the site do not exceed the conservative DCGLs for surface soils and are well below ground surface.

## **Shipping Waste Material and Soils**

As a result of field radiation screening, approximately 4 cubic yards (approximately 8 tons) of soil, and plastic sheeting were removed from the site and placed in two LLRW containers for off-site disposal. Prior to shipping the LLRW containers, the RCT performed a complete radiation survey of the LLRW containers that included dose rate measurements using a "MicroR" meter and removable contamination "smear" surveys. No radiological activity above background levels was observed in the survey of the LLRW containers. The LLRW containers were shipped via F.L.L. Trucking to Impact Services, Inc. (IMPACT) in Oak Ridge, Tennessee. At IMPACT, the LLRW containers were emptied and the material was rescanned for radioactivity. A total of 3.8 cubic yards (6,575 pounds) of soil was classified as non-hazardous LLRW material and shipped to Middle Point Sanitary Landfill in Murfreesboro, Tennessee, for disposal. A total of 0.2 cubic yards of material was classified as LLRW and shipped to Envirocare of Utah, LLC, Salt Lake City, Utah for disposal.

## **Site Restoration**

After excavation and confirmatory sampling were completed, clean removed soil was used to backfill the excavations, and excavation equipment was used to compact the soil backfill. The surface of each disturbed area was then re-graded to improve surface drainage. A silt fence was installed on the downslope (i.e., northwest) side of the site to inhibit sediment run-off.

## **Conclusions and Recommendations**

Based on the results of the ESI/RI and the STEP final interim removal action; all radioactive contaminated material has been removed from the site. The final interim removal action was conducted in a conservative manner to provide maximum protection to human health and the environment; therefore, no further remedial action is recommended for the LaGarde Park site. STEP also recommends removing the perimeter fence from around the site, performing final site restoration, and releasing the site for unrestricted use.

## **1. INTRODUCTION**

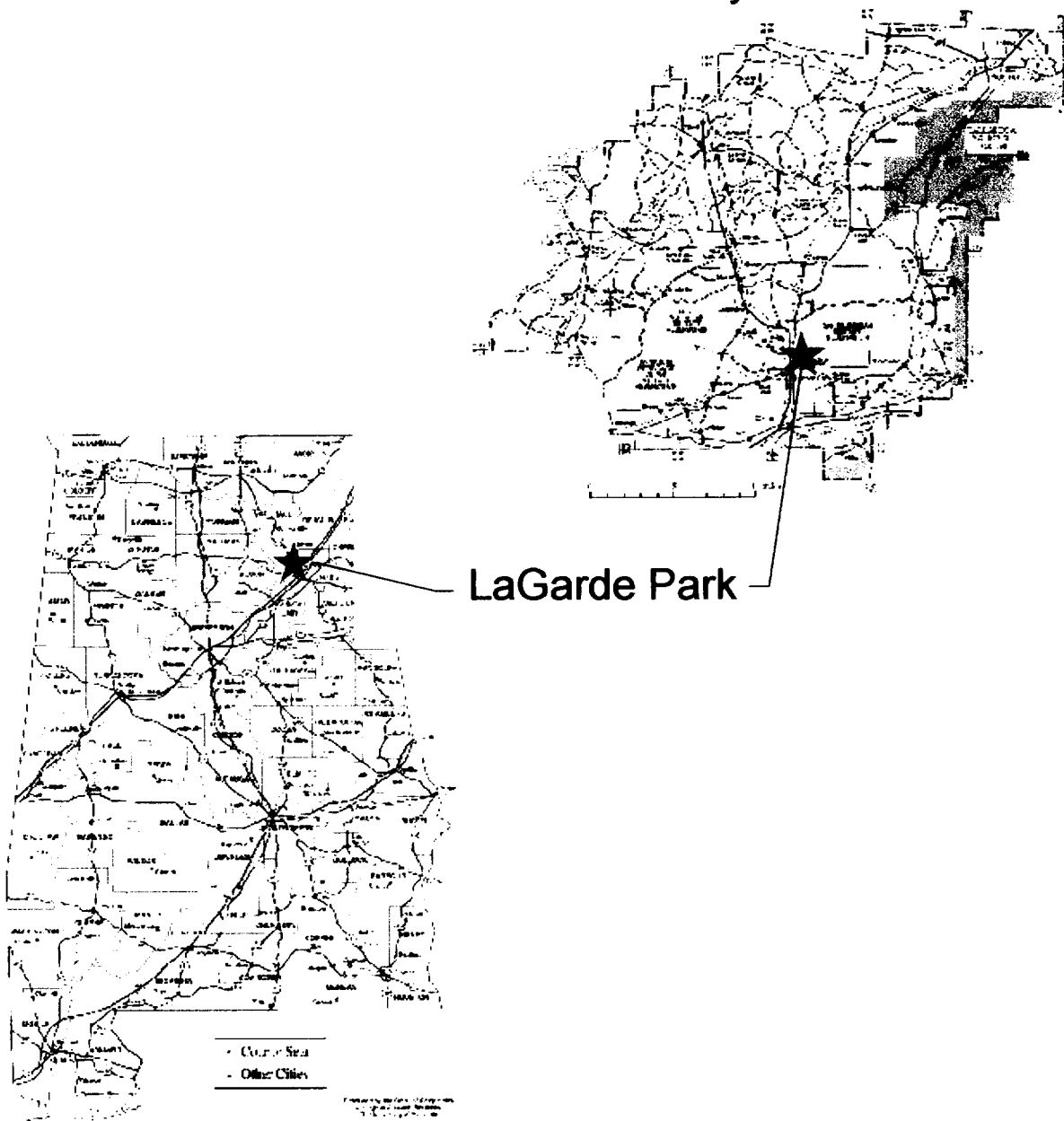
Solutions To Environmental Problems, Inc. (STEP) was contracted by the U.S. Army Corps of Engineers (USACE), Mobile District, to perform a removal action at LaGarde Park in Anniston, Alabama (Contract No. DACA01-01-D-0007, Delivery Order No. 0009). The removal action included the excavation and off-site disposal of low-level radioactive waste (LLRW), confirmation/closure sampling, transportation and disposal of radioactive wastes, and restoration of the site. This report describes the activities conducted during the removal action, the results of the laboratory analyses of samples collected from the excavations, and recommendations for future activities at the site.

## **2. BACKGROUND**

Fort McClellan is a former U.S. Army training base situated north of Interstate 20 in Anniston, Alabama, approximately halfway between Birmingham, Alabama, and Atlanta, Georgia. LaGarde Park is adjacent to the former Fort McClellan and lies within the city limits of Anniston. Figure 1 shows the location of LaGarde Park and Fort McClellan.

Interviews with personnel knowledgeable about operational and waste disposal activities at various sites at Fort McClellan indicated that radioactive wastes were deposited on Iron Mountain. It was reported that a laboratory building, consisting of cinder blocks and sand bags, was located on the "northwest side of Iron Mountain" in "Rattlesnake Gulch." This laboratory was reportedly used to prepare training sources of cobalt-60 ( $\text{Co}^{60}$ ) and cesium-137 ( $\text{Cs}^{137}$ ). The laboratory compound was reportedly 140-feet long by 80-feet wide and was enclosed in a barbed-wire fence with warning signs. Information gathered from previous reports on the area is unclear as to the exact location of the former laboratory site; however, historical aerial photographs show a rectangular area on the northwest side of Iron Mountain that roughly corresponds to the reported size of the laboratory compound. At some point in the late 1960s the laboratory building was demolished, the barbed wire fencing was removed, and the debris was deposited in a waste disposal area southeast of the laboratory site and higher up on Iron Mountain.

## Calhoun County



Alabama

lagarde location.mxd

### LEGEND



Site Location

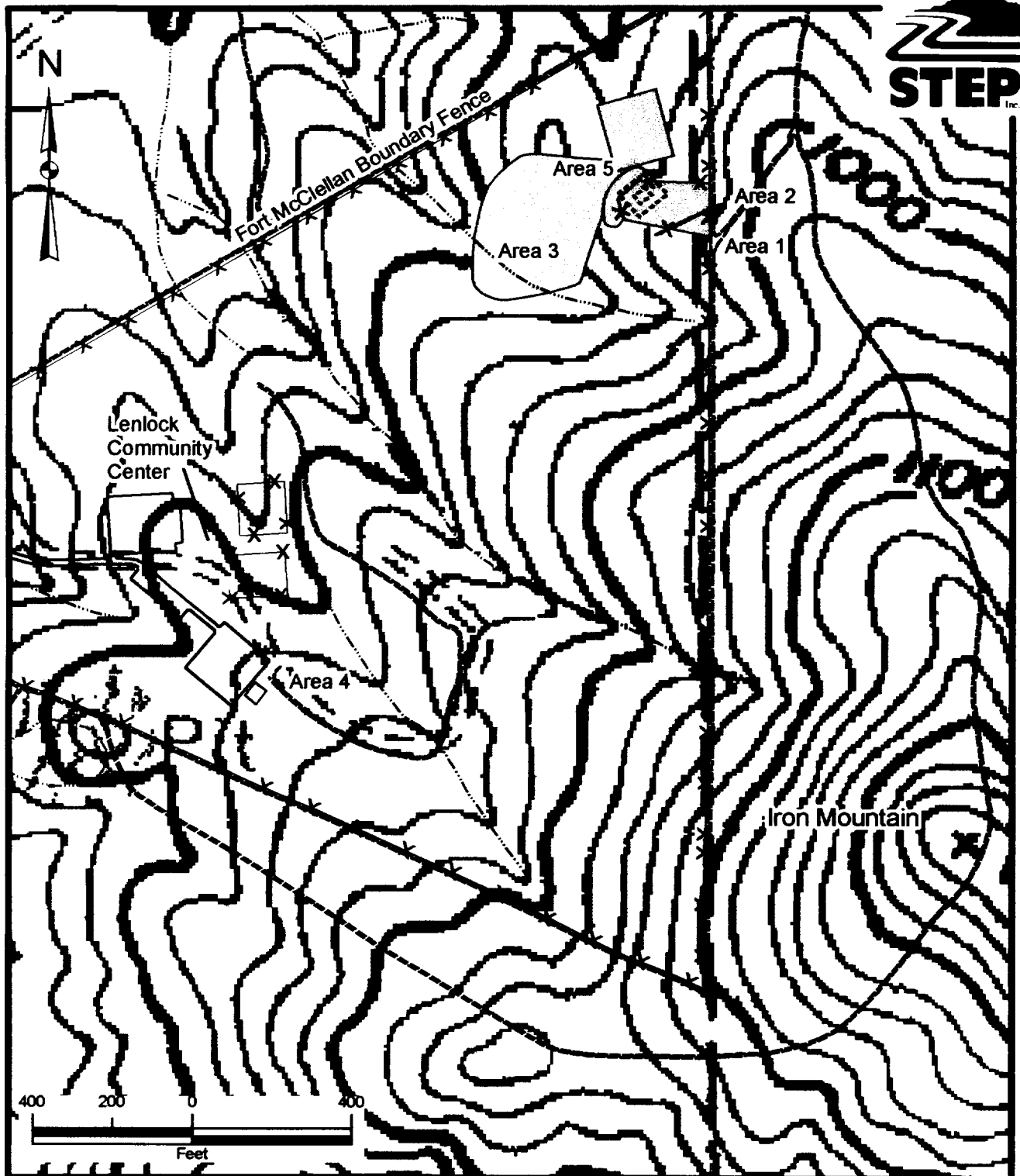
Source: University of Alabama  
Job: Project Report Final Removal Action  
at LaGarde Park Anniston, Alabama

Figure 1 LaGarde Park Location Map

In 1971, a radiation survey was conducted on Iron Mountain, and 22 contaminated spots were identified on the ground surface. In the summer of 1971, five containers of radioactive Co<sup>60</sup> and Cs<sup>137</sup> waste and 18 55-gallon drums of contaminated soils were removed from an area approximately 400 feet southeast of the former laboratory site and were reportedly taken to Pelham Range for disposal. Anecdotal information indicates that building debris (i.e., concrete blocks and fencing) was included in the debris removed. The removal area was cleared for surface military use by the Fort McClellan Health Physics Office; however, no official closeout survey was found in the records. In 1974, approximately 185 acres (which included the former "Rattlesnake Gulch" laboratory site) were deeded as a public park to the City of Anniston. This acreage was subsequently named the John B. LaGarde Interpretive Park.

In 1995, the Base Realignment and Closure Commission (BRAC) voted to permanently close Fort McClellan. The Department of Defense closed the base in October 1999, making 45,000 acres, building facilities, and fully infrastructured property available for private sector reuse and redevelopment.

In order to terminate the Chemical School Radiation License as part of the BRAC proceedings, the Nuclear Regulatory Commission (NRC) required assurances that no radioactive material was left behind. The Army performed an aerial survey in October 2001 that indicated the presence of a radioactive "hot spot" about 100 feet outside Fort McClellan's fence line on property formerly occupied by the training site, but now within the boundaries of LaGarde Park. On February 5, 2002, a team consisting of the Chemical School's radiation protection officer, the NRC, the Alabama Department of Public Health Radiation Office, and the U.S. Environmental Protection Agency visited the "hot spot" identified by the aerial survey to measure the radiation and determine the area involved. The area of investigation measured approximately 100 feet by 100 feet. The Alabama Department of Public Health took soil samples and tree root samples for further analysis. This analysis showed the presence of Co<sup>60</sup> and Cs<sup>137</sup>. The team reported that the dose rates did not present an external hazard, but that digging or removal of vegetation from the area should not be allowed. Because this property was transferred to the City in the mid-1970s, the Army classified the site as a Formerly Utilized Defense Site (FUDS). The USACE Mobile District took action in 2002 under the authority of the Defense Environmental Restoration Program/FUDS and installed fencing around the site to prevent access to the area. Figure 2 shows the location of LaGarde Park and the areas investigated.



**LEGEND**



Areas of Investigation



Former Laboratory Location

Source: Alabama GIS, Site Survey  
Job Title: Remedial Action Report  
Final Removal Action  
At LaGarde Park  
Anniston, Alabama

**Figure 2 Previously Investigated Areas at LaGarde Park**



### 3. INITIAL SITE INVESTIGATION

In February 2003, STEP performed a site investigation (characterization survey) that included a surficial site radiation survey, surface and subsurface soil sampling, and vegetation sampling of areas identified with radiological contamination. The site investigation was performed in four areas:

- Area 1 – the fenced area at LaGarde Park,
- Area 2 – the area of disturbed soil outside the fence,
- Area 3 – the area along the drainage paths downgradient of the fenced area, and
- Area 4 – a small area near the Lenlock Community Center.

Analytical results reported in *Final Completion Report, Site Investigation at LaGarde Park, Anniston, Alabama* (STEP, June 2003) indicated the following:

- Cobalt and uranium were not detected at levels above screening values. Cesium and thorium, however, were detected above NRC residential surface soil screening levels (RSSSLs).
- The surficial survey identified areas where gamma radiation was elevated. At several locations inside the fenced area (Area 1), survey readings were greater than twice background. The data collected indicated that cesium contamination had not spread outside of the fenced area, and the majority of Cs<sup>137</sup> was surficial in nature. Cesium was not detected above the NRC RSSSL in any of the subsurface samples.
- Thorium was evaluated as naturally occurring and appeared to be unrelated to the cesium contamination at the site. Thorium was detected above the NRC RSSSL in the sample collected next to the Lenlock Community Center parking lot and in one location in Area 3 outside of the fence. Thorium was also detected above the NRC RSSSL in two of the three background samples.
- The toxicity characteristic leaching procedure analysis performed on the soil for disposal purposes indicated that none of the soil would be classified as Resource Conservation and Recovery Act hazardous waste.

Based on the results of the site investigation, STEP proposed a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Time Critical Removal Action (TCRA) to excavate and dispose of the cesium contaminated soil and debris located at the site. For the removal action, contaminated areas exceeding the NRC RSSSL and areas three times the background radiation count of 6,040 counts per minute (cpm) were planned for removal.

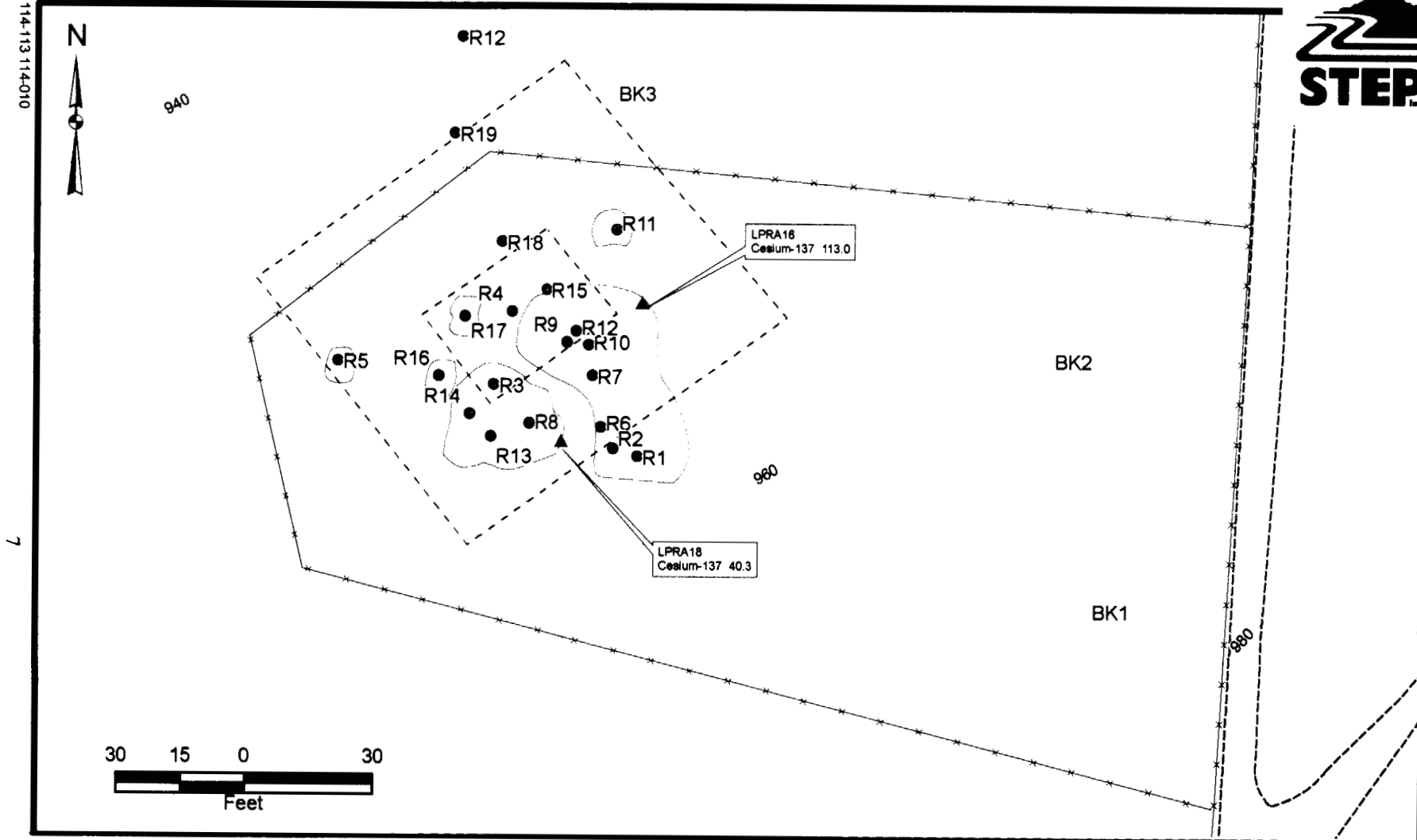
#### 4. TIME CRITICAL REMOVAL ACTION

In September 2003, STEP mobilized to the site to conduct the CERCLA TCRA to excavate and dispose of the Cs<sup>137</sup> contaminated soil and debris located at the site. The full details of the removal action are contained in *Final Report for Removal Action at LaGarde Park* (STEP, May 2004). Based on the site investigation, the estimated volume of contaminated soil to be removed was approximately 30 cubic yards. As the removal action progressed, some of the areas had higher radiation levels below the ground than at the surface. Excavation continued until the available project funding for removal and disposal was expended. During this removal action, a total of 170 cubic yards of contaminated soil was removed and shipped off site for disposal. The presence of radioactive contamination beneath the ground surface and the unexpected lateral extent of contamination indicated that the conceptual model of discrete surface radiation sources was inaccurate. Therefore, based on the unexpected volume of contaminated material, the presence of radioactive contamination at depth, and the possibility that this site corresponded to the former "Rattlesnake Gulch" laboratory site, a CERCLA Expanded Site Investigation (ESI)/Remedial Investigation (RI) was recommended to fully define the lateral and vertical extent of the contamination. The site conceptual model was revised to indicate that the residual radioactive material was left when the former "Rattlesnake Gulch" laboratory building was removed prior to 1971. Figure 3 shows the areas excavated during the CERCLA TCRA.

#### 5. EXPANDED SITE INVESTIGATION/REMEDIAL INVESTIGATION

STEP personnel mobilized to the site on July 12, 2004, to conduct the ESI/RI. These activities included:

- conducting a surficial site radiation survey,
- establishing a regular grid array over the site,
- surface soil sampling,
- subsurface soil sampling, and
- downhole (subsurface) radiation screening.



#### LEGEND

- Soil Sample Location
- Former "Rattlesnake Gulch" Lab Location
- ▲ Confirmatory Sample
- Area Removed
- Elevation Contour Line

Notes:  
 1. Results = pCi/g (picocurie per gram)  
 2. Screening value for Cesium-137 = 11pCi/g

Source: Site Survey  
 Job Title: Remedial Action Report  
 Final Removal Action  
 at LaGarde Park  
 Anniston, Alabama

Figure 3 Areas Previously Excavated and Confirmatory Samples Exceeding Screening Values

Activities and findings of the ESI/RI are presented in *Remedial Investigation Report, Expanded Site Investigation at LaGarde Park* (STEP, April 2005) and summarized in the following sections.

### **5.1 SURFICIAL RADIATION SURVEY**

Since the isotopes of concern at the site (i.e.,  $\text{Co}^{60}$  and  $\text{Cs}^{137}$ ) emit gamma radiation, a site surficial radiation survey was performed to detect gamma radiation within the fenced area (Area 1) and in an area outside of the fence (Area 5). The surficial radiological survey identified an area roughly 65 feet by 95 feet in the western end of the fenced area that exceeded 9,900 cpm. Based on an examination of historical aerial photographs, this area corresponds to the location of the former "Rattlesnake Gulch" laboratory.

### **5.2 SOIL SAMPLING**

A regular grid array (grid nodes spaced at 25-foot intervals) was established over each area. The array for Area 1 consisted of 35 nodes. The array for Area 5 consisted of 42 nodes.

Surface and subsurface soil samples were collected at selected grid nodes to determine the extent of surface and subsurface radiological contamination. Soil borings were installed using a track mounted GeoProbe<sup>®</sup> drilling unit. Continuous soil core was collected at each sampling location. The core was retrieved in 4-foot intervals to GeoProbe<sup>®</sup> refusal or to a maximum total depth of 20 feet below ground surface (bgs). The soil cores were scanned using a gamma scintillater probe. No elevated readings were observed in any of the soil cores.

Soil samples for laboratory analyses were collected at the surface in each boring and a biased soil sample was collected at the corresponding depth in each boring where the highest gamma measurement was recorded in the downhole radiation scan. If the gamma measurements along the boring were uniform, then a soil sample was collected at the bottom of the hole. Laboratory analyses consisted of isotopic analyses for  $\text{Cs}^{137}$  and  $\text{Co}^{60}$ .

### **5.3 DERIVED CONCENTRATION GUIDELINES LEVELS**

The material removed from the Rattlesnake Gulch laboratory was reportedly transported to the burial mound at Rideout Field, Pelham Range, Area 24C at Fort McClellan for disposal. Derived Cleanup

Guideline Levels (DCGLs) were developed during the remediation and decommissioning process for the Pelham Range Burial Mound [*Burial Mound Decommissioning Plan, Appendix 6 – Development of Derived Cleanup Guidelines for the Pelham Range “Burial Mound,”* Allied Technology Group, (September 1999)]. The DCGL process evaluated receptor exposures for different land-use scenarios. The land use scenario that was judged to produce the greatest exposure potential was the residential scenario with backyard garden and cow. This scenario was used to evaluate the exposures from unrestricted release at the site.

The computer code RESRAD 5.82 (Argonne National Laboratory, 1993) was used to evaluate the potential dose and long term risk from the scenario activities to a resident adult and resident child. The soil concentrations that would not exceed the 25 millirem per year allowable exposure limit for  $\text{Co}^{60}$  and  $\text{Cs}^{137}$  were found to be:

- **Resident Adult –**
  - $\text{Co}^{60}$  2.9 picoCuries per gram (pCi/g) (Resulting Risk  $9 \times 10^{-5}$ )
  - $\text{Cs}^{137}$  12 pCi/g (Resulting Risk  $3 \times 10^{-4}$ )
- **Resident Child –**
  - $\text{Co}^{60}$  2.3 pCi/g (Resulting Risk  $6 \times 10^{-5}$ )
  - $\text{Cs}^{137}$  9.2 pCi/g (Resulting Risk  $9 \times 10^{-5}$ )

For the purposes of evaluating the soil concentrations at the LaGarde Park site, the more conservative values of 2.3 pCi/g for  $\text{Co}^{60}$  and 9.2 pCi/g for  $\text{Cs}^{137}$  developed for the Pelham Range Burial Mound, were selected as the DCGLs. None of the soil samples collected during the ESI had concentrations exceeding the corresponding DCGLs for  $\text{Cs}^{137}$  or  $\text{Co}^{60}$ .

#### 5.4 DOWNHOLE RADIATION SURVEY

Upon reaching total depth in each of the borings, a downhole radiation scan was performed in each borehole. Gamma radiation was measured in 1-foot intervals in each borehole from the ground surface to the maximum depth accessible with the probe assembly. The gamma emission rate varied at different depths in many of the holes. A gamma spectrum was collected at the depth exhibiting the highest gross gamma count to provide a real time determination of the nature of any elevated measurements observed in the borehole. “Elevated measurements” were defined as elevated count rates as compared to other depths in the same hole or when compared to nearby holes. Eleven spectra were collected from ten boreholes. Visual analysis of the spectra in the field did not reveal the presence of the characteristic 662 kiloelectron

volt (keV) peak for  $\text{Cs}^{137}$ , nor the 1,173 or 1,332 keV peaks that would identify  $\text{Co}^{60}$ . The spectra were subsequently analyzed mathematically by capturing the gross counts in a region of interest that corresponded to the 662 keV peak for  $\text{Cs}^{137}$ . The background was subtracted from the counts in the region of interest to calculate the net counts in the region. No discernible activity indicating the presence of  $\text{Cs}^{137}$  could be identified in these spectra.

The minimum detectable concentration (MDC) for  $\text{Cs}^{137}$  during the subsurface scan was 2.7 pCi/g based on using the Ludlum Model 44-2 in fixed count mode. The maximum detected concentration of  $\text{Cs}^{137}$  detected in laboratory analyses of the surface soil samples (0-1 foot) was 3.29 pCi/g (0-1 foot, boring SB-03 in Area 1). The maximum detected concentration of  $\text{Cs}^{137}$  in the subsurface soil samples was 0.105 pCi/g (3-4 foot, boring 3G in Area 1). The maximum concentration of  $\text{Cs}^{137}$  detected in the downhole soil samples was less than the MDC calculated for the downhole radiation scan; therefore, the elevated downhole gamma measurements were most likely attributable to naturally occurring sources.

Examination of the raw data curves provided by the laboratory and comparison of these data curves to the incremental gamma log of the boreholes indicated that the elevated gamma readings tended to occur when radium-226 and or radium-228 were above 1 pCi/g. Therefore, elevated gamma measurements were encountered downhole, but no concentrations of  $\text{Cs}^{137}$  exceeding 0.105 pCi/g were detected in the subsurface soil samples because the elevated gamma measurements were caused by naturally occurring radium isotopes not cesium.

## **5.5 EXPANDED SITE INVESTIGATION/REMEDIAL INVESTIGATION CONCLUSIONS AND RECOMMENDATIONS**

Based on the results of the surface radiation scan and surface soil analytical data collected during the ESI/RI, the CERCLA TCRA had reduced the overall surface concentrations of  $\text{Co}^{60}$  and  $\text{Cs}^{137}$  below the corresponding DCGLs and no further action was proposed for the surface soils at the site.

Based on the results of the confirmatory samples collected during the CERCLA TCRA and the subsurface soil samples and downhole radiation scans conducted during the ESI, only two areas of subsurface contamination remained. An additional interim removal action was proposed to address these two areas.

The first area, centered between grid nodes LPA1N3E and LPA1N3F, corresponded to the location of confirmatory soil sample LPRA18 (40.3 pCi/g Cs<sup>137</sup>) from the initial removal action. This area encompassed roughly 10 feet by 10 feet to a maximum depth of 6 feet bgs.

The second area, centered on grid node LPA1N4E, corresponded to the location of confirmatory soil sample LPRA16 (113 pCi/g Cs<sup>137</sup>) from the initial removal action. This area encompassed roughly 10 feet by 10 feet to a maximum depth of 12 to 15 feet bgs. Figure 4 presents the proposed locations for the additional interim removal action.

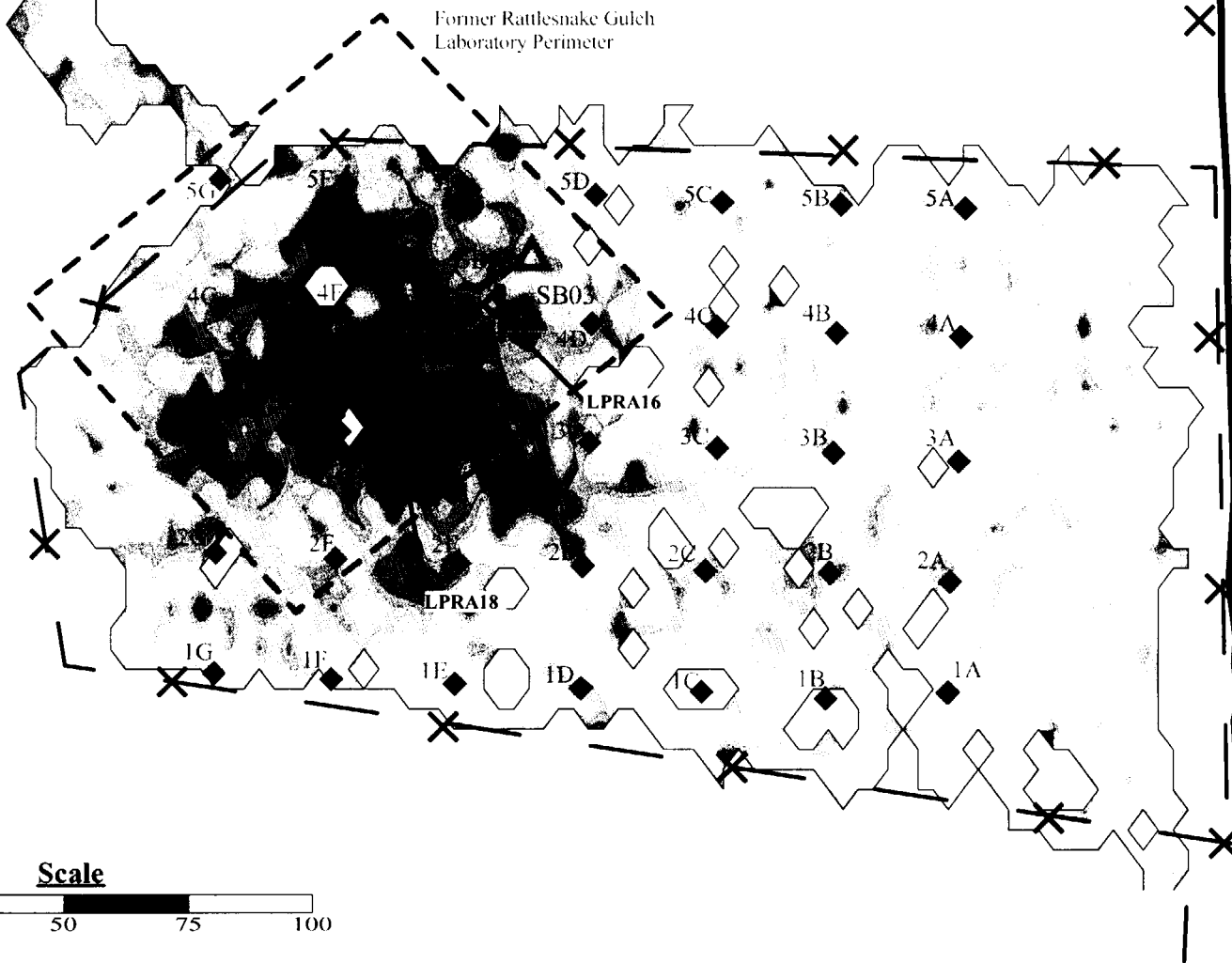
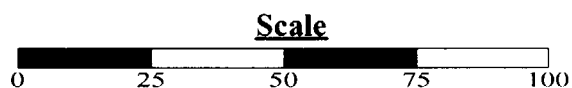
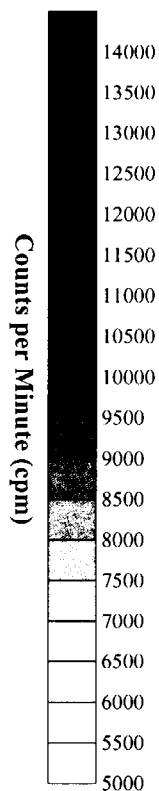
## **6. FINAL INTERIM REMOVAL ACTION**

STEP personnel mobilized to the site on March 28, 2005, to conduct the recommended final interim removal action. Construction of the Anniston bypass road by the Alabama Department of Transportation had destroyed the access road to the LaGarde Park site, and two days (March 28 and 29) were spent re-establishing site access. Excavation activities began on Wednesday, March 30, 2005. A copy of the logbook of the field activities is contained in Appendix A and pictures of the field activities are presented in Appendix B.

### **6.1 RADIOLOGICAL INSTRUMENTATION**

A radiological control technician (RCT) from Auxier & Associates, Inc. of Knoxville, Tennessee, was on site during all activities. The radiological survey instruments used during the final interim removal action included a gamma-ray scintillation probe (Ludlum Model 44-2, Serial Number 117650) attached to a count ratemeter/scaler (Ludlum Model 2221, Serial Number 012883). A Geiger-Mueller (G-M) (Ludlum Model 44-9, Serial Number 108883) survey instrument attached to a count ratemeter/scaler (Ludlum Model 12, Serial Number 117166) was used to survey personnel and equipment leaving the site.

All radiological instrumentation was calibrated within a six month period prior to use using National Institute of Standards and Technology traceable sources and pulser. The instrumentation was also function checked at a designated background location before and after use each day. Function check forms and calibration sheets are included in Appendix C.



### Legend

- 1A ♦ Grid Node
- SB03 ▲ Soil Boring
- X— Fence
- Proposed removal area
- LPRA16 ♦ Confirmatory Sample Exceeding Screening Levels

Prepared By: STEP Inc. Oak Ridge, TN  
Job Title: Final Removal Action  
at La Garde Park  
Anniston, Alabama

**Figure 4 Proposed Areas for Additional Removal Action**



## 6.2 EXCAVATION

An unexploded ordnance (UXO) technician from EOD Technologies, Inc. of Lenoir City, Tennessee, scanned the work areas with a magnetometer prior to any intrusive activities. No magnetic anomalies were identified that indicated the presence of UXO. The UXO technician remained on site throughout the field activities.

The removal action was conducted using an excavator. The first area excavated was centered between grid nodes LPA1N3E and LPA1N3F and corresponded to the location of confirmatory soil sample LPRA18 (40.3 pCi/g Cs<sup>137</sup>) from the CERCLA TCRA. The planned excavation for this site was an area 10-feet wide by 10-feet long to a maximum depth of 6 feet bgs. As the area was excavated, each bucket of dirt removed was laid out in a thin layer (i.e., < 6-inch lifts) adjacent to the excavation and was scanned by the RCT. The RCT slowly moved the gamma-ray scintillation probe over the excavated dirt as near as practical to the ground surface. When soil in the scanned area was at or above background counts (i.e.,  $\geq 7,000$  cpm), the suspected soil was removed by the excavator, placed in the bucket of a skid steer loader, and deposited in a metal LLRW container (B-25 box) for off-site disposal, and the area was re-scanned. This process was repeated until excavation was completed. The final dimensions of the excavation for the first area were 18 feet (east to west) by 16 feet (north to south) by 7-feet deep. The radiation scans conducted by the RCT during the excavation process identified 1 cubic yard of contaminated soil that was removed from the excavated soil and placed in an LLRW container for off-site disposal.

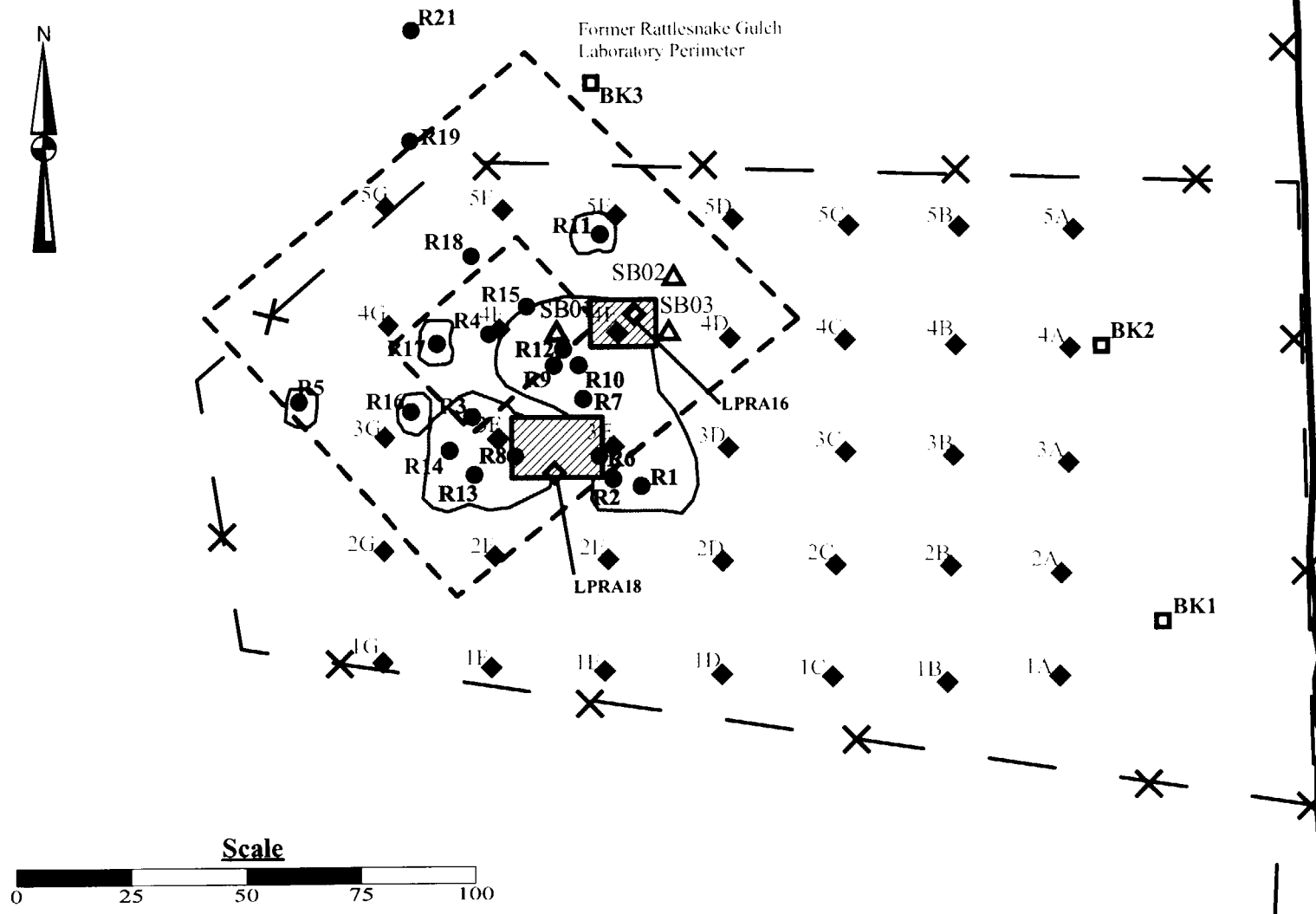
The second excavation area, centered on grid node LPA1N4E, corresponded to the location of confirmatory soil sample LPRA16 (113 pCi/g Cs<sup>137</sup>) from the TCRA. The planned excavation area for this site was 10 feet by 10 feet to a maximum depth of 15 feet bgs. As excavation of the area began, removed soil was scanned using the method described above for Area 1. Plastic sheeting (left in place to mark the excavation bottom from the previous removal action) was encountered at 8 feet bgs. As potentially contaminated soil and the surrounding backfill were removed, a radiation scan was conducted on the removed material while it was still in the excavator bucket. If no contamination was observed, the material was spread and scanned as was done in Area 1. If elevated counts (i.e., equal to or greater than the background of 7,000 cpm) were observed in the bucket, the material was placed directly into the LLRW container. The first bucket of the material beneath the plastic had radiation counts as high as 60,000 cpm (approximately 8.5 times the background count of 7,000 cpm) and was deposited directly into

the LLRW container. Successive buckets were scanned as they were removed from the excavation, and buckets of soil that had elevated gamma counts were deposited directly into the LLRW container. All other buckets of soil were spread and scanned as in Area 1. Excavation continued until all the previously disturbed material had been removed and undisturbed material was encountered in the base of the excavation and on the north, east, and west sidewalls. The south wall of the excavation showed disturbed material to a depth of 8 to 10 feet bgs, indicating the actual total depth of the excavation from the CERCLA TCRA. The final dimensions of the second excavation were 13 feet (east to west) by 10 feet (north to south) by 10 feet deep. Radiation screening identified approximately 3 cubic yards of contaminated soil and material that was placed in the LLRW containers for off-site disposal. Figure 5 presents the location of the excavated areas and the relative position of the previous sample locations.

### 6.3 RADIATION SCANNING

When excavation was complete in each area, a radiological scan of the base and sidewalls of the excavation was conducted. To eliminate interference from background radiation and to focus the "viewing" area of the radiological scanning instrument, the RCT placed the instrument in a lead shield with a directional opening (orifice). The shielding reduced background radiation levels and allowed the scan to pinpoint the locations of measurements. Figure 6 presents a schematic view of the scan instrument configurations. The lead shielded instrument was placed in a sheet metal casing mounted with a hanging bracket on a swivel assembly. This allowed the viewing orifice to be directed downward (for scanning the base of the excavation) or to the side (for scanning the sidewalls of the excavation). The survey instrument was attached to the bucket of the excavator using a nylon rope.

To scan the base of an excavation, the instrument was placed in the "base scanning" configuration and lowered into the excavation to within 6 inches of the foundation floor. The instrument was then moved across the floor of the excavation so that the entire floor of the excavation was scanned by the instrument. If any areas showed elevated gamma counts (i.e., at or above the background), additional soil was removed and the area was re-scanned until the entire floor of each excavation was below the background count of 7,000 cpm. To scan the sidewalls of an excavation, the instrument was rotated 90 degrees in the vertical plane to the "sidewall" configuration and secured in place by a nylon rope and duct tape. The excavator then moved the scanning instrument from top to bottom of the sidewalls until all of the vertical walls of the excavation had been scanned. If the sidewall scan showed readings at or above background counts on the excavation walls, additional soil was removed and the area was re-scanned until all of the sidewalls of the excavation were below the background count of 7,000 cpm.



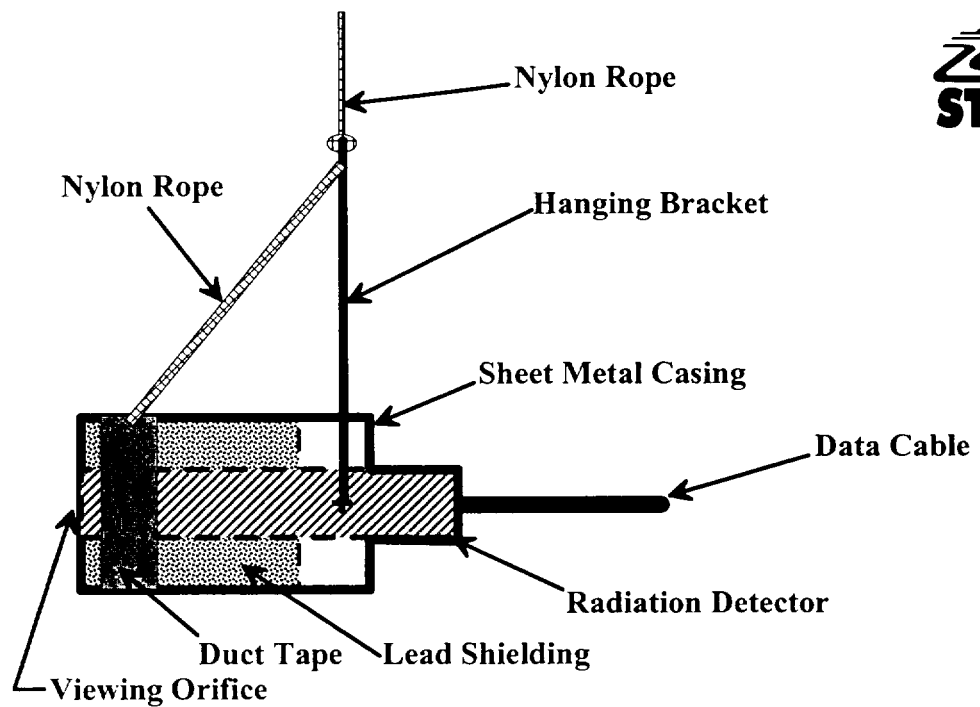
### Legend

- |                    |   |  |
|--------------------|---|--|
| 1A ♦ Grid Node     | Areas Excavated in Final Removal Action         | L.PRA16 ♦ Previous Confirmatory Sample Location                |
| SB01 ▲ Soil Boring | Areas Excavated in Time Critical Removal Action | R1 ● Locations Sampled in Initial Site Investigation           |
| -X- Fence          |   | BK1 □ Background Sample Location in Initial Site Investigation |

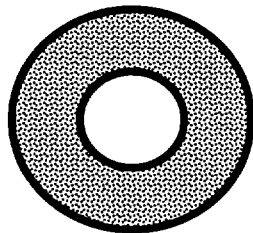
Prepared By: STEP Inc. Oak Ridge, TN  
 Job Title: Remedial Action Report  
 La Garde Park  
 Anniston, Alabama

**Figure 5 Areas Excavated and Previous Sampling Locations Exceeding Screening Values**

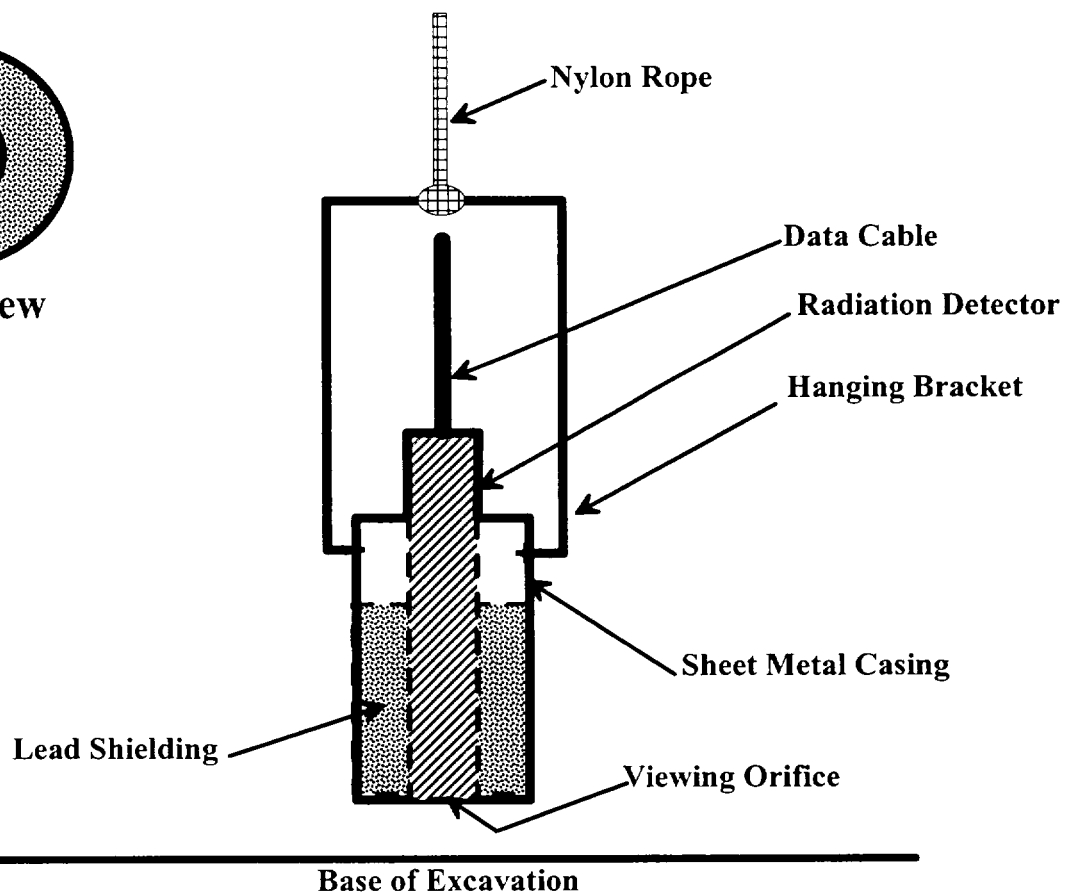
Sidewall of Excavation



**Sidewall Scanning Configuration**



**End View**



**Base of Excavation Scanning Configuration**

**Figure 6 Scanning Configurations for Radiation Detector**

Once the excavations were completed, the RCT used the G-M (Ludlum Model 44-9, SN # 108883) survey instrument connected to a count ratemeter/scaler (Ludlum Model 12, SN# 117166) to frisk all personnel and equipment for radiological contamination before they exited the site. No contamination was found on any personnel or equipment. Personal dosimeters were also distributed to all personnel before they entered the site and were collected as personnel left the site at the completion of field activities. The dosimeters were submitted to Landauer, Inc. for evaluation. None of the dosimeters showed exposure exceeding the minimal detectable dose equivalent of 1 mrem for gamma radiation.

#### **6.4 CONFIRMATORY SOIL SAMPLING**

Once the radiation scan indicated that all contaminated material had been removed from the excavation, confirmatory soil samples were collected in each excavation. One sample was collected from the base of the excavation at each of the four corners, and one sample was collected from the center of the excavation. The soil for the samples was scanned in the excavator bucket by the field screening instrument, collected in the sample container, and placed in a plastic cooler for shipment to the analytical laboratory.

The RCT also screened the samples on site for radiological activity. Each sample was counted for a minimum of 30 minutes. The samples were scanned for the presence of cesium and/or cobalt using a gamma-ray scintillation probe (Ludlum Model 44-10, Serial Number 132947) connected to a multi-channel analyzer (Rainbow 1, Model 7010, Serial Number 701118). None of the samples showed activity exceeding background radiation levels.

A total of eleven samples were submitted for laboratory analyses. Five samples (LPSS01, LPSS02, LPSS03, LPSS04, and LPSS05) were collected from the first excavation and five samples and a duplicate (LPSS06, LPSS06DUP, LPSS07, LPSS08, LPSS09, and LPSS10) were collected from the second excavation. All of the samples were sent to General Engineering Laboratory, LLC of Charleston, South Carolina and analyzed for cesium and cobalt. The resulting analytical data were then subjected to third party data validation. Table 1 presents the validated results of the sample analyses.

The DCGLs for Cs<sup>137</sup> (9.2 pCi/g) and Co<sup>60</sup> (2.3 pCi/g) are based on radionuclide concentration of surface soils. These cleanup goals are highly conservative and protective of human health and the environment. The highest concentration for both Cs<sup>137</sup> (5.93 pCi/g) and Co<sup>60</sup> (0.228 pCi/g) detected in the soil samples were in soil sample LPSS07 collected at the base of the southeast corner of the second excavation.

Therefore, the highest concentration of Cs<sup>137</sup> and Co<sup>60</sup> remaining at the site do not exceed the conservative DCGLs for surface soils and are well below ground surface. Figure 7 presents the relative location of the samples in the excavations and the concentrations of the radionuclides detected. Appendix D contains the Data Validation Report and the laboratory forms for the analyses.

**Table 1 Radionuclide Analytical Results**

Sample No.	Parameter	Collection Date	Analysis Date	Validated Result (pCi/g)	Method Detection Limit (pCi/g)	CRDL/CRQL (pCi/g)	Uncertainty
LPSS01	Cesium-137	03/30/05	04/05/05	0.00161 U	0.0202	0.100	0.0125
LPSS01	Cobalt-60	03/30/05	04/05/05	0.209	0.0184	0.100	0.0327
LPSS02	Cesium-137	03/30/05	04/05/05	0.0194 U	0.0382	0.100	0.0442
LPSS02	Cobalt-60	03/30/05	04/05/05	0.179	0.037	0.100	0.039
LPSS03	Cesium-137	03/30/05	04/05/05	0.124	0.029	0.100	0.0326
LPSS03	Cobalt-60	03/30/05	04/05/05	0.00347 U	0.0259	0.100	0.0289
LPSS04	Cesium-137	03/30/05	04/05/05	0.114	0.0201	0.100	0.0242
LPSS04	Cobalt-60	03/30/05	04/05/05	0.0193	0.016	0.100	0.015
LPSS05	Cesium-137	03/30/05	04/06/05	0.0509 U	0.0671	0.100	0.0369
LPSS05	Cobalt-60	03/30/05	04/06/05	0.159	0.0498	0.100	0.0537
LPSS06	Cesium-137	03/30/05	04/06/05	0.178	0.0459	0.100	0.0441
LPSS06	Cobalt-60	03/30/05	04/06/05	0.115	0.0396	0.100	0.0407
LPSS06DUP	Cesium-137	03/30/05	04/06/05	0.178	0.0588	0.100	0.0702
LPSS06DUP	Cobalt-60	03/30/05	04/06/05	0.0801 U	0.0862	0.100	0.0401
LPSS07	Cesium-137	03/30/05	04/07/05	<b>5.93</b>	0.0577	0.100	0.439
LPSS07	Cobalt-60	03/30/05	04/07/05	<b>0.228</b>	0.0507	0.100	0.0564
LPSS08	Cesium-137	03/30/05	04/07/05	0.100	0.0273	0.100	0.0291
LPSS08	Cobalt-60	03/30/05	04/07/05	-0.0059 U	0.0265	0.100	0.0156
LPSS09	Cesium-137	03/30/05	04/07/05	0.179	0.0352	0.100	0.0434
LPSS09	Cobalt-60	03/30/05	04/07/05	0.00725 U	0.0362	0.100	0.0194
LPSS10	Cesium-137	03/30/05	04/07/05	0.835	0.0776	0.100	0.141
LPSS10	Cobalt-60	03/30/05	04/07/05	0.128	0.0649	0.100	0.0778

**Bold** value is the highest concentration detected for the parameter in any sample.

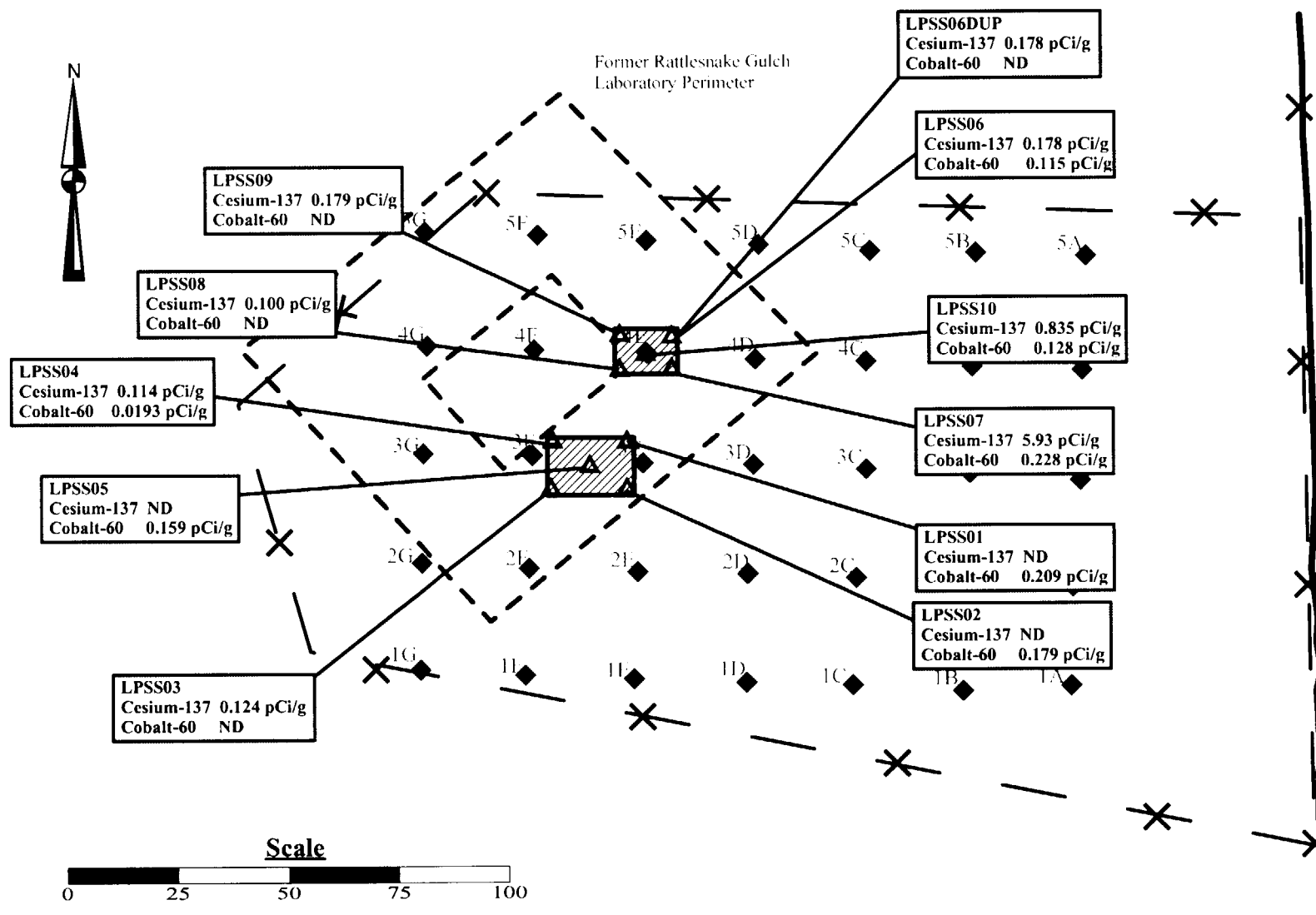
CRDL = contract required detection limit

CRQL = contract required quantitation limit

DUP = duplicate sample

pCi/g = picoCuries per gram

U = result validated as not detected



### Legend

- 1A ♦ Grid Node      Areas Excavated in Final Removal Action      pCi/g = picoCuries per gram  
 -X- Fence      LPSS01 ▲ Confirmatory Sample Location      ND = not detected

Prepared By: STEP Inc. Oak Ridge, TN  
 Job Title: Remedial Action Report  
 La Garde Park  
 Anniston, Alabama

**Figure 7 Confirmatory Sample Locations and Detected Concentrations of Radionuclides**

## **6.5 SHIPPING WASTE MATERIAL AND SOILS**

As a result of field radiation screening, approximately 4 cubic yards (approximately 8 tons) of material were removed from the site during the final interim removal action and placed in two LLRW containers for off-site disposal. Before the LLRW was shipped, the RCT performed a complete radiation survey of the LLRW containers that included dose rate measurements using a "MicroR" meter (Ludlum Model 19, Serial Number 131294) and removable contamination "smear" surveys. No radiological activity above background levels was observed in the survey of the LLRW containers. The LLRW containers were shipped via F.L.L. Trucking to Impact Services, Inc. (IMPACT) in Oak Ridge, Tennessee. At IMPACT, the LLRW containers were emptied and the material was rescanned for radioactivity. A total of 3.8 cubic yards (6,575 lbs) of soil was classified as non-hazardous LLRW material and shipped to Middle Point Sanitary Landfill in Murfreesboro, Tennessee, for disposal. A total of 0.2 cubic yards of material was classified as LLRW and shipped to Envirocare of Utah, LLC., Salt Lake City, Utah for disposal. The bill of lading and waste manifests for the soil and material are contained in Appendix D.

## **6.6 SITE RESTORATION**

At the completion of excavation and confirmatory sampling activities, each excavation was backfilled using the clean removed soil, and excavation equipment was used to compact the fill. The surface of each disturbed area was then re-graded to improve surface drainage. A silt fence was installed on the downslope (i.e., northwest) side of the site to inhibit sediment run-off.

## **6.7 CONCLUSIONS AND RECOMMENDATIONS**

Based on the results of the ESI/RI and the STEP final interim removal action; all radioactive contaminated material has been removed from the site. The final interim removal action was conducted in a conservative manner to provide maximum protection to human health and the environment; therefore, no further remedial action is recommended for the LaGarde Park site. STEP also recommends removing the perimeter fence from around the site, performing final site restoration, and releasing the site for unrestricted use.



## 7. REFERENCES

Allied Technology Group, September 1999. *Burial Mound Decommissioning Plan, Fort McClellan, Alabama.*

Environmental Science and Engineering Inc., January 1998. *Final Environmental Baseline Survey, Fort McClellan, Alabama.*

NRC (U.S. Nuclear Regulatory Commission), March 2000. NRC Inspection Report No. 01-12861-05/99-01.

NRC, August 2000. *Multi-Agency Radiation Survey and Site Investigation Manual*, NUREG-1575, Revision 1.

NRC Office of Nuclear Material Safety and Safeguards (NMSS), September 2002. *Final Consolidated NMSS Decommissioning Guidance – Volume 1 Decommissioning Process* (NUREG 1757).

NRC, August 2003. NRC Inspection Report No. 01-02861-05/03-01.

STEP (Solutions To Environmental Problems, Inc.), June 2003. *Final Completion Report Site Investigation at LaGarde Park Anniston, Alabama.*

STEP, May 2004. *Final Report for Removal Action at LaGarde Park Anniston, Alabama.*

STEP, June 2004. *Final Project Plans, Expanded Site Investigation at LaGarde Park Anniston, Alabama.*

STEP, April 2005. *Final Remedial Investigation Report, Expanded Site Investigation at LaGarde Park Anniston, Alabama.*

USEPA (U.S. Environmental Protection Agency), January 2001. 10 CFR Part 20 Section 1402.

**Appendix A**

**Copy of Field Logbook**

LA GARDE PARK

ANNISTON, AL

CONTRACT NO.

BACA 01-03-D-0010

DO # 0003

STEP

PROJ NO. 114-113/114-010

114-106/114-020

STEP, INC.

EXPANDED SITE INVE.

JULY 12 TO 21, 2004

3/28/05 TO 4/4/05

2ND REMOVAL ACTION

NATIONAL

408

MINING TRANSIT BOOK

BOOK 1 of 1

(82)

MON  
3/28/052ND REMOVAL ACTION  
LA GARDE PARK114-1  
114-020

13:30 AT SUMMERALL GATE

FORK LIFT, BOBCAT, DOZER  
DELIVER

MET W/ STEEL CREW

JUSTIN MCKAMEY, BRIAN MCKAMEY,

JERRY BOATWRIGHT

NOTED GAS PIPELINE SIGNS @

EDGE OF DOT RIGHT WAY

CALLED ALABAMA LINE

LOCATER SERVICE (1-800-292-8225)

GOT LOCATER #050871170

GUARANTEED TO HAVE LINES MARKED  
BY 1:30 WED (3/30)AFTER LOOKING @ SITE DECIDES  
TO PROCEED W/ CLEARING BRUSH  
& NOT DIG. USES DOZER TO  
CLEAR SMALL TREES & BRUSH  
AND KNOCK DOWN BERM OF  
ABANDONED ROAD.ORDERS 18" CULVERT (10') LONG  
FROM WCBB CONCRETE

Joff Cat 3/28/05

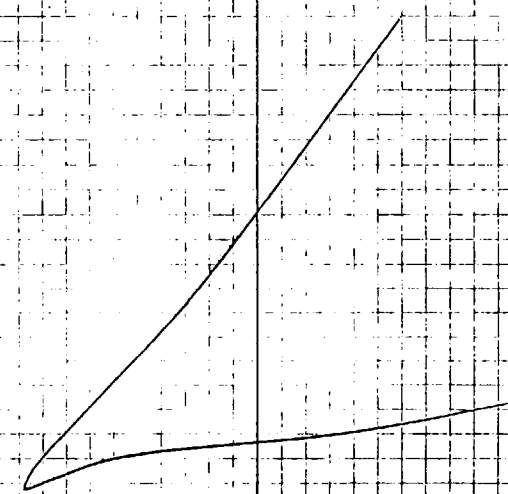
2ND REMOVAL ACTION MON (us)  
LA GARDE PARK 3/28/05DECIDES TO PLACE ROCK ON TOP OF  
SUSPECTED PIPE LINE TRACE (NO DIG)

WORKS ON ROAD TILL

16:30

NEEDS MORE CULVERT &amp; ROCK

17:00 LEAVE FOR DAY



3/28/05 Joff Cat

(84) 3/29/05  
TUE

LAGARDE PARK 114-N6  
2ND REMOVAL ACTION 114-020

0700 ON SITE SUNNY, 49°F  
MET V/JOFF YONAS (FOOT)  
AND STEP CREW (BRIAN & JUSTIN  
MCKAMEY, JARRETTE BOATWRIGHT)  
CONTINUE WORKING ON ACCESS ROAD

7:30 15 METAL BOXES DELIVERED  
TO SITE BY FCC TRUCKING

08:00 MR. O'DELLE FROM  
ALABAMA GAS CAME BY.  
HE SAID GAS LINE RAN ON  
NORTH SIDE OF SOMMERL GATE  
ROAD BUT HAD BEEN TURNED OFF  
AT VALVE @ HWY 21. THE NEW  
GAS LINE PARALLEL TO NEW HWY.  
HE STATED AS LONG AS WE WERE  
ONLY LAYING DOWN ROCK NOT  
DIGGING NEAR GAS LINE WE SHOULD  
BE FINE.

WORKING ON ROAD  
10:45 2ND LOAD OF GRAVEL DELIVERED  
(TRAILER)

Jeff Cuts 3/29/05

LAGARDE PARK TUE  
2ND REMOVAL ACTION 3/29/05 (85)

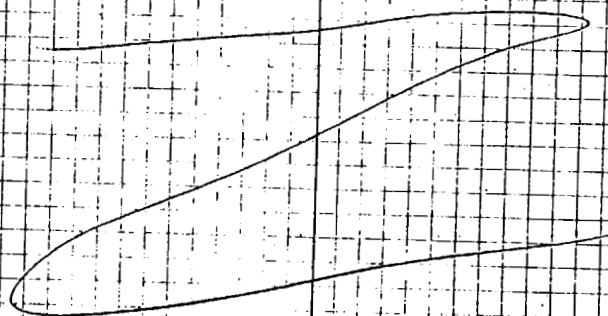
11:30 3RD LOAD OF GRAVEL DELIVERED  
(TRI-AXLE TRUCK) WRONG  
JOB SITE

ENDED UP TAKING 6 TOTAL  
LOADS OF ROCK  
(2 TRAILER + 4 BY TRUCK)  
FROM MILLER SAND

1800 ROAD EXTENDED HALFWAY  
UP HILL (TO CONNECT W/OLD ROAD)

ALL PERSONNEL LEAVING SITE  
ROADS GOOD ENOUGH TO GET EQUIPMENT  
& PERSONNEL UP TO SITE.

PLANNED TO GET ONE MORE LOAD  
OF #4 GRAVEL & 1 LOAD OF  
RIP RAP TO COMPLETE ROAD



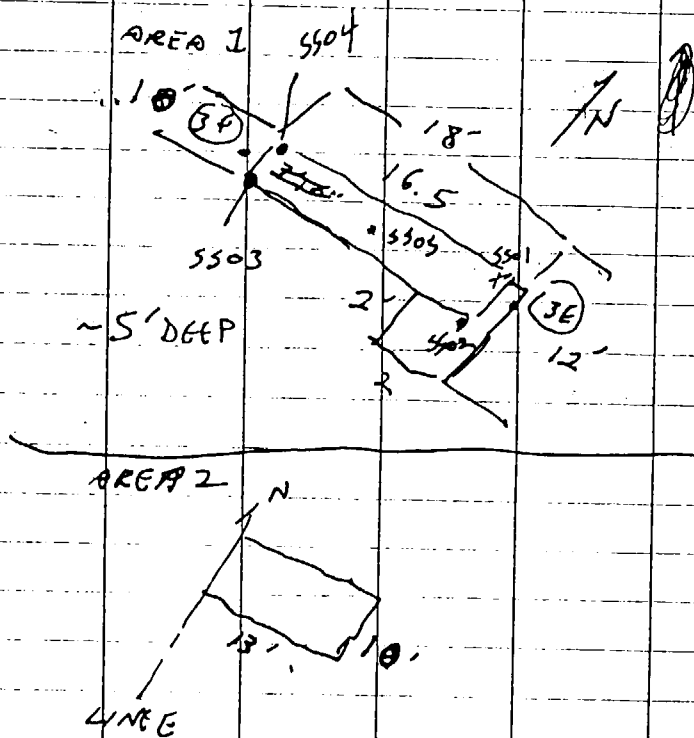
3/29/05 Jeff Cuts

(86)

WED  
3/30/05LAGARDE PARK  
2ND REMOVAL

## DOSIMETERS

05 JASON FADDIS (AUX)  
 03 JEFF YONAS (EOD)  
 01 JEFF CARTER (STEP)  
 02 JARRETTE BOATWRIGHT (STEP)  
 04 BRIAN MCKAMEY (STEP)  
 06 JUSTIN MCKAMEY (STEP)



Jeff Carter 3/30/05

114-106  
114-020LAGARDE  
2ND REMOVAL ACTIONWED  
3/30/05 (87)

0630 ON POST [LIGHT CLOUDS 50°F]  
 JEFF YONAS (EOD)  
 JASON FADDIS (AUX)  
 JEFF CARTER, BRIAN & JUSTIN MCKAMEY  
 JARRETTE BOATWRIGHT (STEP)

0720 CONDUCTED SAFETY  
 MEETING DISCUSSED  
 OPERATIONS ALL CREW  
 PRESENT. DISTRIBUTED

DOSIMETERS  
 0725 ENTERED AREA SET UP  
 JASON CONDUCTED RAD SCAN  
 OF AREA. JEFF Y. CONDUCT  
 UXO SCAN.

745 COMMENCE EXCAVATION  
 BETWEEN FLAGS 3E & 3F  
 SCRAPING 5" LIFTS & SPREAD  
 SOIL FOR SCANNING

09:30 EXCAVED AREA 1 TO 5' TD  
 AREA 18 BY 10 W/ 2' EXTENSION  
 @ S.E. CORNER. CARRIES 2 SKID STEER  
 SCAN BASE & SIDEWALLS ROCK OFF

3/30/05 Jeff Carter



(88)

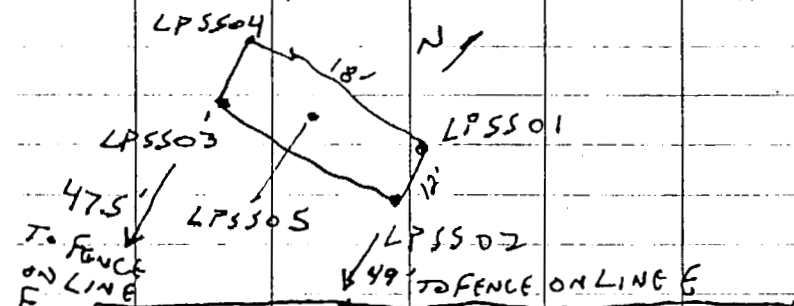
WED

3/30/05

LAGARDE PARK

2ND REMEDIAL ACTION

10:25 COMPLETELY SAMPLING  
AREA 1 COMMENCE  
BACKFILL. COLLECTED  
5 SAMPLES FROM BASE OF EXCAVATION



JASON WILL RUN SAMPLES 01  
02 THROUGH FIELD ANALYZER  
PLACES TWO SKID STEER LOADS  
OF POTENTIALLY CONTAMINATED SOIL  
IN LLRW BOX #004

11:00 BEGIN EXCAVATION AREA 2  
@ 8' DGS FOUND PLASTIC  
SHEETING FROM 1ST RA

12:00 BREAK FOR LUNCH

13:00 RESUME EXCAVATION/SCANNING

Jeff Carter 3/30/05

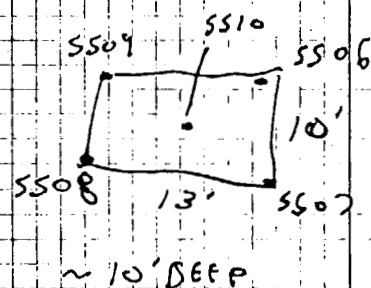
LAGARDE PARK

2ND RA

3/30/05 (87)

WED

13:40 DUG TO 10' F. BACKFILL  
FROM PREVIOUS EXCAVATION STOPPED  
@ APPROX 8' DGS  
APPEARS TO BE UNDISTURBED  
SOIL ON NORTH & EAST SIDE OF  
EXCAVATION ALSO ON WEST SIDE.  
JASON SCANNING HOLE  
AREA @ CENTER OF HOLE HAD  
3,000 LPM SCRAPED MATERIAL  
& PUT IN BOX RE-SCAN BASE OF  
HOLE. ALL 4 WALLS AND BASE  
SCAN CLEAR COLLECTING SAMPLES  
14:00 COLLECT SAMPLES



LPSS06 NE CORNER  
@ BOTTOM (9')

LPSS07 SE  
CORNER @ BOTTOM  
(10')

LPSS08 SW  
CORNER @ BOTTOM  
(9')

LPSS09 NW  
CORNER @ BOTTOM  
(10')

LPSS10 CENTER  
@ BOTTOM (10')

Jeff Carter 3/30/05

(90)

WED  
3/30/05LAGARDE PARK  
2ND RA

14:30 CALLED ROY HOCKSTRA (STED)  
TO REPORT COMPLETION OF  
SAMPLING & GET APPROX. TO  
BACKFILL HOLE & FINISH  
FIELD EFFORT.

15:40 HEARD FROM ROY  
OK TO BACK FILL EXCAVATION  
UXO TECH SWEEP ENTIRE AREA  
SO CAN REGRADE EXCAVATION AREA  
TO IMPROVE DRAINAGE. FILLED  
1 AND 1/2 BOXES w/ POTENTIALLY  
CONTAMINATED MATERIAL -  
WILL STAGE FULL BOXES INSIDE  
FENCE AND MOVE ALL EMPTIES BACK  
TO SOMMERALL ROAD.

16:20 COMPLETED BACKFILL & GRADING  
SITE. <sup>FULL</sup> BOXES STAGED IN FENCE  
AREA. EMPTIES BOXES MOVED  
TO SOMMERALL GATE RD. RCT  
SCANNED OUT SKID STEER, TRACHOE  
& BULLDOZER. RCT SCANNED BOXES  
ALL CLEAR

Jeff C. 3/30/05

LAGARDE PARK  
2ND RA3/30/05 (91)  
WED

16:40 CALLED UNITED RENTAL  
~~RELEASED~~ EXCAVATOR, SKID  
STEER & FORKLIFT (SMALL)  
PICKUP # 8222412

KEEPING LARGE FORKLIFT  
(PARKED INSIDE FENCE @ SITE)  
& DOZER UNTIL BOXES ARE  
SHIPPED OUT.

SITE GATE SECURED. RETRIEVED  
ALL DOSIMETERS AND MOVING  
DOWN TO SOMMERALL GATE  
ROAD.

17:10 EQUIPMENT STAGED OUTSIDE  
SOMMERALL GATE. REFUELING  
EQUIPMENT FOR RELEASE.

RELEASED JEFF YONAS (FOOT UXO)  
& JASON FADDIS (ANXIER, RCT)

17:20 ALL PERSONNEL LEAVING  
SECURED SOMMERALL GATE

3/30/05 Jeff C.



(72)

MON

4/4/05

LAGARDE

ZURR A

114-106-020

12:00 ON SITE SUNNY, MID 70° F  
MET W/ DWIGHT HIXSON (IMPACT)

BRIAN MCKAMEY, JUSTIN MCKAMEY  
(STOP) MOVING BOXES DOWN  
FROM SITE.

14:05 HIXSON CERTIFIED LOAD  
LOADS PROPERLY ON TRUCK  
LEAVING SITE.

14:30 INSTALLED 100' of SILT  
FENCE @ DOWNSLOPE SIDE  
OF EXCAVATION AREA.  
LOCKED GATE LEAVING SITE

14:40 ALL EQUIPMENT STAGED OUTSIDE  
SUMMERALL GATE. CALLED RENTAL  
COMPANY TO PICKUP.

LOCKED SUMMERALL GATE RETURN  
KEY TO GREG SCHANK (MATRIX)

15:20 LEAVE ANNISTON

JH/CAT 4/4/05

## **Appendix B**

### **Photographs of Removal Action**

**LaGarde Park, Anniston, Alabama**  
**Final Removal Action**



Photo 1 Site View Facing South (PreDig)



Photo 2 Site View Facing South (PreDig)

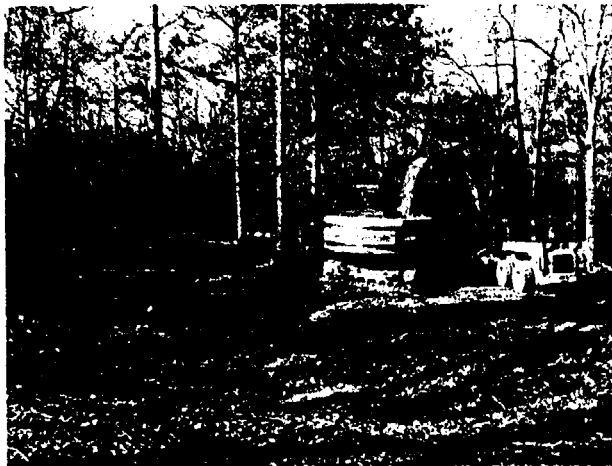


Photo 3 Excavation 1 View Facing Southwest



Photo 4 Excavation 1 View Facing Northeast



Photo 5 Excavation 1 View Facing East



Photo 6 Scanning Soil Excavation 1  
(View Facing North)



Photo 7 Scanning Soil Excavation 1  
(View Facing North)

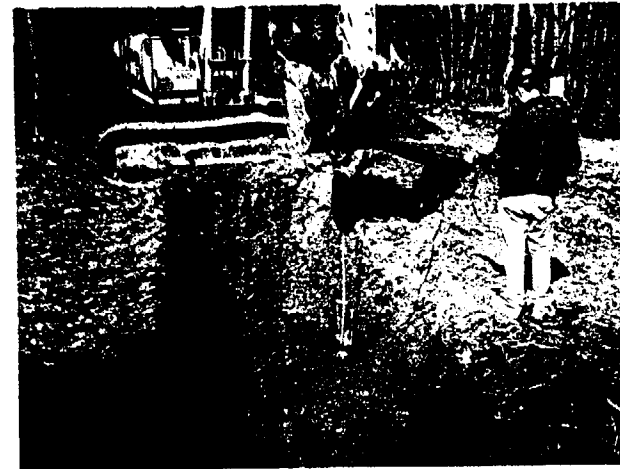


Photo 8 Scanning Base of Excavation 1  
(View Facing West)



Photo 9 Scanning Base of Excavation 1  
(View Facing West)



Photo 10 Assembly for Scanning Excavation Sidewall

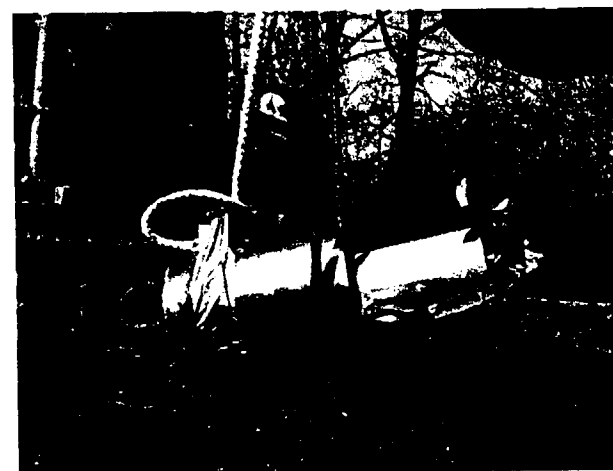


Photo 11 Assembly for Scanning Excavation Sidewall  
(Closeup)

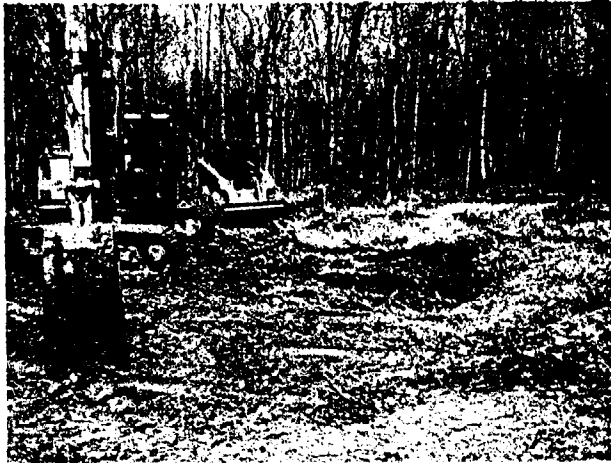


Photo 12 Begin Excavation 2  
(View Facing North)



Photo 13 Scanning Soil from Excavation 2  
(View Facing North)



Photo 14 Excavation 2  
(View Facing East)



Photo 15 Excavation 2  
(View Facing South)



Photo 16 Plastic in Excavation 2  
(View Facing East)



Photo 17 Plastic in Excavation 2  
(View Facing North)



Photo 18 Sidewall of Excavation 2  
(View Facing South)



Photo 19 Front wall of Excavation 2  
(View Facing East)



Photo 20 Back wall of Excavation 2  
(View Facing West)



Photo 21 Side wall of Excavation 2  
(View Facing North)



Photo 22 Re-grading Site  
(View Facing Northeast)





Photo 23, 24, and 25  
Panoramic View of Re-graded Site  
(View Facing East)



Photo 26 View of Re-graded Site  
(View Facing Southeast)



Photo 27 View of Re-graded Site  
(View Facing Northeast)

**Appendix C**

**Instrument Calibration Forms**

## INSTRUMENT QUALITY CONTROL CHECK FORM

METER: (READOUT)	MODEL	2221
	S/N	117650
DETECTOR:	MODEL	44-7
	S/N	012883
	UNITS	cpm
	MODE	rate
HEADPHONE CHECK		N/A

METER CALIBRATION DUE DATE	19 Aug 05
-------------------------------	-----------

DETECTOR CALIBRATION DUE DATE	2 Jan 06
----------------------------------	----------

DATE COMBINATION BASELINE RESPONSE ESTABLISHED	N/A
---	-----

CHECK SOURCES	
RADIONUCLIDE	Cs 137
ID	AA22

RADIONUCLIDE	Co 60
ID	AA23

DATE/TIME OF CHECK	BATTERY RESPONSE	HIGH VOLTAGE	INPUT SENSITIVITY (THRESHOLD)	BACKGROUND READING	INSTRUMENT READING				SURVEY. INITIALS	LOCATION/ COMMENTS
					CHECK SOURCE #1		CHECK SOURCE #2			
					GROSS	NET	GROSS	NET		
1000 3-24-05	6.0	1000	35.3	800	60000	59200	46000	45200	RJF	20' cable in hole @ hole
0700 3-24-05	6.0	1000	35.3	800	60000	59200	46000	45200	RJF	" "
1630 3-30-05	6.0	990	35.3	800	60000	59200	46000	45200	RJF	" "

Check Source #1: + or - 20% Net Source Response Limits are 47360 to 71040.Check Source #2: + or - 20% Net Source Response Limits are 36160 to 54240.

IMPLAG 19

Data Reviewed By:

M. J. Gump

Date Reviewed:

4/20/05

g:\mcs\forms\field\instrqc2.xls 2/7/97

## INSTRUMENT QUALITY CONTROL CHECK FORM

METER: (READOUT)  DETECTOR:	MODEL	12
	S/N	117166
	MODEL	44-9
	S/N	108883
	UNITS	cpm
	MODE	rate
	HEADPHONE CHECK	N/A

METER CALIBRATION DUE DATE	1/2/06
-------------------------------	--------

DETECTOR CALIBRATION DUE DATE	12/22/05
----------------------------------	----------

DATE COMBINATION BASELINE RESPONSE ESTABLISHED	N/A
---	-----

CHECK SOURCES	
RADIONUCLIDE	Cs 137
ID	AA22

RADIONUCLIDE	Co 60
ID	AA23

[illegible]

Check Source #1: + or - 20% Net Source Response Limits are 47968 to 71952

Check Source #2: + or - 20% Net Source Response Limits are 6368 to 9552

Data Reviewed By: N. G. Campbell

Date Reviewed: 4/20/05

g. Կողմնակի մեկնումներ. Իրադրություն 2. և 3. 2/10/17



## INSTRUMENT QUALITY CONTROL CHECK FORM

METER: (READOUT)	MODEL	19
	S/N	13124
DETECTOR:	MODEL	NIA
	S/N	N/A
	UNITS	nR/hr
	MODE	RAK
HEADPHONE CHECK		NIA

METER CALIBRATION DUE DATE	2/20/06
-------------------------------	---------

DETECTOR CALIBRATION DUE DATE	
----------------------------------	--

DATE COMBINATION BASELINE RESPONSE ESTABLISHED	
---	--

CHECK SOURCES	
RADIONUCLIDE	Cs 137
ID	AA22

RADIONUCLIDE	Cs 60
ID	AA23

DATE/TIME OF CHECK	BATTERY RESPONSE	HIGH VOLTAGE	INPUT SENSITIVITY (THRESHOLD)	BACKGROUND READING	INSTRUMENT READING				SURVEY. INITIALS	LOCATION/ COMMENTS
					CHECK SOURCE #1		CHECK SOURCE #2			
					GROSS	NET	GROSS	NET		
3-24-05 1600	OK	N/A	N/A	17	200	183	150	133	RJR	hotel
3-24-05 0100	OK	N/A	N/A	8	200	192	150	142	RJR	site BKG 10-1-1-1
3-30-05 1630	OK	N/A	N/A	8	200	192	150	142	RJR	" "
			</							

Check Source #1: + or - 20% Net Source Response Limits are 146 to 220Check Source #2: + or - 20% Net Source Response Limits are 106 to 160Data Reviewed By: M. G. [Signature]Date Reviewed: 4/20/05

g:\users\h\forms\field\instcheck2.xls 2/7/07



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

# CERTIFICATE OF CALIBRATION

**LUDLUM MEASUREMENTS, INC.**

POST OFFICE BOX 810 PH. 325-235-5494  
501 OAK STREET FAX NO. 325-235-4672  
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER AUXIER & ASSOCIATES

ORDER NO. 220960/284119

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 117650

Mfg. \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_

Cal. Date 19-Aug-04 Cal Due Date 19-Aug-05 Cal. Interval 1 Year Meterface 202-159

Check mark ☒ applies to applicable Instr. and/or detector IAW mfg. spec. T. 73 °F RH 55 % Alt 698.8 mm Hg

☐ New Instrument ☐ Instrument Received ☒ Within Toler.  $\pm 10\%$  ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☒ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☒ Window Operation ☒ Geotropism

☒ Audio ck. ☐ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 4.4 VDC

☒ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 900 V Input Sens. 35 mV Det. Oper. \_\_\_\_\_ V at \_\_\_\_\_ mV Threshold  
Dial Ratio 100 = 10 mV

☒ HV Readout (2 points) Ref./Inst. 500 / 494 V Ref./Inst. 2000 / 1983 V

## COMMENTS:

Calibrated with 39 inch cable.

Firmware: 26 10 72  
calibrated w/ window in "out" position.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1K	400 Kcpm	400	400
X 1K	100 Kcpm	100	100
X 100	40 Kcpm	400	400
X 100	10 Kcpm	100	100
X 10	4 Kcpm	400	400
X 10	1 Kcpm	100	100
X 1	400 cpm	400	400
X 1	100 cpm	100	100

\*Uncertainty within  $\pm 10\%$  C.F. within  $\pm 20\%$

Range(s) Calibrated Electronically

REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout					
400 Kcpm	N/A	400(66)	500 Kcpm	500K	500K
40 Kcpm		400(70)	50 Kcpm	50K	50K
4 Kcpm		400(6)	5 Kcpm	5K	5K
400 cpm		400(0)	500 cpm	500	500
40 cpm		40(0)	50 cpm	50	50

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL 2540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

## Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ S105 ☐ T1008 ☐ T879 ☐ E562 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N \_\_\_\_\_ ☐ Beta S/N \_\_\_\_\_ ☐ Other \_\_\_\_\_

☒ m 500 S/N 578881 ☐ Oscilloscope S/N \_\_\_\_\_ ☒ Multimeter S/N 80040300

Calibrated By: Michael J. Shaw Date 19-Aug-04

Reviewed By: W. J. Shaw Date 20-Aug-04

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.  
FORM C22A 11/26/2003

AC Inst. ☐ Only ☐ Passed Dielectric (H-Pot) and Continuity Test  
Failed: \_\_\_\_\_





Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

COPY

**LUDLUM MEASUREMENTS, INC.**

POST OFFICE BOX 810 PH. 325-235-5494

501 OAK STREET

FAX NO. 325-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

### Bench Test Data For Detector

Detector 44-2 Serial No RN 012883

Customer AUXIER &amp; ASSOCIATES

Order #. 227999/287626

Counter 2221 Serial No. 117627

Counter Input Sensitivity 3.5 mV

Count Time 6 sec Distance Source to Detector Surface

Other \_\_\_\_\_

[illegible]

**Signature**

Michael J Homer

Date \_\_\_\_\_

2-Jan-04



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

**LUDLUM MEASUREMENTS, INC.**

POST OFFICE BOX 810 PH. 325-235-5494

501 OAK STREET

FAX NO. 325-235-4672

SWEETWATER, TEXAS 79556, U.S.A.

### CONVERSION CHART

Customer AUXIER & ASSOCIATES Date 2-Jan-05 Order # 227999/287626

Model 2221 Serial No. 117627 Detector Model 44-2 Serial No. RN 012883

Source Cs-137  $\frac{2}{MTT}$  1.9 mCi

High Voltage 1000 V

Input Sensitivity 35 mV

Reference Point	"As Found" Readings (CPM):		After Adjustment Readings (CPM):	
	Analog	Range/Scale	Analog	Range/Scale
4000 $\mu R/hr$	340 cpm	x1k	340 cpm	x1k
1000	180	↓	180	↓
400	70	↓	70	↓
200	340	x100	340	x100
100 ↓	180 ↓	↓	180 ↓	↓

Reference Point	"As Found" Readings:		After Adjustment Readings:	
	Digital	Count Time	Digital	Count Time
4000 $\mu R/hr$	33749	6sec	33749	6sec
1000	17206	↓	17206	↓
400	6859	↓	6859	↓
200	3396	↓	3396	↓
100 ↓	1749	↓	1749	↓

Signature: Michael J Thomas

Date 2-Jan-05



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

# CERTIFICATE OF CALIBRATION

**LUDUM MEASUREMENTS, INC.**

PO: P.O. BOX 810 PH. 325-235-5494  
501 OAK STREET FAX NO. 325-235-4672  
SWEETWATER, TEXAS 79556 U.S.A.

CUSTOMER AUXIER & ASSOCIATES

ORDER NO. 227999/287626

Model 12

Serial No. 117166

Model

Serial No.

Cal. Date 2-Jan-05 Cal Due Date 2-Jan-06 Cal. Interval 1 Year Meterface 202-635

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 41 % Alt 700.8 mm Hg

☐ New Instrument ☐ Instrument Received ☐ Within Toler. +10% ☐ 10-20% ☒ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☐ Window Operation ☒ Geotropism

☒ Audio ck. ☐ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 2.2 VDC

☒ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 750 V Input Sens. 35 mV Det. Oper.        V at        mV Threshold        mV

☒ HV Readout (2 points) Ref./Inst. 500 / 480 V Ref./Inst. 2000 / 1987 V

COMMENTS: Calibrated with 39" cable.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-B in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1000	400Kcpm	320	400
X 1000	100Kcpm	90	90
X 100	40Kcpm	320	400
X 100	10Kcpm	90	100
X 10	4Kcpm	320	400
X 10	1Kcpm	90	100
X 1	400cpm	320	400
X 1	100cpm	90	100

\*Uncertainty within ± 10% C.F. within ± 20%

All Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	40Kcpm	4018(0)	Log Scale		
	4Kcpm	401(0)			
	400cpm	40(0)			
	40cpm	4(0)			

Ludum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

## Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M665 ☐ S106 ☐ T1008 ☐ T879 ☐ E852 ☐ E851 ☐ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ m 500 S/N 578881 ☐ Oscilloscope S/N ☒ Multimeter S/N 80040300

Calibrated By: Michael J. Thomas Date 2-Jan-05

Reviewed By: W. J. [Signature] Date 5 Jan 05

This certificate shall not be reproduced except in full, without the written approval of Ludum Measurements, Inc. FORM C22A 11/26/2003

AC Inst. Only ☐ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed:



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

# COPY

## LUDLUM MEASUREMENTS, INC.

POST OFFICE BOX 810 PH. 325-235-5494  
501 OAK STREET FAX NO. 325-235-4672  
SWEETWATER, TEXAS 79556, U.S.A.

### CONVERSION CHART

Customer AUXIER & ASSOCIATES Date 29-Dec-04 Order # 227999/287626

Model 2221 Serial No. 117627 Detector Model 44-9 Serial No. PR108883

Source Cs-137 194.6

High Voltage 900 V

Input Sensitivity 35 mV

Reference Point	"As Found" Readings (CPM):		After Adjustment Readings (CPM):	
	Analog	Range/Scale	Analog	Range/Scale
150 mR/hr	N/A	N/A	320	x1K
50	↓	↓	140	↓
15	↓	↓	60	↓
5	↓	↓	200	x100
1.5	↓	↓	50	↓
1.0	↓	↓	30	↓

Reference Point	"As Found" Readings:		After Adjustment Readings:	
	Digital	Count Time	Digital	Count Time
150 mR/hr	N/A	N/A	32659	6 sec
50	↓	↓	14102	↓
15	↓	↓	6047	↓
5	↓	↓	2091	↓
1.5	↓	↓	556	↓
1.0	↓	↓	354	↓

Signature: Michael J. Thorne

Date 29-Dec-04



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

**CERTIFICATE OF CALIBRATION**

**LUDLUM MEASUREMENTS, INC.**

POST OFFICE BOX 810 PH. 325-235-8494  
501 OAK STREET FAX NO. 325-235-4672  
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER AUXIER & ASSOCIATES

ORDER NO. 227999/287626

Mfg. Ludlum Measurements, Inc. Model 12

Serial No. 121288

Mfg. \_\_\_\_\_ Model \_\_\_\_\_

Serial No. \_\_\_\_\_

Cal. Date 2-Jan-05 Cal Due Date 2-Jan-06 Cal. Interval 1 Year Meterface 202-635

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 41 % Alt 700.8 mm Hg

☐ New Instrument ☐ Instrument Received ☒ Within Toler.  $\pm 10\%$  ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck.

☒ Meter Zeroed

☐ Background Subtract

☐ Input Sens. Linearity

☒ F/S Resp. ck.

☒ Reset ck.

☐ Window Operation

☒ Geotopism

☒ Audio ck.

☐ Alarm Setting ck.

☒ Batt. ck. (Min. Volt) 2.2 VDC

☒ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89.

☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 800 V Input Sens. 35 mV Def. Oper. \_\_\_\_\_ V at \_\_\_\_\_ mV Threshold Dial Ratio \_\_\_\_\_ = \_\_\_\_\_ mV

☒ HV Readout (2 points) Ref./Inst. 500 / 510 V Ref./Inst. 2000 / 2022 V

COMMENTS: calibrated w/39" cable.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-B in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1000	400Kcpm	400	400
X 1000	100Kcpm	100	100
X 100	40Kcpm	400	400
X 100	10Kcpm	100	100
X 10	4Kcpm	400	400
X 10	1Kcpm	100	100
X 1	400cpm	400	400
X 1	100cpm	100	100

\*Uncertainty within  $\pm 10\%$  C.F. within  $\pm 20\%$

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout			Log Scale		
40Kcpm	4014(0)	4014(0)			
4Kcpm	401(0)	401(0)			
400cpm	40(0)	40(0)			
40cpm	4(0)	4(0)			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N223-1978. State of Texas Calibration License No. LC-1963

**Reference Instruments and/or Sources:**

Cs-137 Gamma S/N ☐ 1162 ☐ 6112 ☐ M565 ☐ 5106 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N \_\_\_\_\_

☐ Beta S/N \_\_\_\_\_

☐ Other \_\_\_\_\_

☒ m 500 S/N 578881

☐ Oscilloscope S/N \_\_\_\_\_

☒ Multimeter S/N 80040300

Calibrated By: Michael J. Thomas

Date 2-Jan-05

Issued By: WJH

Date 5-Feb-05

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.  
FORM C22A 11/26/2003

AC Inst. ☐ Only ☐ Power Diode (Hi-Pot) and Continuity Test



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

COPY

LUDLUM MEASUREMENTS, INC.  
POST OFFICE BOX 810 PH. 325-235-5494  
501 OAK STREET FAX NO. 325-235-4672  
SWEETWATER, TEXAS 79556, U.S.A.

## Bench Test Data For Detector

Detector 44-9 Serial No. PR127166Customer AUXIER & ASSOCIATESOrder #. 220960/284119Counter 2200 Serial No. 83012Counter Input Sensitivity 35 mVCount Time 1 minute B.G. / 2 minute Source Count Distance Source to Detector Surface
$$\frac{10,466 \text{ cpm} - 40 \text{ cpm}}{22,600 \text{ dpm}} = \frac{10,426 \text{ cpm}}{22,600 \text{ dpm}}$$

High Voltage	Background	Isotope <u>Tc-99</u> Size <u>14,100 cpm</u>	Isotope Size	Isotope Size	Isotope Size
--------------	------------	--	-----------------	-----------------	-----------------

900

40

10,466

Signature

Michael J. ThumDate 19-Aug-04

Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

## CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.  
POST OFFICE BOX 810 PH. 325-235-5494  
501 OAK STREET FAX NO. 325-235-46  
SWEETWATER, TEXAS 79556, U.S.A.

JMER GRIFFIN INSTRUMENTS

ORDER NO. 230493 / 288981

J. Ludlum Measurements, Inc. Model 19

Serial No. 131294

fig. Model

Serial No.

Cal. Date 23-Feb-05 Cal Due Date 23-Aug-05 Cal. Interval 6 Months Meterface 202-016

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 39 % Alt 698.8 mm H

☐ New Instrument ☐ Instrument Received ☐ Within Toler.  $\pm 10\%$  ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☒ Mechanical ck.

☒ Meter Zeroed

☐ Background Subtract

☐ Input Sens. Linearity

☒ F/S Resp. ck

☒ Reset ck.

☐ Window Operation

☒ Geotropism

☒ Audio ck.

☐ Alarm Setting ck.

☒ Batt. ck. (Min. Volt) 2.2 VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89.

☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 775 V Input Sens. 35 mV Det. Oper. V at mV Threshold Dial Ratio =

☐ HV Readout (2 points) Ref./Inst. / V Ref./Inst. / V

### COMMENTS:

# COPY

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
5000	4000uR/hr	N/A	4200
5000	1000uR/hr		1000
500	400uR/hr = 748.00 cpm		400
500	100uR/hr		100
250	200uR/hr = 362.00 cpm		200
250	100uR/hr		100
50	748.0 cpm		40
50	187.0 cpm		20
25	362.0 cpm		20
25	90.5 cpm		5

\*Uncertainty within  $\pm 10\%$  C.F. within  $\pm 20\%$

50, 25 Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING
Digital Readout			Log Scale		

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration technique. The calibration system conforms to the requirements of ANSI/NCSS Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-19

### Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ S105 ☐ T1008 ☒ T879 ☐ E552 ☐ E551 ☐ 720 ☐ 734 ☐ 1616 ☐ Neutron Am-241 Be S/N T-3

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ m-300 S/N 125489 ☐ Oscilloscope S/N ☒ Multimeter S/N 68260348

Calibrated By: V. Lee Alvarado Date 23 Feb 05

Reviewed By: W. R. L. Date 23 Feb 05



## GRIFFIN INSTRUMENTS



## CALIBRATION CERTIFICATE FOR 44-10 PROBE # PR132947

Owner: IMPACT

DATE: 08/23/05

LOCATION: Griffin Inst

TECH: J. Glenn

DATE LAST CAL EXPIRES:

02/03/05

## REASON FOR CALIBRATION:

☒ Due For Calibration ☐ Repair (See Remarks) ☐ Other (See Remarks) ☐ Due and Repair

## NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2221

SERIAL #: 126523

CAL. DUE: 01/02/06

MODEL:

SERIAL #:

CAL. DUE:

SOURCE #: Other

ISOTOPE:

ACTIVITY:

ASSAY DATE:

SOURCE #: 99-1816

ISOTOPE: Cs137

ACTIVITY: 1.23 uCi

ASSAY DATE: 08/12/99

GEOMETRY: For G-5 Probe - Source placed in desk drawer, no planchet or jig, probe on top of desk. All Others: Jig upside down with source underneath, activity side up.

Physical Condition: ☒ Sat ☐ Unsat

Efficiency From Last Calibration: 4.5%

Previous HV Set Point: 900 V

Counts (CPM)

Background (CPM)

Net CPM:

Decay (yrs): 6.00

126501

8933

117566

AF Efficiency: 4.95%

Is the AF efficiency within 20% of the efficiency from the last calibration?

☒ Yes ☐ No

Reproducibility: 124990

124510

124170

Average:

124556.67

Are the Individual counts within 10% of the average?

☒ Yes ☐ No

High Voltage:

Source Response (CPM):

Background (CPM):

Net CPM:

N/A




HV

RESPONSE

BACKGROUND

NET CPM

Decay (yrs):

6.00

V

Efficiency:

Remarks:

Does Instrument Meet Final Acceptance Criteria?:

☒ Yes ☐ No

Calibration Sticker Attached?:

☒ Yes ☐ No

Date Instrument Is Due For Next Calibration:

08/23/06

Performed/Reviewed by:

*Joanne Glenn*

Date: 8/23/2005

Entered by:

Initials





GRIFFIN INSTRUMENTS



## CALIBRATION CERTIFICATE FOR

44-10

PROBE #

PR132947

IMPACT

DATE: 02/03/04		LOCATION: Griffin Inst	
TECH: J. Glenn		DATE LAST CAL EXPIRES:	
REASON FOR CALIBRATION:			
<input checked="" type="radio"/> Due For Calibration <input type="radio"/> Repair (See Remarks) <input type="radio"/> Other (See Remarks) <input type="radio"/> Due and Repair			
EQUIPMENT USED DURING CALIBRATION			
MODEL: 12	SERIAL #: 121356	CAL. DUE: 02/03/05	
MODEL:	SERIAL #:	CAL. DUE:	
SOURCES			
SOURCE #: Other	SOURCE #: 99-1816		
ISOTOPE:	ISOTOPE: Cs137		
ACTIVITY:	ACTIVITY: 1.23 uCi		
ASSAY DATE:	ASSAY DATE: 08/12/99		

GEOMETRY: For G-5 Probe - Source placed in desk drawer, no planchet or jig, probe on top of desk. All Others: Jig upside down with source underneath, activity side up.			
Physical Condition: <input checked="" type="radio"/> Sat <input type="radio"/> Unsat		Previous HV Set Point: V	
Efficiency From Last Calibration:			
Counts (CPM)	Background (CPM)	Net CPM:	
AF Efficiency:			
Is the AF efficiency within 20% of the efficiency from the last calibration? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Reproducibility: 120000	120000	120000	Average: 120000.00
Are the individual counts within 10% of the average? <input checked="" type="radio"/> Yes <input type="radio"/> No			

Copy



## GRIFFIN INSTRUMENTS



## PLATEAU AND SET POINT DATA

Date: 02/03/04

High Voltage:	Source Response (CPM):	Background (CPM):	Net CPM:
650	100000	5000	95000
700	110000	7500	102500
750	115000	7500	107500
800	120000	8000	112000
850	122000	8000	114000
900	130000	8500	121500
950	130000	8500	121500

HV	RESPONSE	BACKGROUND	NET CPM	Efficiency:
900 V	130000	8500	121500	4.45%

Remarks: No previous cal data.

Does Instrument Meet Final Acceptance Criteria?:

☒ Yes ☐ No

Calibration Sticker Attached?:

☒ Yes ☐ No

Date Instrument is Due For Next Calibration:

02/03/05

Performed by:

*James Blum*

Reviewed by:

*Sam*

Date:

2-3-04

Entered in Computer Inventory By:

*James Blum*

Date:

2/3/04

Copy

**Appendix D**

**Data Validation Report  
and  
Laboratory Forms**

**DATA VALIDATION REPORT**  
**for the**  
**Final Removal Action at LaGarde Park**  
**Anniston, Alabama**

**Prepared**

**By**

**Solutions To Environmental Problems, Inc**

**May 2005**

## Table of Contents

---

	Page
1.0 Introduction .....	1
2.0 Procedures .....	1
3.0 Summary of Data Validation .....	1
4.0 Analysis-Specific Data Validation Summaries .....	2
4.1 Gamma Scan by EML HASL 300, 4.5.2.3 .....	2
5.0 Data Qualifier Definitions .....	3

### Tables

Table 1 Data Validation Reason Codes .....	4
--	---

## **La Garde Park**

### **1.0 Introduction**

---

The data validation of eleven soil samples from La Garde Park, that were analyzed for cesium-137 and Co-60 (EML HASL 300, 4.5.2.3), was completed in May, 2005. Level III data validation was performed on 100% of the environmental samples collected during the remedial investigation activities. General Engineering Labs, Charleston, SC, produced all the analytical data.

### **2.0 Procedures**

---

The sample data were validated following the logic identified in the STEP Data Validation Procedures for "Radiological Analysis" and "Gross Alpha/Beta" (1995). The data validation qualifiers applied by the reviewer were recorded in a column adjacent and to the right of the laboratory results. A data validation reason code was also added to each of the reviewer's qualifiers to provide the user with a means to identify which results were qualified and the reason for the qualifiers (Table 1, Page 5).

### **3.0 Summary of Data Validation Findings**

---

This data validation report reflects the data validation findings for samples associated with La Garde Park. Overall the data was of excellent quality and all measurements required to satisfy the project QC objectives, PARCC were met. Each of these measures and specific data qualifications are discussed below.

*Accuracy:* Accuracy is measured by the results from the recovery of known amounts of compounds or elements from laboratory control samples (LCS), matrix spikes (MS) and surrogate recoveries. The overall measure of accuracy for the site was calculated by comparing the number of spike recoveries that exceeded the laboratory limits by the total number of LCS, MS and surrogate spikes. For the cesium and cobalt results accuracy was measured at 100%.

*Precision:* Precision is a measure of the agreement between duplicate sample measurements of the same quantity and is reflected in the RPD between spikes and the RPD for the field duplicate analysis. The overall project QC objective for precision is 90% or greater, and the measurement for La Garde Park is 100%.

*Representativeness:* The measures of representativeness -- sample handling, analytical blank analysis, field blanks -- were met for all sites. Designated analytical protocols were followed. Holding times were met. Overall, no major problems were identified resulting from analytical failure.

*Comparability:* All data were analyzed using appropriate approved methods of analysis. All data results were reported correctly and in standard units

*Completeness:* Completeness is the amount of valid data compared to the planned amount and is expressed as a percent of the usable data points divided by the total number of analytes for each parameter analyzed. Out of a total of 22 data points, no data were rejected, resulting in a completeness of 100%.

Data validation summaries, which function as worksheets for the validation task, are included for each parameter in each data package. The following section highlights the key findings of the data validation for each analysis.

## **4.0 Analysis-Specific Data Validation Summaries**

---

### ***Cesium-137 and Co-60 by EML HASL 300, 4.5.2.3***

Eleven soil samples were analyzed and validated for radiological constituents. Overall, the data are of good quality and are usable as qualified. Data were reviewed for the following:

***Holding Times/Sample Condition.*** No qualifiers were required. All holding times were met.

***Initial and Continuing Calibration.*** All standards were calibrated as required. The CCVS efficiencies were checked and calibration frequencies were met.

**Blanks.** No elements were noted in the blanks. No qualifiers were required.

**Matrix Spike/Matrix Spike Duplicate(MS/MSD)/Duplicate.** No MS/MSD results were analyzed.

**Laboratory Control Sample (LCS).** LCS analyses were performed for the project samples and all QC criteria were met.

**Field Duplicates.** Field duplicates were evaluated and the results were within the QC limit.

**Quantitation.** All results were acceptable as reported by the laboratory.

## **5.0 Data Qualifier Definitions**

### **Qualifier**

- U** The analyte was analyzed for, but was not detected above the reported sample quantitation limit or the reported analyte value was not detected above 5x or 10x the level reported in laboratory or field blanks.
- J** The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ** The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
- R** The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet quality control criteria. The presence or absence of the analyte cannot be verified.



**Table 1: Data Validation Reason Codes**

Reason Code	Definition
01	Sample received outside of 4+/-2 degrees Celsius
01A	Improper sample preservation
02	Holding time exceeded
02A	Extraction
02B	Analysis
03	Instrument performance – outside criteria
03A	BFB
03B	DFTPP
03C	DDT and/or Endrin % breakdown exceeds criteria
03D	Retention time windows
03E	Resolution
04	Initial calibration results outside specified criteria
04A	Compound mean RRF QC criteria not met
04B	Individual % RSD criteria not met
04C	Correlation coefficient >0.995
05	Continuing calibration results outside specified criteria
05A	Compound mean RRF QC criteria not met
05B	Compound % D QC criteria not met
06	Result qualified as a result of the 5x/10x blank correction
06A	Method or preparation blank
06B	ICB or CCB
06C	ER
06D	TB
06E	FB
07	Surrogate recoveries outside control limits
07A	Sample
07B	Associated method blank or LCS
08	MS/MSD/Duplicate results outside criteria
08A	MS and/or MSD recovery not within control limits (accuracy)
08B	% RPD outside acceptance criteria (precision)
09	Post digestion spike outside criteria (GFAA)
10	Internal standards outside specified control limits
10A	Recovery
10B	Retention time
11	Laboratory control sample recoveries outside specified limits
11A	Recovery
11B	% RPD (if run in duplicate)
12	Interference check standard
13	Serial dilution
14	Tentatively identified compounds
15	Quantitation
16	Multiple results available; alternate analysis preferred
17	Field duplicate RPD criteria is exceeded
18	Percent difference between original and second column exceeds QC criteria
19	Professional judgment was used to qualify the data
20	Pesticide clean-up checks
21	Target compound identification
22	Radiological calibration
23	Radiological quantitation
24	Reported result and/or lab qualifier revised to reflect validation findings

SDG: 133576 Project: LaGarde Park

Method: Radiological Matrix/No. of Samples: Soil - 11

Validation Samples: LPSS 010305 LPSS 040305 LPSS 070305  
LPSS 020305 LPSS 050305 LPSS 080305  
LPSS 030305 LPSS 060305 LPSS 090305  
LPSS 060305DUP LPSS 100305

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	<u></u>
2. Chain of Custody	<u>A</u>	<u>see comment #1</u>
3. Holding Times	<u>A</u>	<u></u>
4. Calibrations	<u>A</u>	<u></u>
5. Blanks	<u>A</u>	<u></u>
6. ICP/ICS	<u>N/A</u>	<u></u>
7. Blank Spike/LCS	<u>A</u>	<u></u>
8. Duplicates	<u>A</u>	<u></u>
9. Matrix Spike	<u>N/A</u>	<u></u>
10. Furnace Atomic Absorption QC	<u>N/A</u>	<u></u>
11. ICP Serial Dilution	<u>N/A</u>	<u></u>
12. Sample Result Verification	<u>A</u>	<u></u>
13. Field QC Samples	<u>A</u>	<u></u>
14. Overall Assessment	<u>A</u>	<u></u>

Status Codes:

A = Acceptable

R = Data Rejected

X = Data acceptable but qualified due to problems

## Qualifications:

---

---

---

---

---

---

---

---

---

---

## Significant Findings/Recommendations:

- #1 • The analyst did not scan samples into the batch prior to analysis, however the samples did remain in their custody at all times. Error was corrected and analyst instructed in the proper procedure.

---

---

---

---

---

---

---

---

---

---

## Overall Data Quality:

Acceptable as reported

---

---

---

---

---

---

Date: 4/29/2005

Validator's Signature:

J. Thomas Kitching

Peer Reviewer:





# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Report Date: April 27, 2005

Contact: Mr. Dong Hawn  
Project: La Garde Park ESI

Client Sample ID: LPSS010305  
Sample ID: 133576001  
Matrix: Soil  
Collect Date: 30-MAR-05 10:05  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qual	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
<i>GammaSpec, Gamma, Solid (Standard List)</i>													
Cesium-137	U	0.00161	+/-0.0125	0.0202	0.100	pCi/g	u		AKB	04/05/05	2206	413891	I
Cobalt-60		0.209	+/-0.0327	0.0184	0.100	pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Contact: Mr. Doug Hiwn  
Project: La Garde Park EST

Report Date: April 27, 2005

Client Sample ID: LPSS020305  
Sample ID: 133576002  
Matrix: Soil  
Collect Date: 30-MAR-05 10:10  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Rw

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qua	DF	Analyst	Date	Time	Batch	Metho
Rad Gamma Spec Analysis													
Gammaspex, Gamma, Solid (Standard List)													
Cesium-137	U	0.0194	+/-0.0442	0.0382	0.100	pCi/g	u		AKB	04/05/05	2207	413891	1
Cobalt-60		0.179	+/-0.039	0.037	0.100	pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TCI	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EWL HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Step, Inc.  
Address : 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Report Date: April 27, 2005

Contact: Mr. Doug Hawn  
Project: La Garde Park ESI

Client Sample ID: LPSS030305  
Sample ID: 133576003  
Matrix: Soil  
Collect Date: 30-MAR-05 10:22  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Rev

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qual	DF	Analyst	Date	Time	Batch	Metho
Rad Gamma Spec Analysis													
Gammascpec, Gamma, Solid (Standard List)													
Cesium-137		0.124	+/-0.0326	0.029	0.100	pCi/g			AKB	04/05/05	2231	413891	-1
Cobalt-60	U	0.00347	+/-0.0289	0.0259	0.100	pCi/g	U						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TCI	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	



# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Report Date: April 27, 2005

Contact: Mr. Doug Hawn  
Project: La Garde Park ESI

Client Sample ID: LPSS040305  
Sample ID: 133576004  
Matrix: Soil  
Collect Date: 30-MAR-05 10:20  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Rev

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qua	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
<i>GammaSpec, Gamma, Solid (Standard List)</i>													
Cesium-137		0.114	+/-0.0242	0.0201	0.100	pCi/g			AKB	04/05/05	2232	413891	1
Cobalt-60		0.0193	+/-0.015	0.016	0.100	pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TCI	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 555-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Contact: Mr. Doug Hawn  
Project: La Garde Park ESI

Report Date: April 27, 2005

Client Sample ID: LPSS050305  
Sample ID: 133576005  
Matrix: Soil  
Collect Date: 30-MAR-05 10:15  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Rw

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis												
GammaSpec, Gamma, Solid (Standard List)												
Cesium-137	U	0.0509	+/-0.0369	0.0671	0.100	pCi/g	u	AKB	04/06/05	0752	413891	1
Cobalt-60		0.139	+/-0.0537	0.0498	0.100	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TCI	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Collier Ct.  
Oak Ridge, Tennessee 37830

Report Date: April 27, 2005

Contact: Mr. Doug Hawn  
Project: La Grude Park ES1

Client Sample ID: LPSS060305  
Sample ID: 133576006  
Matrix: Soil  
Collect Date: 30-MAR-05 14:00  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Rev

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qual	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
GammaSpec, Gamma, Solid (Standard List)													
Cesium-137		0.178	+/-0.0441	0.0459	0.100	pCi/g			AKB	04/06/05	0752	413891	1
Cobalt-60		0.115	+/-0.0407	0.0396	0.100	pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Contact: Mr. Dong Huwn  
Project: La Garde Park ESI

Report Date: April 27, 2005

Client Sample ID: LPSS060305 DUP  
Sample ID: 133576007  
Matrix: Soil  
Collect Date: 30-MAR-05 14:00  
Receive Date: 01-APR-05  
Collector: Client  
Project: STEP00402  
Client ID: STEP001  
Rev

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qu	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammascpec, Gamma, Solid (Standard List)													
Cesium-137		0.178	+/-0.0702	0.0588	0.100	pCi/g			AKB	04/06/05	0831	413891	1
Cobalt-60	U	0.0801	+/-0.0401	0.0862	0.100	pCi/g	u						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Steg, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Report Date: April 27, 2005

Contact: Mr. Doug Hawn  
Project: La Garde Park ESI

Client Sample ID: LPSS070305  
Sample ID: 133576008  
Matrix: Soil  
Collect Date: 30-MAR-05 14:15  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Rw

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qual	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammascpec, Gamma, Solid (Standard List)													
Cesium-137		5.93	+/-0.439	0.0577	0.100	pCi/g			AKB	04/07/05	0753	413691	1
Cobalt-60		0.228	+/-0.0564	0.0507	0.100	pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TC1	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Contact: Mr. Doug Hawn  
Project: La Garde Park ESI

Report Date: April 27, 2005

Client Sample ID: LPSS080305  
Sample ID: 133576009  
Matrix: Soil  
Collect Date: 30-MAR-05 14:22  
Receive Date: 01-APR-05  
Collector: Client  
Project: STEP00402  
Client ID: STEP001  
RW

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Quoted	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammascpec, Gamma, Solid (Standard List)													
Cesium-137		0.100	+/-0.0291	0.0273	0.100	pCi/g			AKB	04/07/05	2111	413691	1
Cobalt-60	U	-0.0059	+/-0.0156	0.0265	0.100	pCi/g	LC						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TCI	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Step, Inc.  
Address : 1006 Floyd Celler Ct.  
Oak Ridge, Tennessee 37830

Report Date: April 27, 2005

Contact: Mr. Doug Hawn  
Project: La Garde Park ES1

Client Sample ID: LPSS090305  
Sample ID: 133576010  
Matrix: Soil  
Collect Date: 30-MAR-05 14:20  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

Rev

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qual	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>													
<i>Gamma spec, Gamma, Solid (Standard List)</i>													
Cesium-137		0.179	+/-0.0434	0.0352	0.100	pCi/g			AKB	04/07/05	2341	413891	1
Cobalt-60	U	0.00725	+/-0.0194	0.0362	0.100	pCi/g	U						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TCI	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	

# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company: Step, Inc.  
Address: 1006 Floyd Culler Ct.  
Oak Ridge, Tennessee 37830

Report Date: April 27, 2005

Contact: Mr. Doug Hawn  
Project: La Garde Park ESI

Client Sample ID: LPSS100305  
Sample ID: 133576011  
Matrix: Soil  
Collect Date: 30-MAR-05 14:17  
Receive Date: 01-APR-05  
Collector: Client

Project: STEP00402  
Client ID: STEP001

RW

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	Qual	DF	Analyst	Date	Time	Batch	Metho
Rad Gamma Spec Analysis													
Gammascpec, Gamma, Solid (Standard List)													
Cesium-137		0.835	+/-0.141	0.0776	0.100	pCi/g			AKB	04/07/05	2341	413891	I
Cobalt-60		0.128	+/-0.0778	0.0649	0.100	pCi/g							

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	TCI	04/04/05	1133	413761

### The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EML HASL 300, 4.5.2.3	



# DATA VALIDATION WORKSHEET RADIOLOGICAL

Reviewer: Kitchings

Date: 4/29

Object: LaGarde Park

SDG: 133576

Matrix/No. Samples: 5-11

<b>I. Sample Management</b>			
<b>A. Sample Preservation, Handling and Transport</b>			
1. Have all samples been preserved with HNO <sub>3</sub> to pH <2?	Yes	No	<u>N/A</u>
2. Have sample temperatures been kept at 4°C (+ or - 2°C)?	Yes	<u>No</u>	N/A
3. Were all samples received in proper condition?	<u>Yes</u>	No	N/A
4. Were any qualifications required based on this information?	Yes	<u>No</u>	N/A
Cooler @ <u>19.0°C</u> - no quals required.			
<b>B. Chain of Custody</b>			
1. Were all samples properly recorded on COCs? <u>see #1</u>	<u>Yes</u>	No	N/A
2. Were correct analyses performed on samples? <u>document #1</u>	<u>Yes</u>	No	N/A
<b>C. Holding Times</b>			
1. Were samples analyzed within acceptable holding times?	<u>Yes</u>	No	N/A
2. Were any qualifications required based on this information?	Yes	<u>No</u>	N/A
<b>SAMPLED</b>		<b>PREPPED/ANALYZED</b>	
<u>3/30</u>		<u>4/5, 4/6</u> <u>22:06</u> <u>23:41</u>	
<b>II. Calibrations</b>			
1. Were proper number of calibration standards used for each analytical instrument used?	<u>Yes</u>	No	N/A
2. Is the calibration correlation coefficient > or = 0.995 for each analytical instrument used?	Yes	No	<u>N/A</u>
3. Are initial and continuing calibration verification %R within <u>the</u> <del>10%</del> (+ or - 1%) acceptance window?	<u>Yes</u>	No	N/A
4. Are CRDL Standard %R within 10% (+ or - 1%) acceptance window?	Yes	No	<u>N/A</u>
5. Were any qualifications required based on this information?	Yes	<u>No</u>	N/A
Comments/Qualifications: <u>NECAP cert. for initial standard</u> <div style="display: flex; justify-content: space-between;"> <div> <u>4/5 @ 7:04</u>  <u>4/6 @ 7:07</u>  <u>4/7 @ 7:17</u> </div> <div> CS 1321  Co 2660  1322  2665  1322  2662 </div> <div> <u>Window -</u>  1317-1325  2657-2665  1319-1327  2663-2671  1320-1326  2659-2663 ✓ </div> </div>			

**DATA VALIDATION WORKSHEET  
RADIOLOGICAL**

viewer: Kitchings

Date: 4/29

Subject: LaGarde Park

SDG: 133576

Matrix/No. Samples: S-1

**III. Blanks**

- |   |            |           |     |
|---|------------|-----------|-----|
| 1. Are any analytes reported in laboratory prep or calibration blanks above the MDL?      | Yes        | <u>No</u> | N/A |
| 2. Are any analytes reported as negative values in laboratory prep or calibration blanks? | Yes        | <u>No</u> | N/A |
| 3. Were any qualifications required based on this information?                            | <u>Yes</u> | <u>No</u> | N/A |

Comments/Qualifications:

818103      Cs -137    U  
                 Co -60    U

**IV. ICP Interference Check Sample (ICS)**

- |   |     |    |            |
|---|-----|----|------------|
| 1. Were ICS samples run at the beginning and end of each sample analysis run? | Yes | No | <u>N/A</u> |
| 2. Are ICS %R within 80-120% acceptable control limits?                       | Yes | No | <u>N/A</u> |
| 3. Were any qualifications required based on this information?                | Yes | No | <u>N/A</u> |

Comments/Qualifications:

**V. Blank Spike/Laboratory Control Sample (LCS)**

- |   |            |           |            |
|---|------------|-----------|------------|
| 1. Are all aqueous LCS %R within 80-120% control limits?                        | Yes        | No        | <u>N/A</u> |
| 2. Are all solid LCS %R within control limits established by EPA? <u>75-125</u> | <u>Yes</u> | No        | N/A        |
| 3. Were any qualifications required based on this information?                  | Yes        | <u>No</u> | N/A        |

Comments/Qualifications:

818105

Cs 137       $9.90 / 9.07 = 109.2$

Co 60       $14.2 / 12.9 = 110.1$

**DATA VALIDATION WORKSHEET  
RADIOLOGICAL**

Reviewer: Kitchings

Date: 4/29

Object: LaGarde Park

SDG: 133576

Matrix/No. Samples: S-11

<b>VI. Duplicates</b>			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	<u>No</u>	N/A
2. For duplicate samples >5x CRDL, were RPDs within control limits of + or - 20% for water, or + or - 35% for soil?	Yes	No	<u>N/A</u>
3. For duplicate samples <5x CRDL, were duplicate samples within control limit of + or - CRDL for water, or + or - 2xCRDL for soil?	Yes	No	<u>N/A</u>
4. Were any qualifications required based on this information?	Yes	<u>No</u>	N/A
Comments/Qualifications: 413891 Cs both a's Co 0.209 0.226 RPD = $\frac{.003}{.2075} = 1.45\%$			
<b>VII. Matrix Spike</b>			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	No	<u>N/A</u>
2. Were spike recoveries within 75-125% limits (limits do not apply when original sample concentration exceeds spike concentration by a factor of 4)?	Yes	No	<u>N/A</u>
3. Were any qualifications required based on this information?	Yes	No	<u>N/A</u>
Comments/Qualifications: None			
<b>VIII. ICP Serial Dilution</b>			
1. Were %Ds for ICP serial dilution samples within 10% for analytes with concentrations greater than 50x IDL?	Yes	No	<u>N/A</u>
2. Were any qualifications required based on this information?	Yes	No	<u>N/A</u>
Comments/Qualifications:			

**DATA VALIDATION WORKSHEET  
RADIOLOGICAL**

Reviewer: Kitchings Date: 4/29  
 Subject: LaGarde Park SDG: 133576 Matrix/No. Samples: S-11

<b>IX. Sample Result Qualification</b> Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Were correct calculations used to determine sample results?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
3. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <div style="font-family: cursive; font-size: 1.2em; padding: 10px;">             76003 CS-137 0.1242 ✓              Co-60 0.00113 &lt; 0.029 -u ✓           </div>			
<b>X. Field QC</b>			
1. Were any Field Duplicates associated with this SDG?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
a. If Yes, were RPDs acceptable (50% for water samples, 100% for soil samples)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
a. If yes, were any analytes reported in samples >IDL?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
b. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <div style="font-family: cursive; font-size: 1.2em; padding: 10px;">             60305 60305 DUP.              0.178 CS ✓ 0.178              0.115 Co ✓ u           </div>			
<b>XI. Overall Assessment of Data</b>			
1. Are there any specific concerns or limitations regarding the data in this SDG?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications:			

## **Appendix E**

### **Bill of Lading and Waste Manifests**

## STRAIGHT BILL OF LADING SHORT FORM NOT NEGOTIABLE

BOL 040405 - 01

CARRIER: F.C.C.

Shipper No:

Page 1 of 1

Date: 4/4/05

Carrier No:

Purchase / Customer Order No: N/A

Received, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described below in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier agrees to carry to its usual place of delivery, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said route to destination and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. The shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consignee: IMPACT Services, Inc.  
1001 N. Ferguson Rd. - ETPP  
Oak Ridge, TN 37830

From: Army Corps. of Engineers / STEP, Inc.  
Sommerall Gate of Fort McClellan  
Route 21  
Shipper: Anniston, AL

Wade Hixson, tTA / IMPACT Services, Inc.  
516-270-7509

Attention: Bobby Parrott, 865-576-8708

Site: LaGarde Park, Anniston, AL

Route: N/ATrailer No.: 10346Tractor No.: 98

No. Pkgs.	HM	Description of Material	Weight (Kgs.)	Class	ERG	Subject to section 7 of conditions of applicable Bill of Lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
13		Clean, used, empty metal bins (ST-90s & B-25s) Approx. 750# per bin, ~9,750# Gross Wt.	4432			<p>The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.</p> <p><u>N/A</u> Signature of the Consignor</p>
2		Metal bins (ST-90, B-25) containing soil  DOT Non-Regulated  Approx. 8000# / bin, ~ 16,000# Gross Wt.	7273			
		Gross Wt. of Load ~ 25,750#				
						If freight charges are to be pre-paid, write or stamp here "TO BE PREPAID". <u>N/A</u>
15		Totals	5455			

Total Activity:

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property:  
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

\$ N/A per (unit)

SS741 Reference

Additional information:

Material Description: DOT Non-Regulated Load of 13 Empty Metal Bins and 2 Metal Bins of DOT Non-Regulated Soil Material

Label(s) applied: none  
Markings: NONE

Project 0502010

Placard(s) required:

NONE

Transportation hereunder is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are to be reimbursed by the U.S. Government, pursuant to cost reimbursable contract number NA

This is to certify that the above named materials are properly classified, described, marked, and labeled, and are in proper condition for transportation according to applicable regulations of the U.S. Department of Transportation.

This shipment is for the U.S. Department of Energy and the actual total transportation charges paid to the carrier(s) by the consignor or consignee are assignable to, and shall be reimbursed by the U.S. Government and is subject to the terms and conditions set forth in the standard form of the U.S. Government Bill of Lading and to any available special rates or charges.  
YES ( ) NO (x )

Carrier: ITA / IMPACT

The additions on the face hereof and to the terms and conditions are hereby noted:

Carrier: Charles ShepherdPrint: Charles ShepherdPer: Charles ShepherdDate: 4/4/05

Shipper: ITA / IMPACT  
Contact: Wade Hixson  
Per: Wade Hixson



BFI OF TENNESSEE, INC.  
P.O. BOX 10267  
MURFREESBORO, TN 37129  
(615) 896-2075

LMS TICKET NO. \_\_\_\_\_  
TENNESSEE DIVISION  
NON-HAZARDOUS SPECIAL AND ASBESTOS WASTE MANIFEST

1288

### GENERATOR

GENERATOR SPECIAL WASTE - COMPLETE SECTIONS: I, II, V, VII, VIII, IX, XI  
INSTRUCTIONS ASBESTOS WASTE - COMPLETE SECTIONS: I THRU XII (Section 1, if required to analyze for hazardous waste characteristics)

SECTION I BFI WASTE CODE L45Y21940 / / / /

#### SECTION II GENERATOR

#### GENERATING LOCATION

NAME IMPACT SERVICES

MAILING ADDRESS P.O. BOX 4849 OAK RIDGE, TN 37831

PHONE NO. 865-803-2829

#### SECTION III OPERATOR/CONTRACTOR

NAME

ADDRESS

PHONE NO.

#### SECTION IV OWNER

NAME

PHONE NO.

#### SECTION V WASTE DISPOSAL SITE

#### PHYSICAL SITE LOCATION

NAME MIDDLE POINT SANITARY LANDFILL

MAILING ADDRESS P.O. BOX 10267 - MURFREESBORO, TN 37129

PHONE NO. (615) 896-2075

#### SECTION VI RESPONSIBLE AGENCY (LOCAL STATE, EPA)

NAME ST. of TENNESSEE

ADDRESS 711 R. S. GASS BLVD., NASHVILLE, TN 37216

PHONE NO. 615-687-7000

#### SECTION VII DESCRIPTION OF WASTE

CO-MINGLED WASTE

BKRU025283

040207541 and

0502010 (657516)

CONTAINERS  
NO. TYPE

1 Intermodal

CONTAINERS  
UNIT

TONNAGE

11.42

TYPE  
DM -- METAL DRUM  
DM -- PLASTIC DRUM  
BA -- 6 MIL PLASTIC  
BAGS/WRAP  
T -- TRUCK  
O -- OTHER

TYPE  
P -- POUND  
Y -- YARDS  
M<sup>3</sup> -- CUBIC  
METER  
Y<sup>3</sup> -- CUBIC  
YARDS  
O -- OTHER

ASBESTOS WASTE: RQ, ASBESTOS, 9, NA 2212, PG 111

REGULATED

NON-REGULATED

#### SECTION VIII SPECIAL HANDLING INSTRUCTIONS AND ADDITIONAL INFORMATION

#### SECTION IX GENERATOR CERTIFICATION

I hereby certify that the above named material is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations. AND, if the waste is a treatment residue of a previously restricted hazardous waste subject to the Land Disposal Restrictions, I certify and warrant that the waste has been treated in accordance with the requirements of 40 CFR Part 268 and is no longer a hazardous waste as defined by 40 CFR Part 261.

Bobby Parrott Ops. Mgr 4/12/05  
Print/Type Name & Title Shipment Date  
Signature Date

#### SECTION X OPERATOR CERTIFICATION (ASBESTOS)

I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

Print/Type Name & Title Shipment Date  
Operators Signature Date

### TRANSPORTER

#### SECTION XI TRANSPORTER 1

NAME OF CO. Southern Freight

ADDRESS Kingston TN

X DRIVER Charles McLean

Print/Type Name/Title

TRUCK NO. 142 PHONE NO. 865-717-8870

Acknowledgement of receipt of materials.

Charles McLean 4/12/05  
Signature Date

#### SECTION XI TRANSPORTER 2

NAME OF CO.

ADDRESS

DRIVER

Print/Type Name/Title

TRUCK NO. PHONE NO.

Acknowledgement of receipt of materials.

Signature Date

### DISPOSAL SITE

#### DISCREPANCY INDICATION SPACE

MP 25yd. 7.29tn.  
Print/Type Name

#### DISPOSAL COORDINATES (Landfill use only)

Signature/Date

PERMIT # SNL 75-0219

MIDDLE POINT LANDFILL

750 E. JEFFERSON PIKE (37130)

I hereby certify that the above material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Don Burgess  
AUTHORIZED AGENT (PLEASE PRINT)

SIGNATURE OF AUTHORIZED AGENT

4/13/05  
Receipt Date

#### DISPOSAL INSTRUCTIONS



## STRAIGHT BILL OF LADING SHORT FORM NOT NEGOTIABLE

CARRIER: R&amp;R Trucking

Shipper No: 0926-02-0001

Carrier No: EPA ID #  
MOR000501973

SCAC No:

Date: 05/23/05

Purchase / Customer Order No: P.O. 22 Rev. 2

Page 1 of 3

Received, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described below in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier agrees to carry to its usual place of delivery, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said route to destination and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. The shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consignee:  
Envirocare of Utah, Inc.  
Clive Disposal Site (Bulk Waste Facility)  
Interstate 80, Exit 49  
Clive, UT 84029

Shipper: Impact Services, Inc.  
P.O. Box 4849  
Oak Ridge, TN 37831  
Site: ETTP, Building K-1220, Hwy 58  
Oak Ridge, TN 37831

Route: See Transporter for Route

Vehicle Initial and Number: Trailer No:

5948/3830040

No. Pkgs.	HM	Description of Material	Weight (Kgs.)	Class	ERG	
1	X	Radioactive Material, low specific activity, (LSA-I), 7, UN2912, solid, oxide, See Note 1 excepted fissile-	992	7	162	Subject to section 7 of conditions of applicable Bill of Lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:  The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.  N/A  Signature of the Consignor
1	X	Radioactive Material, low specific activity, (LSA-I), 7, UN2912, solid, oxide, See Note 1 excepted fissile-	984	7	162	
1	X	Radioactive Material, low specific activity, (LSA-I), 7, UN2912, solid, oxide, See Note 1 excepted fissile-	1,073	7	162	
1	X	Radioactive Material, low specific activity, (LSA-I), 7, UN2912, solid, oxide, See Note 1 excepted fissile-	2,828	7	162	
1	X	DOT - Non Regulated DAW	1,435	NA	NA	If freight charges are to be pre-paid, write or stamp here "TO BE PREPAID".  N/A
1	X	Radioactive Material, low specific activity, (LSA-II), 7, UN3321, solid, oxide, See Note 1 excepted fissile-	727	7	162	

## Remarks:

Total Shipment weight = {8039.1 kgs} {17686.0 Lbs.}

Note 1: See attachment for isotopes and activity per package.

Total Activity in MBq = 2.878E+03

Exclusive Use Shipment - Instructions included.

## Additional information:

In case of an emergency, call IMPAC+ Services, Inc. at (865) 576-8724.

In case of an emergency, contact Anne Weaver at 865-482-8670.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.  
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding:

N/A

per (unit)

SS741 Reference

Label(s) applied:

None

Marking(s) required

Class A Unstable  
Weight (Kgs), LSA-I, LSA-II

Placard(s) required:

Radioactive

IF THIS BILL OF LADING LISTS HAZARDOUS MATERIALS - NOTE AS FOLLOWS:

Emergency Response No.: 865 576-8724

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the U.S. Department of Transportation.

Shipper: Visionary Solutions

Contact: Brad Squibb

Per:

The additions on the face hereof and to the terms and conditions are hereby noted.

Carrier: R&amp;R Trucking

Per:

Date: 05/23/05



## ISOTOPES REPORT

Envirocare of Utah, Inc.

Page 2 of 3

[illegible]

01-900-0089				200-00064			
Total Activity				Total Activity			
Isotope	(MBq)	(mCi)	(Ci)	Isotope	(MBq)	(mCi)	(Ci)
C-14	5.33E+02	1.4400E+01	1.4400E-02	Cs-137	6.51E+00	1.7600E-01	1.7600E-04
Cs-137	9.29E-01	2.5100E-02	2.5100E-05	Am-241	5.07E-03	1.3700E-04	1.3700E-07
H-3	1.59E+01	4.3100E-01	4.3100E-04	Fe-55	4.51E+00	1.2200E-01	1.2200E-04
I-129	1.91E-03	5.1700E-05	5.1700E-08	Co-60	1.81E+01	4.8900E-01	4.8900E-04
Ra-226	5.99E+00	1.6200E-01	1.6200E-04	Ni-63	2.55E+01	6.8800E-01	6.8800E-04
Sr-90	3.59E+00	9.6900E-02	9.6900E-05	Sr-90	6.55E-02	1.7700E-03	1.7700E-06
Tc-99	2.66E+02	7.1800E+00	7.1800E-03	Ce-144	8.36E-01	2.2600E-02	2.2600E-05
				Hf-172	6.03E+00	1.6300E-01	1.6300E-04
				Pu-238	2.59E-03	6.9900E-05	6.9900E-08
				Pu-239/240	3.92E-03	1.0600E-04	1.0600E-07
				Pu-241	2.81E-01	7.5900E-03	7.5900E-06
				Cm-242	9.29E-05	2.5100E-06	2.5100E-09
				Cm-243	8.99E-04	2.4300E-05	2.4300E-08
				Zn-65	5.44E+01	1.4700E+00	1.4700E-03
Activity Totals	8.2492E+02	2.2295E+01	2.2295E-02	Activity Totals	1.1619E+02	3.1403E+00	1.6703E-03

200-00065					200-000100				
Total Activity					Total Activity				
Isotope	(MBq)		(mCi)		Isotope	(MBq)		(mCi)	
Cs-137	7.03E-02		1.9000E-03		Am-241	1.14E+00		3.0800E-02	
Am-241	5.48E-05		1.4800E-06		C-14	1.02E+01		2.7700E-01	
Fe-55	4.85E-02		1.3100E-03		Co-60	1.02E+01		2.7700E-01	
Co-60	4.00E-01		1.0800E-02		Cs-137	7.96E+00		2.1500E-01	
Ni-63	2.66E-01		7.1800E-03		Fe-55	7.73E+01		2.0900E+00	
Sr-90	7.07E-04		1.9100E-05		H-3	1.69E+02		4.5600E+00	
Ce-144	9.03E-03		2.4400E-04		Ni-63	3.07E+01		8.3100E-01	
Hf-172	6.48E-02		1.7500E-03		Pu-241	1.48E+01		4.0000E-01	
Pu-238	2.78E-05		7.5200E-07		Tc-99	1.25E+01		3.3900E-01	
Pu-239/240	4.22E-05		1.1400E-06		Cs-134	4.22E-01		1.1400E-02	
Pu-241	3.02E-03		8.1600E-05						
Cm-242	9.99E-07		2.7000E-08						
Cm-243	9.66E-06		2.6100E-07						
Zn-65	5.85E-01		1.5800E-02						
Activity Totals	1.4463E+00		3.9088E-02		Activity Totals	3.3415E+02		9.0312E+00	

2.878E+03

BECHTEL JACOBS COMPANY, LLC  
INSTRUCTIONS REGARDING CONTROLS FOR RADIOACTIVE SHIPMENTS  
CONSIGNED AS EXCLUSIVE USE (SOLE USE OR FULL LOAD)

Transporter R + R Trucking Truck/Trailer No. 5948 / 3830040

Signature [Signature] Date 5-23-05

These written instructions are provided to the carrier named on the shipping papers for the above referenced shipment and are to be maintained with said shipping papers. It is the carrier's responsibility to ensure that these instructions are conveyed to its driver(s) and administrative personnel, as appropriate, for the duration of the movement to final destination.

1. Maintain exclusive use of this vehicle for the duration of the movement. No other freight is to be loaded with this shipment except as directed by the consignor.
2. All loading or unloading of freight in this shipment shall only be done, or as directed, by the consignor or consignee.
3. The carrier is to move this shipment without delay, but in accordance with the legal statutes of transit jurisdictions.
4. Stops enroute are to be minimized to the extent practical and limited to accepted safe haven areas. Bechtel Jacobs Company must approve stops in excess of ninety-six hours.
5. The carrier is to take positive steps enroute and during necessary stops to segregate this shipment from other freight, buildings, and personnel, so as to minimize potential exposures.
6. The carrier is to make periodic inspection of equipment, load, and placarding at appropriate intervals enroute to ensure maintenance of shipment safety controls.
7. To the maximum extent practical, the carrier, when movement is by highway, is to use interstate or limited access divided highways and avoid high density urban areas, especially where circumferential interstate highways are available to allow avoidance of travel through the highest populated portion of an urban area.

SPECIAL HANDLING INSTRUCTIONS

1. If provided, by highway, the carrier's driver(s) is to maintain visual contact with escort(s) and obey all traffic signs.
2. Radiation surveys enroute will be made only with acceptable monitoring devices and the consignor or consignee will be notified that such monitoring has been done and by whom. Radiation surveys taken at destination by authorized personnel of the consignee will be provided to the carrier on request or the carrier will be notified if there are contamination levels that would warrant taking the conveyance out of service.
3. Each motor vehicle used for transporting Radioactive Materials under Exclusive Use conditions in accordance with 173.427 shall be surveyed with radiation detection instruments after each use. The carrier should ensure the vehicle has met the Department of Transportation Return to Service Limits as required by 49 CFR 173.443(c) and 49 CFR 177.843(a).
4. The carrier is to take the appropriate emergency response actions should an accident or spillage occur enroute. The carrier will make notification as indicated on accompanying shipping papers in the event of a delay, accident, or other emergency enroute.

## POTENTIAL HAZARDS

## HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content increases.
- Undamaged packages are safe. Contents of damaged packages may cause higher external radiation exposure, or both external and internal radiation exposure if contents are released.
- Low radiation hazard when material is inside container. If material is released from package or bulk container, hazard will vary from low to moderate. Level of hazard will depend on the type and amount of radioactivity, the kind of material it is in, and/or the surfaces it is on.
- Some material may be released from packages during accidents of moderate severity but risks to people are not great.
- Released radioactive materials or contaminated objects usually will be visible if packaging fails.
- Some exclusive use shipments of bulk and packaged materials will not have "RADIOACTIVE" labels. Placards, markings and shipping papers provide identification.
- Some packages may have a "RADIOACTIVE" label and a second hazard label. The second hazard is usually greater than the radiation hazard; so follow this GUIDE as well as the response GUIDE for the second hazard class label.
- Some radioactive materials cannot be detected by commonly available instruments.
- Runoff from control of cargo fire may cause low-level pollution.

## FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Uranium and Thorium metal cuttings may ignite spontaneously if exposed to air (see GUIDE 136).
- Nitrates are oxidizers and may ignite other combustibles (see GUIDE 141).

## PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. • Stay upwind. • Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

## PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide adequate protection.

## EVACUATION

## Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

## Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

## EMERGENCY RESPONSE

## FIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

## Small Fires

- Dry chemical, CO<sub>2</sub>, water spray or regular foam.

## Large Fires

- Water spray, fog (flooding amounts).
- Dike fire-control water for later disposal.

## SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Cover liquid spill with sand, earth or other non-combustible absorbent material.
- Dike to collect large liquid spills.
- Cover powder spill with plastic sheet or tarp to minimize spreading.

## FIRST AID

- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.
- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

<b>FORM 540</b> <b>UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST</b>		Envirocare of Utah, Inc.		5. SHIPPER - NAME AND FACILITY IMPAC+ Services, Inc. P.O. Box 4849 Oak Ridge, TN 37831		SHIPMENT I.D. NUMBER 0926-02-0001		7. FORM 540 AND 540A FORM 541 AND 541A FORM 542 AND 542A ADDITIONAL INFORMATION		PAGE 1 OF 2 PAGE(S) PAGE 1 OF 4 PAGE(S) NA 1 PAGE(S) NA X PAGE(S)		8. MANIFEST NUMBER (Use this number on all continuation pages) 0926-02-0001							
SHIPPING PAPER				USER PERMIT NUMBER 0406002911		SHIPMENT NUMBER 0926-02-0001		GENERATOR TYPE (Specify) G		9. CONSIGNEE - Name and Facility Address Envirocare of Utah, Inc. Clive Disposal Site Interstate 80, Exit 49 Clive, UT 84029									
1. EMERGENCY TELEPHONE NUMBER (Include Area Code) 865-574-3282				CONTACT Anne Weaver/Visionary Solutions		TELEPHONE NUMBER (Include Area Code) 865-482-8670		SIGNATURE - Authorized consignee acknowledging waste receipt		CONTACT Shipping and Receiving TELEPHONE NUMBER (Include Area Code) 1-435-884-0165		DATE							
ORGANIZATION IMPAC+ Services, Inc.				6. CARRIER - Name and Address R&R Trucking P.O. Box 545 Duenweg, MD 54841		EPA ID NUMBER MOR000501973		SHIPPING DATE 05/23/05		10. CERTIFICATION This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as required by the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.									
2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST 6		4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? If "Yes", provide Manifest Number:		EPA MANIFEST NUMBER NA		CONTACT Don Ritchie SIGNATURE - Authorized carrier acknowledging waste receipt <i>Don Ritchie</i>		TELEPHONE NUMBER (Include Area Code) 1-800-625-6885		DATE 5-23-05							
11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)				12. DOT LABEL "RADIOACTIVE"		13. TRANSPORT INDEX		14. PHYSICAL AND CHEMICAL FORM		15. INDIVIDUAL RADIONUCLIDES		16. TOTAL PACKAGE ACTIVITY MBq mCi		17. LSA/SCO CLASS		18. TOTAL WEIGHT OR VOLUME (Use appropriate units)		19. IDENTIFICATION NUMBER OF PACKAGE	
Radioactive material, Low Specific Activity, (LSA-I), 7, UN2912, fissile-excepted				"NA"		"NA"		Solid Metal		C-14 Cs-137 H-3 I-129 Ra-226 Sr-90 Tc-99		8.68E+02 2.35E+01		LSA-I		96 Cu Ft 992 kg		01-900-0086	
Radioactive material, Low Specific Activity, (LSA-I), 7, UN2912, fissile-excepted				"NA"		"NA"		Solid Metal		C-14 Cs-137 H-3 I-129 Ra-226 Sr-90 Tc-99		7.33E+02 1.98E+01		LSA-I		96 Cu Ft 904 kg		01-900-0299	
Totals												1.60E+03 4.33E+01				192 Cu Ft 1,975 kg			
FOR CONSIGNEE USE ONLY Record Waste Description Inadequate Contamination or Leakage Detected Unexpected Exposure Rates Detected Labels, Markings, etc. Inadequate Container Integrity Inadequate Other No Violations Detected on this Shipment.				20. TERMS AND CONDITIONS A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material is (or) X is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land disposal notice and/or certification as required by 40 CFR 268.1. B. TITLE: Upon acceptance at the disposal site by Envirocare of Utah, Inc., and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in Envirocare of Utah, Inc. C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and Envirocare of Utah, Inc.'s facility license. D. INDEMNIFICATION: Generator agrees to indemnify Envirocare of Utah, Inc., its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.															

**UNIFORM LOW-LEVEL RADIOACTIVE  
WASTE MANIFEST**

**SHIPPING PAPER (CONTINUATION)**

8. MANIFEST NUMBER

0926-02-0001

3. PAGE 2 OF 2 PAGE(S)

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES				16. TOTAL PACKAGE ACTIVITY MBq mCi		17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)		19. IDENTIFICATION NUMBER OF PACKAGE
Radioactive material, Low Specific Activity, (LSA-I), 7, UN2912, fissile-excepted	"NA"	"NA"	Solid Metal	C-14 Ra-226	Cs-137 Sr-90	H-3 Tc-99	I-129	8.25E+02	2.23E+01	LSA-I	96 1073	Cu Ft kg	01-900-0089
Radioactive material, Low Specific Activity, (LSA-I), 7, UN2912, fissile-excepted	"NA"	"NA"	Solid Metal	Cs-137 Ni-63 Pu-238 Cm-243	Am-241 Sr-90 Pu-239/240 Zn-65	Fe-55 Ce-144 Pu-241	Co-60 Hf-172 Cm-242	1.16E+02	3.14E+00	LSA-I	90 2828	Cu Ft kg	200-00064
DOT - Non Regulated DAW	"NA"	"NA"	Solid Oxides( DAW)	Cs-137 Ni-63 Pu-238 Cm-243	Am-241 Sr-90 Pu-239/240 Zn-65	Fe-55 Ce-144 Pu-241	Co-60 Hf-172 Cm-242	1.45E+00	3.91E-02	"NA"	90 1435	Cu Ft kg	200-00065
Radioactive material, Low Specific Activity, (LSA-II), 7, UN3321, fissile-excepted	"NA"	"NA"	Solid Oxides( DAW)	Am-241 Fe-55 Tc-99	C-14 H-3 Cs-134	Co-60 Ni-63	Cs-137 Pu-241	3.34E+02	9.03E+00	LSA-II	96 727	Cu Ft kg	200-000100
<b>Subtotal</b>								1.28E+03	3.45E+01		372.0 6083.6	Cu Ft kgs	
<b>Totals</b>								2.88E+03	7.78E+01		564.0 8,039	Cu Ft kgs	

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST					
CONTAINER AND WASTE DESCRIPTION					
Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste					
<div>FORM 841<div>Enviorecare of Utah, Inc.</div></div>					
<div>1. MANIFEST TOTALS<div>SPECIAL NUCLEAR MATERIAL (grams)</div><div>U-233U-235PuTOTAL</div><div>NPNPBS 5.51E+00 3 package BS NP</div></div>					
<div>2. MANIFEST NUMBER 0926-02-0001</div>					
<div>3. PAGE 1 OF 4 PAGE(S)</div>					
<div>4. SHIPPER NAME IMPAC+ Services, Inc. Anne Weaver/Visionary Solutions</div>					
<div>SHIPMENT ID NUMBER 0926-02-0001</div>					
<div>NUMBER OF PACKAGES DISPOSAL CONTAINERSNET WASTE VOLUME NET WASTE WEIGHTACTIVITYALL NUCLIDESTritiumC-14Tc-99I-129MBqMCITriple-ACTIVITYSOURCE(kg)(tons)NP</div>					
<div>DISPOSAL CONTAINER DESCRIPTIONWASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER</div>					
<div>CONTAINER IDENTIFICATION NUMBERGENERATOR ID NUMBER(S)UTAH DISPOSAL PERMIT NUMBERCONTAINER DESCRIPTIONVOLUMEWASTE AND CONTAINER WEIGHTSURFACE RADIATION LEVELSURFACE CONTAMINATIONWASTE DESCRIPTORAPPROXIMATE WASTE VOLUME(S) IN CONTAINERSOLIDIFICATION OR STABILIZATION MEDIACHEMICAL DESCRIPTIONCHEMICAL FORMWEIGHT% CHELATING AGENTRADIOLOGICAL DESCRIPTIONINDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL, OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENTWASTE CLASS</div>					
<div>01-900-0086SWC E-0506022.729920.0050&lt;1.20E-03&lt;6.00E-0340 H2.72100OxidesNoneSubtotal3.27E+048.66E+022.36E+01SNM Total0.000E+003.27E+048.66E+022.36E+01</div>					
<div>NOTE 1: Container Description CodesFor containers waste requiring disposal in approved structural over-packs the numerical code must be followed by "OP."</div>					
<div>Note 1A: Bulk Packaging Description Codes(Choose one code as may be applicable).</div>					
<div>NOTE 2: Waste Descriptor Codes.(Choose up to three which predominate by volume)</div>					
<div>Note 2A: Specific Waste Descriptions(Choose all applicable codes).</div>					
<div>Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S" and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED</div>					

## CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

0926-02-0001

3. PAGE 2 OF 4 PAGE(S)

FORM 541A

## CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

0928-02-0001

3. PAGE 3 OF 4 PAGE(S)

FORM 541A



UNIFORM LOW LEVEL RADIOACTIVE  
WASTE MANIFEST

0926-02-0001

3. PAGE 4 OF 4 PAGE(S)

[illegible]

NRC FORM 542 U.S. NUCLEAR REGULATORY COMMISSION				1. WASTE COLLECTOR/PROCESSOR				2. MANIFEST NUMBER						
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST INDEX AND REGIONAL COMPACT TABULATION				MANIFEST		SHIPPER USE ONLY		3.						
List all original "PROCESSED WASTE" generators (if any) before "COLLECTED" WASTE" generators.				IDENTIFICATION NUMBER R-73024-E07		SHIPPING DATE 01/30/05 BS 5/23/05		PAGE 1 OF 1 PAGE(S)						
4. GENERATOR IDENTIFICATION NUMBER	5. GENERATOR NAME, PERMIT NUMBER (IF APPLICABLE), AND TELEPHONE NUMBER	6. GENERATOR FACILITY ADDRESS	7. PREPROCESSED WASTE (OR MATERIAL VOLUME)		8. MANIFEST NUMBER(S) UNDER WHICH WASTE (OR MATERIAL) RECEIVED AND DATE OF RECEIPT	9. WASTE CODE P = PROCESSED C = COLLECTED	10. ORIGINATING COMPACT REGION OR STATE	11. AS PROCESSED / COLLECTED TOTAL						
			(m3)	(l3)				A. SOURCE MATERIAL (kg) (lb)		B. SNM (g)	C. ACTIVITY (MBq) (mCi)		D. VOLUME (m3) (l3)	
SWC E-06060 01-900-0086	ICN Biomedicals	ICN Biomedicals 2727 Campus Drive Irvine, CA 92612	12.69	448.0	RSR4294	"P"	Southwestern Low-Level Radioactive Waste Commission*	0	0	0.00	8.68E+02	2.35E+01	2.72	96.00
SWC E-05060 01-900-0299	ICN Biomedicals	ICN Biomedicals 2727 Campus Drive Irvine, CA 92612	12.69	448.0	RSR4294	"P"	Southwestern Low-Level Radioactive Waste Commission*	0	0	0.00	7.33E+02	1.98E+01	2.72	96.00
SWC E-06060 01-900-0089	ICN Biomedicals	ICN Biomedicals 2727 Campus Drive Irvine, CA 92612	12.69	448.0	RSR4294	"P"	Southwestern Low-Level Radioactive Waste Commission*	0	0	0.00	8.25E+02	2.23E+01	2.72	96.00
LO5435 200-00064	Trace Radiochemical	Trace Radiochemicals, Inc. 2101 Shady Oaks Drive Denton, TX 76205	6.37	225.0	TRACE051204	"P"	Texas	0	0	0.00	1.16E+02	3.14E+00	2.56	90.00
LO5436 200-00066	Trace Radiochemical	Trace Radiochemicals, Inc. 2101 Shady Oaks Drive Denton, TX 76205	6.37	225.0	TRACE051204	"P"	Texas	0	0	0.00	1.45E+00	3.91E-02	2.56	90.00
R-73024-E07 200-000100	IMPACT Services, Inc. 865-805-5693	IMPACT Services ETTP, Bldg. K-1220, Hwy 58 Oak Ridge, TN 37830	2.72	96.0	NA	"C"	Southeast Compact TN	0	0	0.00	3.34E+02	9.03E+00	2.72	96.00
TOTALS OF ALL PAGES (NRC FORMS 542 AND 542A)								0.0	0.0	0.00	2.88E+03	7.78E+01	16.0	564.0



## Special Nuclear Material Exemption Certification

### EC-0230-SNM, Revision 2

The Special Nuclear Material Exemption Certification form must be completed and signed by each generator certifying to the following conditions. Please attach this form and all required information to the Radioactive Waste Profile Record (EC-0230). A completed and signed copy of this form must also accompany each waste manifest.

Waste Stream ID: 02

Manifest No. 0926-02-0001

**1. Check applicable category below for the waste stream:**

✓	Uranium Enrichment Percent	Weight Percent of Chemicals in Condition 2c	Weight Percent of Materials in Condition 2d	U-235 Concentration (pCi/g)	Measurement Uncertainty* (pCi/g)
<input checked="" type="checkbox"/>	< 10 %	≤ 20 %	≤ 1 %	≤ 1,900	≤ 285
<input type="checkbox"/>	Unlimited	≤ 20 %	≤ 1 %	≤ 1,190	≤ 179
<input type="checkbox"/>	Unlimited	Sum of both ≤ 45 % of waste by weight		≤ 680	≤ 102
<input type="checkbox"/>	Unlimited	Unlimited	Unlimited	≤ 26	≤ 10
<input type="checkbox"/>	Not Applicable - Enriched U-235 is not present in the waste.				

\* A concentration value is used for the maximum measurement uncertainty limit rather than a percentage value to allow greater flexibility for generators with waste having very low SNM concentrations.

**2. Certify to the following requirements by checking each box:**

- ☒ a. Concentrations of SNM in individual waste containers do not exceed the applicable values listed in the above table and SNM isotope concentrations listed in Table 1.
- ☒ b. The SNM is homogeneously distributed throughout the waste or the SNM concentrations in any contiguous mass of 600 kilograms (1,323 lbs) do not exceed on average the specified limits. (Based on process knowledge or testing).
- ☒ c. Except as allowed by Condition 1, the waste does not contain "pure forms" of chemicals containing carbon, fluorine, magnesium, or bismuth in bulk quantities (e.g., a pallet of drums, a B-25 box). By "pure forms," it is meant that mixtures of the above elements such as magnesium oxide, magnesium carbonate, magnesium fluoride, bismuth oxide, etc. do not contain other elements. (Based on process knowledge or testing).
- ☒ d. Except as allowed by Condition 1, the waste does not contain total quantities of beryllium, hydrogenous material enriched in deuterium, or graphite above one percent of the total weight of the waste. (Based on process knowledge, physical observations, or testing).
- ☒ e. Waste packages do not contain highly soluble forms of uranium greater than 350 grams of uranium-235 or 200 grams of uranium-233. If the waste contains mixtures of U-233 and U-235, the waste meets the sum of the fractions rule. Highly soluble forms of uranium include, but are not limited to: uranium sulfate, uranyl acetate, uranyl chloride, uranyl formate, uranyl fluoride, uranyl nitrate, uranyl potassium carbonate, and uranyl sulfate. (Based on process knowledge or testing).
- ☐ f. For containers of liquid waste with more than 600 kilograms of waste, the total activity (pCi) of SNM in the manifested container does not exceed the SNM concentration in the above table or Table 1 times 600 kilograms of waste (based on process knowledge or testing). For example, the maximum activity of Pu-239 in any manifested container of liquid waste is 6.0 mCi (6.0E+09 pCi) as shown below:

$$10,000 \frac{\text{pCi}}{\text{g}} \times 600,000 \text{ g} = 6.0 \times 10^9 \text{ pCi} = 6.0 \text{ mCi Pu - 239}$$



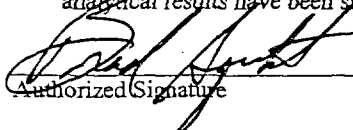
**Table 1. Maximum concentrations of SNM in individual waste containers (refer to above table for U-235 limits).**

Radionuclide	Maximum Concentration (pCi/g)	Measurement Uncertainty (pCi/g)	Radionuclide	Maximum Concentration (pCi/g)	Measurement Uncertainty (pCi/g)
U-233	75,000	11,250	Pu-241	350,000	50,000
Pu-236	500	75	Pu-242	10,000	1,500
Pu-238	10,000	1,500	Pu-243	500	75
Pu-239	10,000	1,500	Pu-244	500	75
Pu-240	10,000	1,500			

3. Indicate that the following information is attached to the Radioactive Waste Profile Record by checking each box. (Note: Only the two-page Special Nuclear Material Exemption Certification form needs to be included with each manifest).

- ☒ a. Provide a description of how the waste was generated, list the physical forms in the waste, and identify the uranium chemical composition.
- ☒ b. Provide a general description of how the waste was characterized (including the volumetric extent of the waste, and the number, location, type, and results of any analytical testing), the range of SNM concentrations, and the analytical results with error values used to develop the concentration ranges.
- ☒ c. Describe the process by which the waste was generated showing that the spatial distribution of SNM must be uniform, or other information supporting spatial distribution.
- ☒ d. Describe the methods to be used to determine the concentrations on the manifests. These methods could include direct measurement and the use of scaling factors. Describe the uncertainty associated with sampling and testing used to obtain the manifest concentrations.

4. Generator's certification of compliance with the SNM exemption: I certify that the information provided on this form is complete, true, and correct and is based on process knowledge, physical observations, or approved laboratory testing. I also certify that sampling and radiological testing of waste containing SNM was performed in accordance with Envirocare's Radioactive Material License and that any supporting documentation and analytical results have been submitted to Envirocare of Utah, Inc.


 Brad Squibb      Waste Broker      5/23/05  
 Authorized Signature      Printed Name      Title      Date



## Notice to Transport

EC-1800, Revision 1

Envirocare has reviewed the Radioactive Waste Profile Record and supporting documentation for the waste stream identified below. Based on our review of the information and certifications provided, Envirocare hereby issues notice that the following waste may be scheduled for transport and delivery to the Envirocare Disposal Facility.

Impact Services / Oak Ridge, TN

0406002911

Generator Name / Waste Location

Utah Site Access Permit Number

NFS

Contractor Name

0926-02

Notice to Transport Rev# 0

Waste Profile Rev# 0 (Date: 2/21/2005)

Waste Stream ID

Debris

TBD

Waste Stream Name

Volume (ft<sup>3</sup>)

Waste Type: NORM ☐ LLRW ☒ RCRA Treated LLRW ☐ 11e.(2) ☐

MW ☐ Treated MW ☐ MW Needing Treatment ☐

PCB/Rad ☐ PCB/MW ☐ PCB/MW Needing Treatment ☐

Waste Form: Solid ☒ Liquid ☐

Waste will require treatment or solidification at Envirocare's Treatment Facility: ☐ Yes ☒ No

If yes, indicate "Treatment Facility" in Block 9 of the Uniform LLRW Manifest Form 540.

If no, indicate "Bulk Waste Facility" in Block 9 of the Uniform LLRW Manifest Form 540.

Disposal Cell Location (Bulk Waste Facility): ☒ Class A LLRW ☐ Mixed Waste ☐ 11e.(2)

[Signature]  
Signature

3/3/2005  
Date

NOTICE: Transport and delivery of the material are to be done in accordance with a signed Disposal Agreement. Upon arrival at the facility, the shipment will be made subject to incoming-shipment procedures and may be accepted or rejected by Envirocare for management at the facility. To generators of mixed waste designated above, notice is hereby provided that Envirocare possesses a RCRA permit for the treatment, storage and disposal of mixed (radioactive/hazardous) waste. Hazardous waste manifests and applicable LDR notices and certifications must also accompany mixed waste shipments. Envirocare will accept conforming waste shipped by the generator in accordance with our permits and waste disposal agreement.

NOTE: THE WASTE MUST NOT CONTAIN UNAUTHORIZED FREE LIQUIDS OR PYROPHORIC, SHOCK-SENSITIVE, AIR-REACTIVE, OR WATER-REACTIVE MATERIALS, AND MUST CONFORM WITH THE FOLLOWING INCOMING SHIPMENT PARAMETER TOLERANCES:

<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
Solid pH	Ox/Red Test	Cyanide Test	"Sniffer"	Sulfide test

The above ranges have been established for the waste using the pre-shipment samples that were submitted prior to waste stream approval. DO NOT SHIP MATERIAL THAT EXCEEDS ANY OF THE ABOVE TOLERANCES.

# 1 IMPACT

# COPY

Tracking No: 301-004.052

Technician: D. Duvon

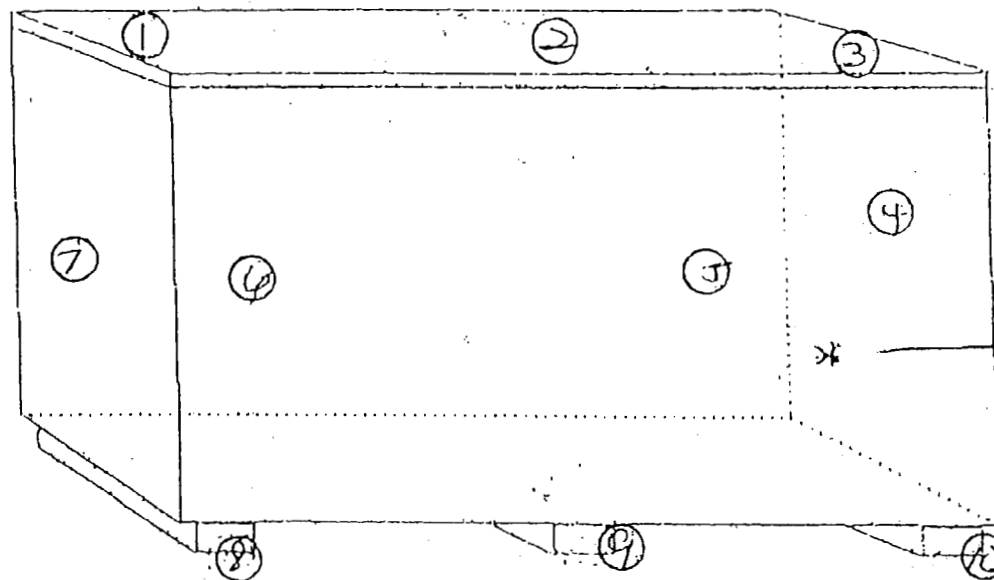
Reviewed: C. Hedges / C. Hedges

No. 1219 P. 2

Box-ST-90

Serial # 1136

BC # 200-00064



\* 5.0 mrad/hr. Count  
1.2 mrad/hr. @ 30cm  
0.4 mrad/hr. @ 1m from

Apr. 25, 2005 9:48AM

Date: 4/14/05 Time: 1000 Reason for Survey: Skymont - out

RWP #(s): ABCD0003

Type of Survey: Rad. Con

Model: Biccon

Serial #: B8382

Cal Due: 2-12-06

Remarks:

Rad Inst(s)

Contan Inst(s)

Lab Inst(s)

WPC9510

04/14

3-12-06

Contamination (in CCPM/mass in ☐ ) or (dpm/100 cm<sup>2</sup> ☒ )

1	11	21
2	12	22
3	13	23
4	14	24
5	15	25
6	16	26
7	17	27
8	18	28
9	19	29
10	20	30

Similar locations are circled and numbered.

Dose Rates are in mR/hr, unless otherwise noted; underlined to indicate General Area; and, \* to indicate Contact reading

# IMPACT

# COPY

Tracking No: 301,004,052

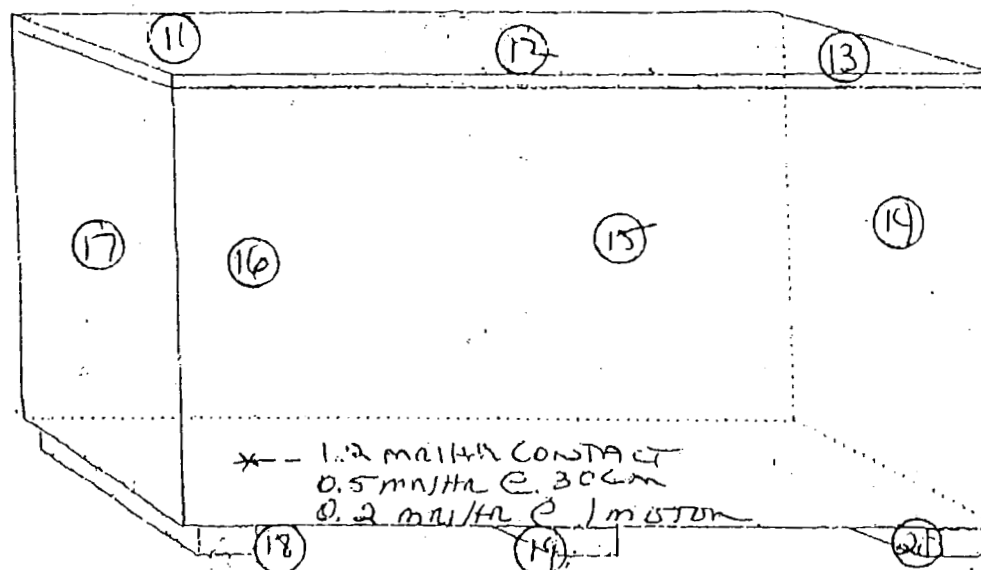
Technician: K. M. Ta

Reviewed: C. H. P. / C. H. P.

Box - B-25

Serial # N/A

BC # 200-00100



Date: 4/14/05 Time: 1000 Reason for Survey: Shipment - air

RWP # (s): ABCD0505 Type of Survey: Rail-car

Rad Inst(s): \_\_\_\_\_ Contam Inst(s): \_\_\_\_\_ Lab Inst(s): WPC 900

Model: BICRON \_\_\_\_\_ \_\_\_\_\_ 02614

Serial #: 38382 \_\_\_\_\_ \_\_\_\_\_ 3-12-06

Cal Due: 2-12-06 \_\_\_\_\_ \_\_\_\_\_

Remarks: \_\_\_\_\_

Smear locations are circled and numbered.

Dose Rates are in  $\mu\text{R/hr}$ , unless otherwise noted; underlined in indicate General Area; and, \* to indicate Contact reading

Contamination (in CCPM/muasslin  $\square$ ) or (dpm/100 cm<sup>2</sup>)

1	11	21
2	12	22
3	13	23
4	14	24
5	15	25
6	16	26
7	17	27
8	18	28
9	19	29
10	20	30

3

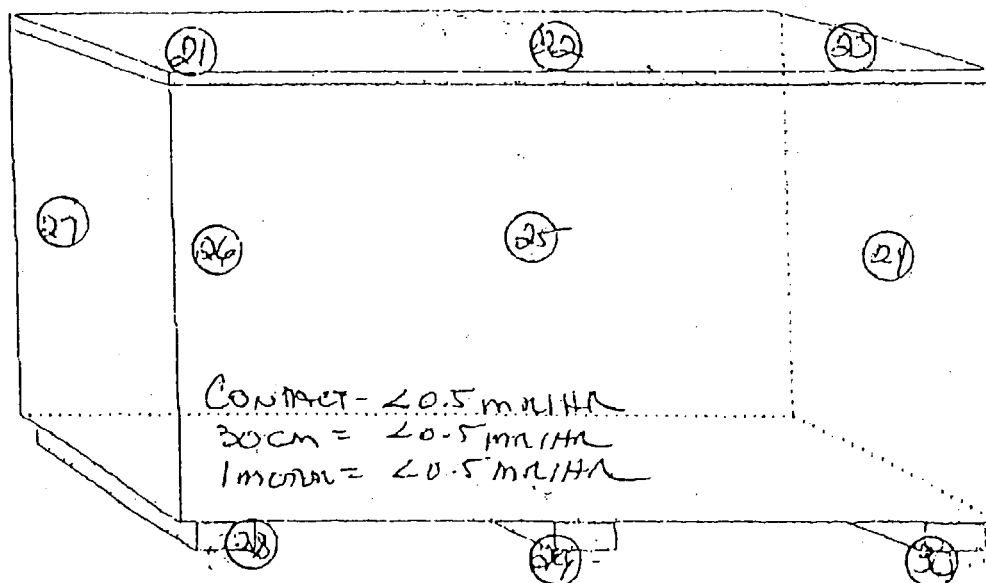
IMPACT

COPY

Tracking No: 301.004.052Technician: AD ConnerReviewed: C. Hapler / S. Hapler

No. 1219 P. 4

Box-B-25

Serial # 410BC# 01-700-6089

Apr 25, 2005 9:48AM

Date: 4/14/05 Time: 1000 Reason for Survey: SHIPMENT OUTRWP # (s): ABCD0503 Type of Survey: BAD-COM

Model: <u>BILCO</u>	Rad Inst(s):	Comom Inst(s):	Lab Inst(s):
Serial # <u>B8382</u>			<u>WAC950</u>
Cal Due <u>2-12-06</u>			<u>01614</u>
Remarks:			<u>3-12-06</u>

Sensor locations are circled and numbered.

Exposure rates are in mR/hr, unless otherwise noted; underlined to indicate General Area; and, \* to indicate Contact reading

Contamination (in CCPM/mass/in  $\square$ ) or (dpm/100 cm<sup>2</sup>)

1	11	21
2	12	22
3	13	23
4	14	24
5	15	25
6	16	26
7	17	27
8	18	28
9	19	29
10	20	30



A

IMPACT

COPY

Tracking No: 301,004,052

Technician:

J. J. J.

Reviewed:

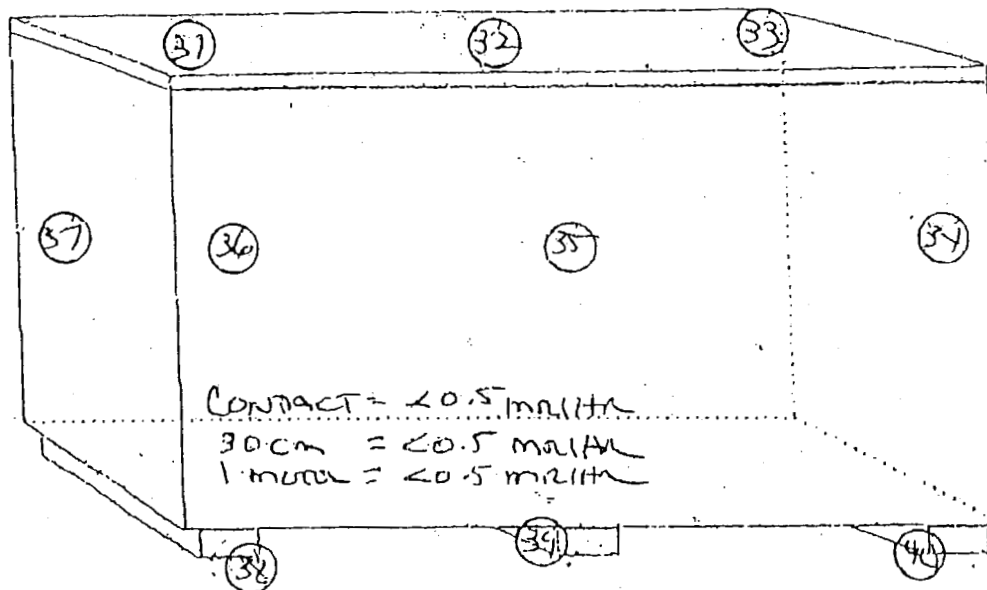
C. H. J. / C. H. J.

No. 1219 P. 5

Box-B-25

Serial # N/A

BC # 01-900-0086



Date: 4/14/05 Time: 1000 Reason for Survey Support - Out

RVP # (s): ABCD 0503 Type of Survey: Rad. Con.

Model: B. J. J. Rad Inst(s): Lab Inst(s):

Serial #: 08582 WPC 9550

Cal Due: 3-12-06 01/01/06

Remarks: 3-12-06

Smear locations are circled and numbered.

Dose Rates are In mR/h, unless otherwise noted; underlined to indicate General Area; and, \* to indicate Contact reading

Contamination (in CCPI/M/Inastlin ☐ ) or (dpm/100 cm<sup>2</sup>) (X)

1	11	21
2	12	22
3	13	23
4	14	24
5	15	25
6	16	26
7	17	27
8	18	28
9	19	29
10	20	30

Apr 25, 2005 9:48AM

# IMPACT

## COPY

Tracking No: 301-004-002

Technician: W. Hester

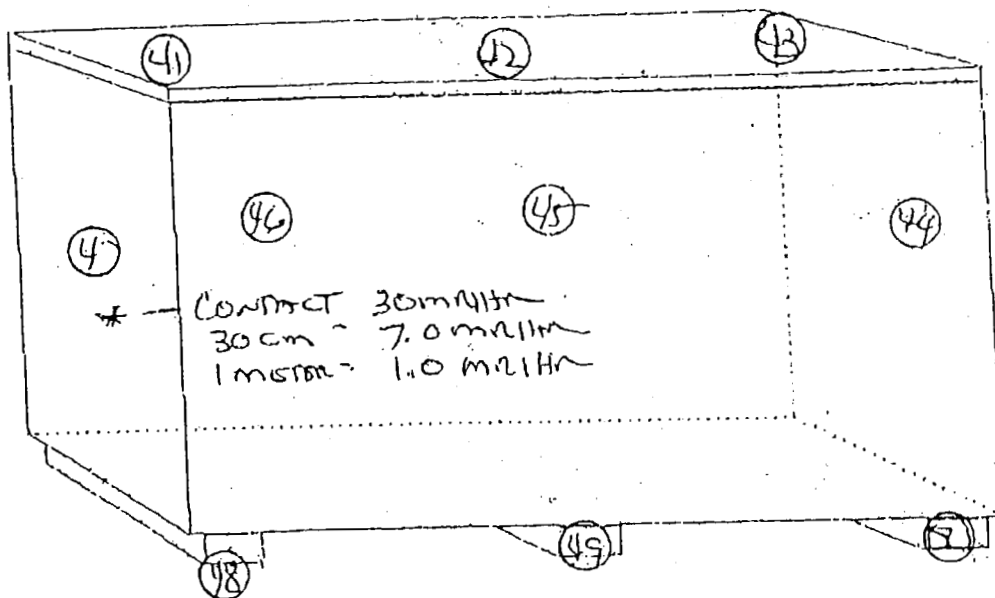
Reviewed: C. Hester

No. 1219 P. 6

Box - 5790

Serial # 0147

BC# 20000065



Apr. 25, 2005 9:49AM

Date: 4/14/05 Time: 1000 Reason for Survey: Supervisor Act

RWT # (s): ABCD0503 Type of Survey: Radi. Co.

Model: BICRON Rad Inst(s): WPC9550

Serial #: 01614 Contain Inst(s): 01614

Cal Due: 2-12-06 Remarks: A

Smear Incisions are Circled and Numbered.

Dose Rates are in  $\mu\text{R/hr}$ , unless otherwise noted; underlined to indicate General Area; 'x' to indicate Contact readings

Contamination (in CCPM/massive ☐ ) or (dpm/100 cm<sup>2</sup>) ☒

1	11	21
2	508	22
3	13	23
4	ATTACHED	24
5	15	25
6	16	26
7	17	27
8	18	28
9	19	29
10	20	30

16

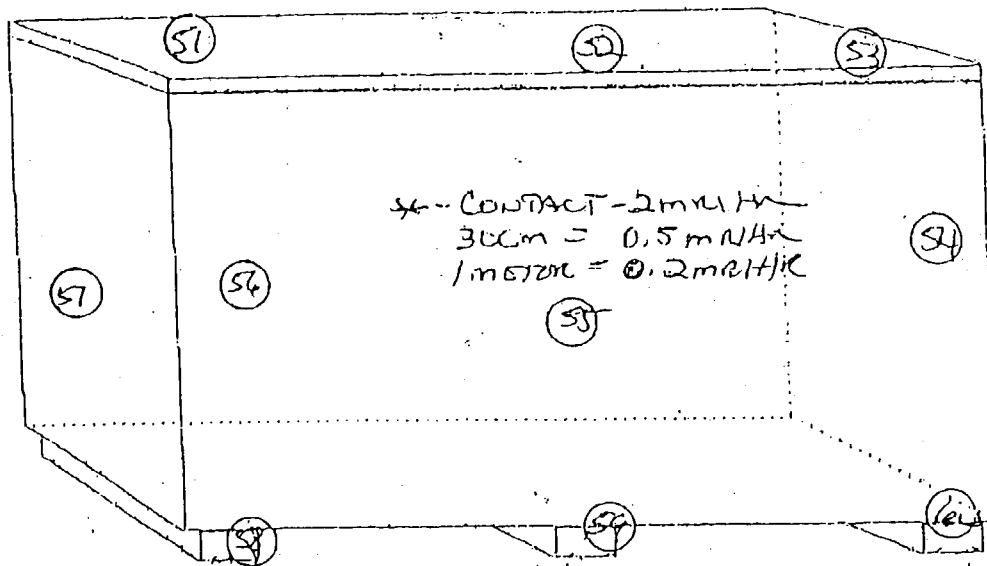
IMPACT

COPY

Tracking No: 301.004,052 Technician: SSD MeyerReviewed: C. Hefner / S. Hefner

No. 1219 P. 7

Box-B25

Serial # N/ABC # 01-900-0099

Apr. 25, 2005 9:49AM

Date: 4/14/05 Time: 1000 Reason for Survey: Shipment OutRWP # (s): ABC00503 Type of Survey: Rad. Con

Rad Inst(s): \_\_\_\_\_ Contam Inst(s): \_\_\_\_\_ Lab Inst(s): \_\_\_\_\_

Model: BLLC001 \_\_\_\_\_ WPC 9550Serial #: 62382 \_\_\_\_\_ 01014Cal Due: 2-12-06 \_\_\_\_\_ 3-12-06

Remarks: \_\_\_\_\_

Smear locations are circled and numbered.

Dose Rates are in mR/hr, unless otherwise noted; underlined to indicate General Area; and, \* to indicate Contact reading

Contamination (in CCPM/mass/in ☐) or (dpm/100 cm<sup>2</sup>)

1	11	21
2	12	22
3	13	23
4	14	24
5	15	25
6	16	26
7	17	27
8	18	28
9	19	29
10	20	30

02/24/2008

COPY

ALPHA										BETA									
EST: 25.31 Z Rsp: 0.27 LBS: 17.43 SW: 29.34 Z Rsp: 2.91 LBS: 28.04																			
ID	CARRIER	AFT	ROI	COUNTS	NET CPH	CPH	LIMITS	COUNTS	NET CPH	CPH	LIMITS	DATE	TIME						
001.004.652	1	1	0	1	0.77	2.90		1	-2.05	-5.97		04-14-2005	09:40:31						
	2	1	0	1	0.73	2.90		3	-0.05	-0.16		04-14-2005	09:41:52						
	3	1	0	0	-0.77	-1.06		6	3.29	11.17		04-14-2005	09:43:12						
	4	1	0	1	0.73	2.90		3	-0.05	-0.16		04-14-2005	09:44:33						
	5	1	0	0	-0.27	-1.06		2	-0.72	-2.47		04-14-2005	09:45:53						
	6	1	0	0	-0.27	-1.06		1	-1.72	-5.97		04-14-2005	09:47:13						
	7	1	0	0	-0.27	-1.06		3	0.28	0.94		04-14-2005	09:48:35						
	8	1	0	1	0.73	2.90		2	-1.05	-3.37		04-14-2005	09:49:55						
	9	1	0	0	-0.27	-1.06		10	7.78	24.20		04-14-2005	09:51:16						
	10	1	0	1	0.73	2.90		2	-1.05	-3.37		04-14-2005	09:52:37						
	11	1	0	0	-0.27	-1.06		0	-2.72	-9.29		04-14-2005	09:53:57						
	12	1	0	0	-0.27	-1.06		0	2.28	7.78		04-14-2005	09:55:17						
	13	1	0	0	-0.27	-1.06		4	4.28	21.35		04-14-2005	09:56:38						
	14	1	0	0	-0.27	-1.06		1	-1.72	-5.97		04-14-2005	09:57:58						
	15	1	0	0	-0.27	-1.06		2	-0.72	-2.47		04-14-2005	09:59:19						
	16	1	0	4	3.73	14.75		10	5.99	20.40		04-14-2005	10:00:39						
	17	1	0	0	-0.27	-1.06		1	3.28	11.17		04-14-2005	10:02:00						
	18	1	0	0	-0.27	-1.06		0	-2.72	-9.29		04-14-2005	10:03:20						
	19	1	0	1	0.73	2.90		5	1.95	6.44		04-14-2005	10:04:41						
	20	1	0	1	0.73	2.90		4	5.95	20.29		04-14-2005	10:06:01						
	21	1	0	1	0.73	2.90		5	1.95	6.44		04-14-2005	10:07:22						
	22	1	0	0	-0.27	-1.06		7	4.28	14.58		04-14-2005	10:08:42						
	23	1	0	1	0.73	2.90		8	4.95	16.58		04-14-2005	10:10:03						
	24	1	0	2	1.73	6.85		10	6.43	22.50		04-14-2005	10:11:23						
	25	1	0	0	-0.27	-1.06		9	4.28	14.58		04-14-2005	10:12:44						
	26	1	0	1	0.73	2.90		5	2.95	10.07		04-14-2005	10:14:04						
	27	1	0	1	0.73	2.90		3	-0.05	-0.16		04-14-2005	10:15:25						
	28	1	0	2	1.73	6.85		1	-2.37	-8.07		04-14-2005	10:16:45						
	29	1	0	0	-0.27	-1.06		0	-2.72	-9.29		04-14-2005	10:18:06						
	30	1	0	0	-0.27	-1.06		4	4.28	21.35		04-14-2005	10:19:26						
	31	1	0	0	-0.27	-1.06		4	1.25	4.75		04-14-2005	10:20:47						
	32	1	0	2	1.73	6.85		14	10.43	35.33		04-14-2005	10:22:07						
	33	1	0	0	-0.27	-1.06		4	1.25	4.75		04-14-2005	10:23:28						
	34	1	0	0	-0.27	-1.06		6	3.28	11.17		04-14-2005	10:24:48						
	35	1	0	2	1.73	6.85		3	1.63	5.36		04-14-2005	10:26:09						
	36	1	0	0	-0.27	-1.06		0	5.28	21.39		04-14-2005	10:27:29						
	37	1	0	0	-0.27	-1.06		0	4.28	21.35		04-14-2005	10:28:50						
	38	1	0	0	-0.27	-1.06		3	0.28	0.94		04-14-2005	10:30:10						
	39	1	0	0	-0.27	-1.06		2	-0.72	-2.47		04-14-2005	10:31:31						
	40	1	0	1	0.73	2.90		5	-0.05	-0.16		04-14-2005	10:32:51						
	41	1	0	1	0.73	2.90		5	1.95	6.44		04-14-2005	10:34:12						
	42	1	0	1	0.73	2.90		5	1.95	6.44		04-14-2005	10:35:32						
	43	1	0	1	0.73	2.90		4	0.94	3.28		04-14-2005	10:36:53						
	44	1	0	1	0.73	2.90		2	-1.05	-3.37		04-14-2005	10:38:13						
	45	1	0	0	-0.27	-1.06		5	2.28	7.78		04-14-2005	10:39:34						
	46	1	0	0	-0.27	-1.06		2	-0.72	-2.47		04-14-2005	10:40:54						
	47	1	0	0	-0.27	-1.06		3	0.28	0.94		04-14-2005	10:42:15						
	48	1	0	0	-0.27	-1.06		0	-2.72	-9.29		04-14-2005	10:43:35						
	49	1	0	0	-0.27	-1.06		1	-1.72	-5.97		04-14-2005	10:44:56						
	50	1	0	1	0.73	2.90		5	1.95	6.44		04-14-2005	10:46:16						
	51	1	0	2	1.73	6.85		5	1.63	5.36		04-14-2005	10:47:37						
	52	1	0	4	3.73	14.75		6	1.99	6.77		04-14-2005	10:48:57						
	53	1	0	0	-0.27	-1.06		1	15.28	11.17		04-14-2005	10:50:18						

Apr 25, 2005 9:49AM

No. 1219 P. 9

**COPY**

Press Alpha Beta

Alpha Number 1

ALPHA										BETA									
EPR: 20.31 I Skp: 0.27 LLB: 17.43										EPR: 29.34 I Skp: 2.81 LLB: 28.04									
ID	CARRIER	REF	ACT	COUNTS	NET CPM	CPM	LIMITS	COUNTS	NET CPM	CPM	LIMITS	DATE	TIME						
54	1	0	1	0.73	2.90	1	-2.63	-1.97	04-14-2005	10:51:0									
55	1	0	1	0.73	2.90	1	-0.43	-0.13	04-14-2005	10:53:0									
56	1	0	1	0.73	2.90	1	1.33	1.66	04-14-2005	10:55:0									
57	1	0	0	-0.27	-1.04	0	-2.72	-3.25	04-14-2005	10:56:0									
58	1	0	0	-0.27	-1.04	3	0.28	0.94	04-14-2005	10:57:0									
59	1	0	0	-0.27	-1.04	5	2.98	7.76	04-14-2005	10:58:0									
60	1	0	0	-0.27	-1.04	3	0.28	0.94	04-14-2005	10:59:0									