

***FINAL***

**BUILDING 1103A AREA  
CHARACTERIZATION SURVEY  
REPORT**

**U.S. Army Research Laboratory  
Aberdeen Proving Ground, MD**

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## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1-1</b>
1.1	BACKGROUND.....	1-1
1.2	SURVEY SCOPE .....	1-2
1.3	PREVIOUS INVESTIGATIONS .....	1-3
1.4	CONTAMINANTS OF CONCERN.....	1-3
<b>2.0</b>	<b>SCREENING LIMITS, INSTRUMENTATION, AND METHODOLOGY .....</b>	<b>2-1</b>
2.1	SCREENING LIMITS.....	2-2
2.1.1	<i>Radioactivity</i> .....	2-2
2.1.2	<i>Potentially Hazardous Constituents</i> .....	2-4
2.2	DIRECT RADIATION MEASUREMENTS .....	2-4
2.2.1	<i>Surface Scan Surveys</i> .....	2-4
2.2.2	<i>Integrated Surface Measurements</i> .....	2-5
2.3	SMEAR SAMPLE SURVEYS.....	2-6
2.4	GAMMA WALKOVER SURVEY .....	2-7
2.5	VOLUMETRIC SAMPLE COLLECTION AND ANALYSIS.....	2-8
<b>3.0</b>	<b>SURVEY RESULTS.....</b>	<b>3-1</b>
3.1	BUILDING 1103A .....	3-1
3.1.1	<i>Interior Walls</i> .....	3-2
3.1.2	<i>Ceilings</i> .....	3-3
3.1.3	<i>Floors</i> .....	3-5
3.1.4	<i>Exterior Walls</i> .....	3-7
3.1.5	<i>Downspouts and Drains</i> .....	3-7
3.2	BUILDING BRL12 .....	3-8
3.2.1	<i>Interior Walls</i> .....	3-8
3.2.2	<i>Ceilings</i> .....	3-9
3.2.3	<i>Floors</i> .....	3-10
3.2.4	<i>Exterior Walls</i> .....	3-11
3.2.5	<i>Downspouts</i> .....	3-12
3.3	FREESTANDING VAULT .....	3-12
3.3.1	<i>Interior Walls</i> .....	3-13
3.3.2	<i>Ceiling</i> .....	3-13
3.3.3	<i>Floors</i> .....	3-14
3.3.4	<i>Exterior Walls</i> .....	3-14
3.4	BUILDING 1103B .....	3-15
3.4.1	<i>Exterior Walls</i> .....	3-16
3.4.2	<i>Downspouts</i> .....	3-16
3.5	PAVEMENT AND GROUNDS.....	3-17
3.5.1	<i>Central Asphalt</i> .....	3-17
3.5.2	<i>Adjacent Asphalt</i> .....	3-18
3.5.3	<i>Grounds</i> .....	3-18

<b>4.0</b>	<b>QUALITY ASSURANCE/QUALITY CONTROL.....</b>	<b>4-1</b>
4.1	SURVEY INSTRUMENTATION QC.....	4-1
4.1.1	<i>Minimum Detectable Concentrations</i> .....	4-1
4.1.2	<i>Instrument Calibration</i> .....	4-2
4.1.3	<i>Instrument QC Checks</i> .....	4-2
4.2	SAMPLING AND ANALYSIS QC .....	4-3
4.2.1	<i>Precision</i> .....	4-3
4.2.2	<i>Accuracy</i> .....	4-4
4.3	DATA MANAGEMENT AND DOCUMENTATION .....	4-6
4.3.1	<i>Field Data</i> .....	4-6
4.3.2	<i>Analytical Data</i> .....	4-6
<b>5.0</b>	<b>CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>5-1</b>
5.1	BUILDING 1103A .....	5-1
5.2	BUILDING BRL12 .....	5-3
5.3	FREESTANDING VAULT .....	5-4
5.4	BUILDING 1103B .....	5-4
5.5	PAVEMENT AND GROUNDS.....	5-4
<b>6.0</b>	<b>REFERENCES.....</b>	<b>6-1</b>

## **LIST OF TABLES**

Table 2-1: Radioactivity Screening Limits .....	2-2
Table 2-2: Action Levels for Chemicals of Interest.....	2-4
Table 2-3: Direct Surface Scan Assumptions .....	2-5
Table 2-4: Detector Integrated Measurement Sensitivities and Assumptions .....	2-6
Table 3-1: Interior Wall Survey Results for Building 1103A.....	3-3
Table 3-2: Ceiling Survey Results for Building 1103A.....	3-4
Table 3-3: Floor Survey Results for Building 1103A.....	3-6
Table 3-4: Exterior Wall Survey Results for Building 1103A.....	3-7
Table 3-5: Interior Wall Survey Results for Building BRL12.....	3-9
Table 3-6: Ceiling Survey Results for Building BRL12.....	3-10
Table 3-7: Floor Survey Results for Building BRL12.....	3-11
Table 3-8: Exterior Wall Survey Results for Building BRL12.....	3-12
Table 3-9: Interior Wall Survey Results for the Freestanding Vault .....	3-13
Table 3-10: Ceiling Survey Results for Freestanding Vault.....	3-14
Table 3-11: Floor Survey Results for Freestanding Vault .....	3-14
Table 3-12: Exterior Wall Survey Results for Freestanding Vault/Tool Shed .....	3-15
Table 3-13: Exterior Wall Survey of Building 1103B.....	3-16

## **LIST OF FIGURES**

Figure 1-1: Building 1103A Area Layout.....	1-5
Figure 1-2: Building 1103A Floor Plan .....	1-6
Figure 1-3: Building BRL12 Floor Plan .....	1-7
Figure 1-4: Freestanding Vault .....	1-8

## **APPENDICES**

- Appendix A: ARL Nuclear Materials License
- Appendix B: Building Survey Results
- Appendix C: Pavement and Grounds Survey Results
- Appendix D: Volumetric Sample Collection and Analysis Results
- Appendix E: Asbestos Inspection Report
- Appendix F: Instrument Calibration and Quality Control Data
- Appendix G: Site Photographs (December 2005)

## ACRONYMS AND ABBREVIATIONS

<b>ACM</b>	Asbestos Containing Material	<b>NaI</b>	Sodium Iodide
<b>AJMC</b>	Army Joint Munitions Command	<b>NIST</b>	National Institute of Standards and Technology
<b>ANL</b>	Argonne National Laboratory	<b>NRC</b>	Nuclear Regulatory Commission
<b>APG</b>	Aberdeen Proving Ground		
<b>ARL</b>	Army Research Laboratory	<b><sup>234m</sup>Pa</b>	Protactinium-234
<b>CABRERA</b>	Cabrera Services, Inc.	<b>PCB</b>	Polychlorinated Biphenyl
<b>CD</b>	Compact Disc	<b>pCi/g</b>	picocurie(s) per gram
<b>cm</b>	centimeter(s)	<b>PM</b>	Project Manager
<b>cm<sup>2</sup></b>	square centimeter(s)	<b>ppm</b>	parts per million
<b>COC</b>	Contaminant of Concern	<b>QA</b>	Quality Assurance
<b>cpm</b>	counts per minute	<b>QAPP</b>	Quality Assurance Project Plan
<b><sup>137</sup>Cs</b>	Cesium-137	<b>QC</b>	Quality Control
<b>DCB</b>	dechlorobiphenyl		
<b>DCGL</b>	Derived Concentration Guideline Level	<b>RCRA</b>	Resource Conservation and Recovery Act
<b>DGPS</b>	Differential Global Positioning System	<b>RL</b>	Reporting Limit
<b>dpm</b>	disintegration(s) per minute	<b>ROC</b>	Radionuclide of Concern
<b>DU</b>	Depleted Uranium	<b>σ</b>	sigma
<b>EDD</b>	Electronic Data Deliverable	<b>sec</b>	second(s)
<b>FSM</b>	Field Site Manager	<b>SSHP</b>	Site Safety and Health Plan
<b>GM</b>	Geiger Mueller	<b>TMX</b>	tetrachloro-meta-xylene
<b>GWS</b>	Gamma Walkover Survey	<b><sup>232</sup>U</b>	Uranium-232
<b>in.</b>	inch(es)	<b><sup>234</sup>U</b>	Uranium-234
<b>LCS</b>	Laboratory Control Sample	<b><sup>235</sup>U</b>	Uranium-235
<b>LQAP</b>	Laboratory Quality Assurance Plan	<b><sup>238</sup>U</b>	Uranium-238
<b>μR/hr</b>	microRoentgens per hour		
<b>MARSSIM</b>	Multi-Agency Radiation Survey and Site Investigation Manual		
<b>MDC</b>	Minimum Detectable Concentration		
<b>MDL</b>	Method Detection Limit		
<b>mg/L</b>	milligrams per liter		
<b>min</b>	minute(s)		
<b>mrem/yr</b>	millirem(s) per year		
<b>MS</b>	Matrix Spike		
<b>MSD</b>	Matrix Spike Duplicate		

## 1.0 INTRODUCTION

This *Characterization Survey Report* presents the results of characterization survey and sampling activities conducted in the Building 1103A area of the U.S. Army Research Laboratory (ARL) located at Aberdeen Proving Ground (APG) in Aberdeen, Maryland. The scope of the survey includes the evaluation of radiological and other environmental contamination in Buildings 1103A and BRL12, the associated vault, and the surrounding pavement and grounds. Characterization activities, including both fieldwork and document preparation, were performed by Cabrera Services, Inc. (CABRERA) for the U.S. Army Joint Munitions Command (AJMC), under Contract No. W52P1J-04-D-0007, Delivery Order 0006.

Detailed plans for the characterization survey discussed in this report are presented in the *Building 1103A Area Characterization Survey Work Plan* (CABRERA, 2006a), hereafter referred to as the *Work Plan*. Onsite field activities were performed May 16 to June 2, 2006, in accordance with the *Building 1103A Area Characterization Survey Site Safety and Health Plan* (SSHP; CABRERA, 2006b). Data was collected in accordance with the *Building 1103A Area Characterization Survey Quality Assurance Project Plan* (QAPP; CABRERA, 2006c).

The field measurements and analytical data collected during this effort will be used to support the development of a *Decommissioning Plan* for the Building 1103A area, in accordance with U.S. Nuclear Regulatory Commission (NRC) requirements and guidance.

### 1.1 Background

The Building 1103A area is a former radioactive material processing and storage facility on Spesutie Island at APG. Historical site activities involving depleted uranium (DU) have resulted in radiological contamination of the buildings and grounds. ARL has responsibility for this area and desires to initiate the decommissioning process so that the area can be released from its NRC Nuclear Materials License requirements (see Appendix A) and reused for other purposes.

The general layout of the Building 1103A area is shown in Figure 1-1. Floor plans of the main buildings comprising this area (i.e., Building 1103A, Building BRL12, and the freestanding vault) are depicted in Figures 1-2 through 1-4, respectively. Historical activities involved the unloading of DU contaminated targets in the central asphalt area; storage and staging of the targets in one of the three vaults; cutting and machining of the targets in

Buildings 1103A (and, to a lesser extent, BRL12); and storage and reloading of the resulting steel pieces in preparation for decontamination, disposal, or reuse.

Limited DU activities in the Building 1103A area were temporarily resumed upon completion of the characterization survey. It is expected that work involving DU will permanently cease in 2008, at which time the characterization survey results presented in this report will be verified, and the Army is expected to proceed with decommissioning the site.

## 1.2 Survey Scope

The scope of the characterization survey includes the interior and exterior surfaces of Buildings 1103A, Building BRL12, and the freestanding vault; the northern and western exterior surfaces of Building 1103B; and the asphalt pavement and grass-covered grounds in the immediate vicinity of the buildings. Based on the nature of historical activities conducted in this area and on the time period during which the structures were built, the characterization survey addresses DU contamination, as well as any hazardous materials suspected of being present in the building materials.

The characterization approach presented in the *Work Plan* included both radiological surveys and volumetric sampling, consistent with guidance presented in the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM; NRC, 2000). The primary objective of the fieldwork was to collect sufficient data to adequately characterize the Building 1103A area in support of its decommissioning and release from NRC license requirements. Results of the data collection effort have been used to identify the nature and extent of contamination so that future decisions regarding the appropriate disposition of impacted building materials can be made appropriately.

The results presented in this report will provide the basis for the development of a decommissioning plan for the Building 1103A area. The plan will evaluate alternative remediation approaches that may include the removal of contaminated building materials, asphalt, and soil, as well as the decontamination and re-use of non-porous building materials. Decommissioning activities will proceed based on NRC approval of the recommended approach. Following the completion of decommissioning activities, the results of final status surveys of the buildings and grounds will be used to demonstrate that compliance with the NRC dose-based standard has been achieved, and the area can be released for unrestricted use in accordance with 10 CFR 20.1402.

### 1.3 Previous Investigations

In preparation for the characterization of the Building 1103A area, previous radiation survey results were reviewed, as discussed in the *Work Plan*. These results identified radiological contamination on many interior surfaces of Building 1103A, especially in the main work area. Routine surveys indicated low levels of removable contamination and general area dose rates of approximately 20 microRoentgens per hour ( $\mu\text{R/hr}$ ). The highest reported contact reading was 120  $\mu\text{R/hr}$ , located near the metal shearing machine. It was assumed that the interior surfaces of Building BRL12 were similarly contaminated from past machining operations, and that the vault walls and floors were contaminated from the storage and handling of contaminated targets.

A screening-level gamma walkover survey (GWS) was performed by the Army in 2005 to identify general areas of asphalt and grounds contamination that should be included in the Building 1103A area characterization effort. The results, which are presented in the *Work Plan*, indicated elevated radiation in the middle of the central asphalt pavement area (i.e., east of Building BRL12). This was assumed to be a result of historical activities conducted in this area, such as acetylene torch-cutting of contaminated items. The GWS also indicated elevated radiation measurements on the grounds south of the perimeter fence, which were assumed to be due to the transport and re-deposition of contaminated particles in storm water runoff.

### 1.4 Contaminants of Concern

Radionuclides of concern (ROCs) known to be present in the Building 1103A area are limited to DU isotopes (i.e., Uranium-234 [ $^{234}\text{U}$ ], Uranium-235 [ $^{235}\text{U}$ ], and Uranium-238 [ $^{238}\text{U}$ ]) and their short-lived decay progeny (thorium-234 [ $^{234}\text{Th}$ ], protactinium-234m [ $^{234\text{m}}\text{Pa}$ ], and thorium-231 [ $^{231}\text{Th}$ ]). The assumed DU composition is based on the isotopic uranium weight ratios routinely used for shipments of DU waste from APG (BARG, 1995). The activity fractions are calculated from the weight ratios and specific activities of each uranium isotope. The resulting composition consists of  $^{234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  activity fractions of 0.084, 0.012, and 0.904, respectively. This composition is relatively similar to the 0.190, 0.021, 0.790 average activity fractions measured in three DU soil samples from the Transonic Range of APG, as described in the Argonne National Laboratory (ANL) report *Derived Uranium Guideline for the Depleted Uranium Study Area of the Transonic Range, Aberdeen Proving Ground, Maryland* (ANL, 1999).

Other potential contaminants of concern (COCs) include hazardous substances such as asbestos, polychlorinated biphenyl compounds (PCBs), and *Resource Conservation and Recovery Act (RCRA)* metals, including mercury and lead. These substances may be present as constituents in building materials (e.g., floor tile, ceiling tile, adhesives, paint, flame-retardant materials, light bulbs or ballast, electrical systems, etc.), particularly those manufactured prior to the 1970's.

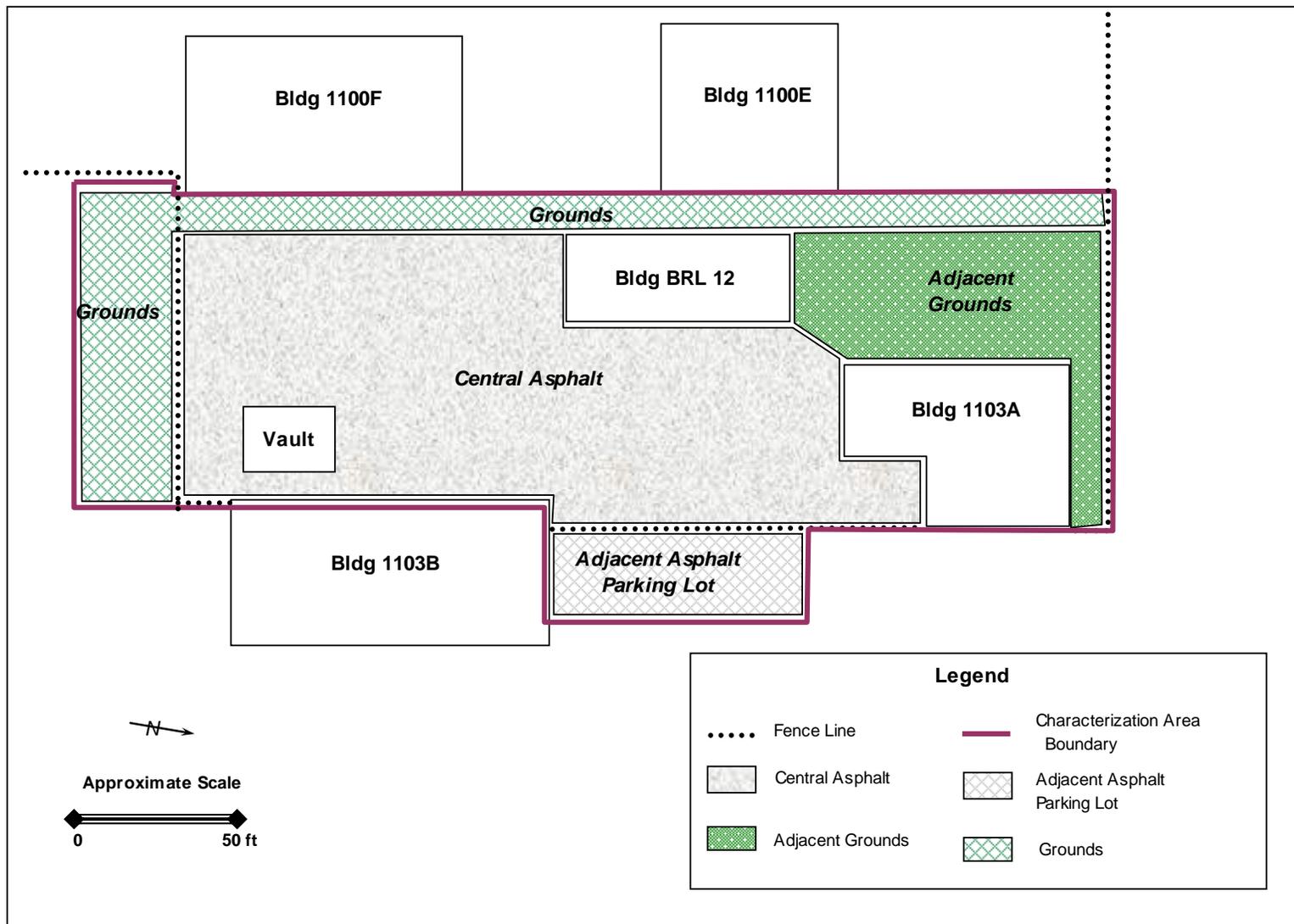


Figure 1-1: Building 1103A Area Layout

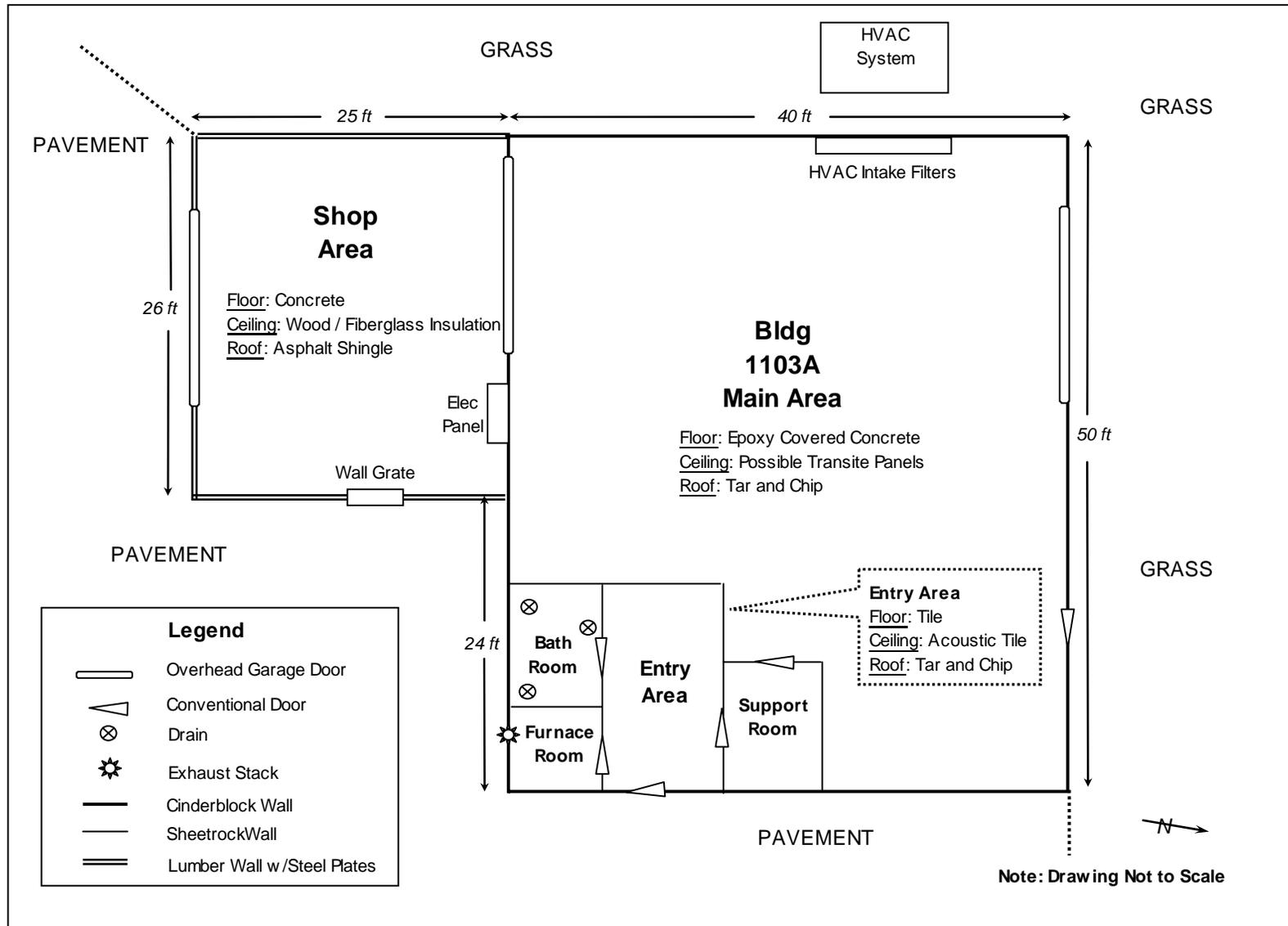


Figure 1-2: Building 1103A Floor Plan

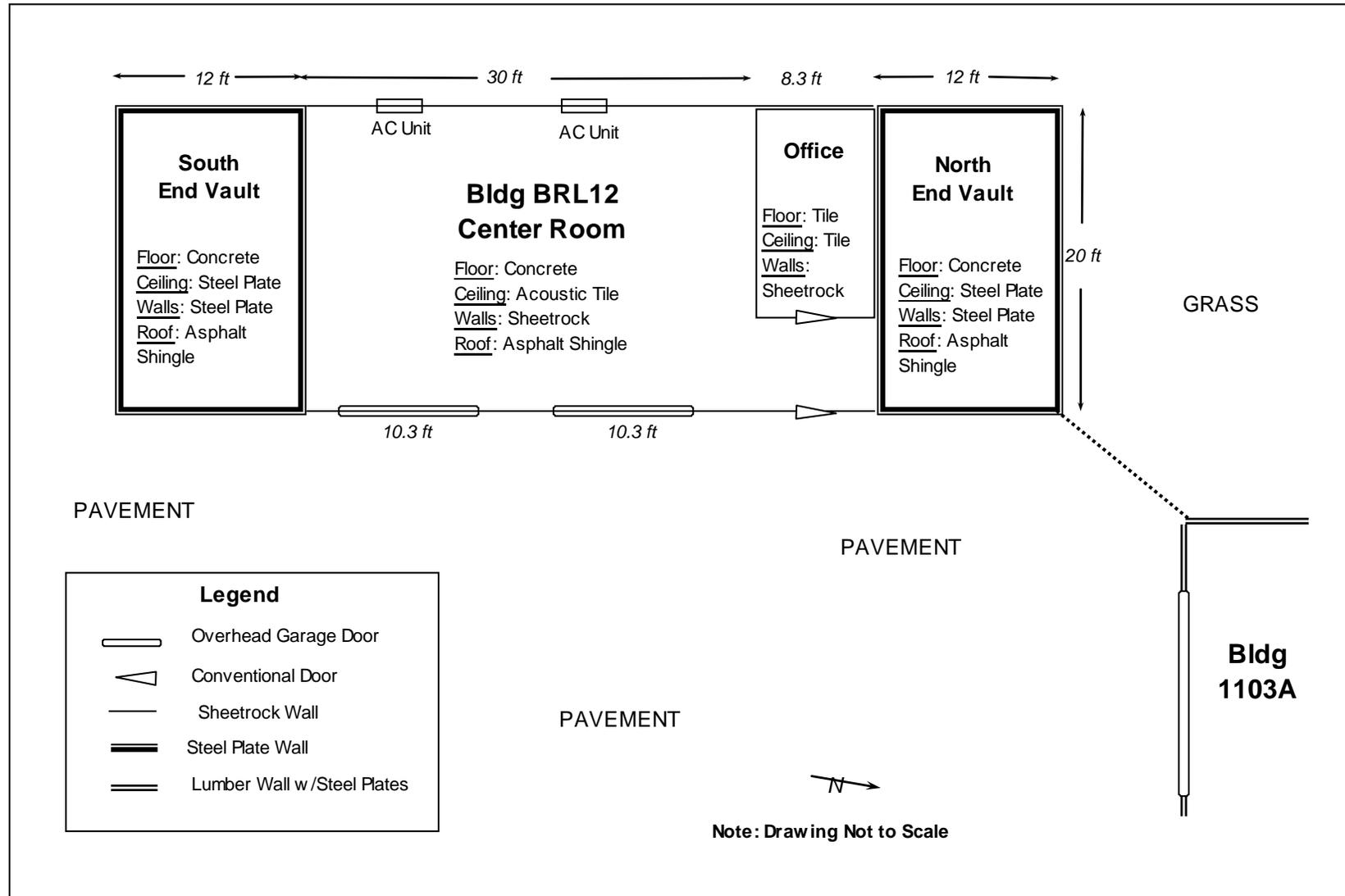


Figure 1-3: Building BRL12 Floor Plan

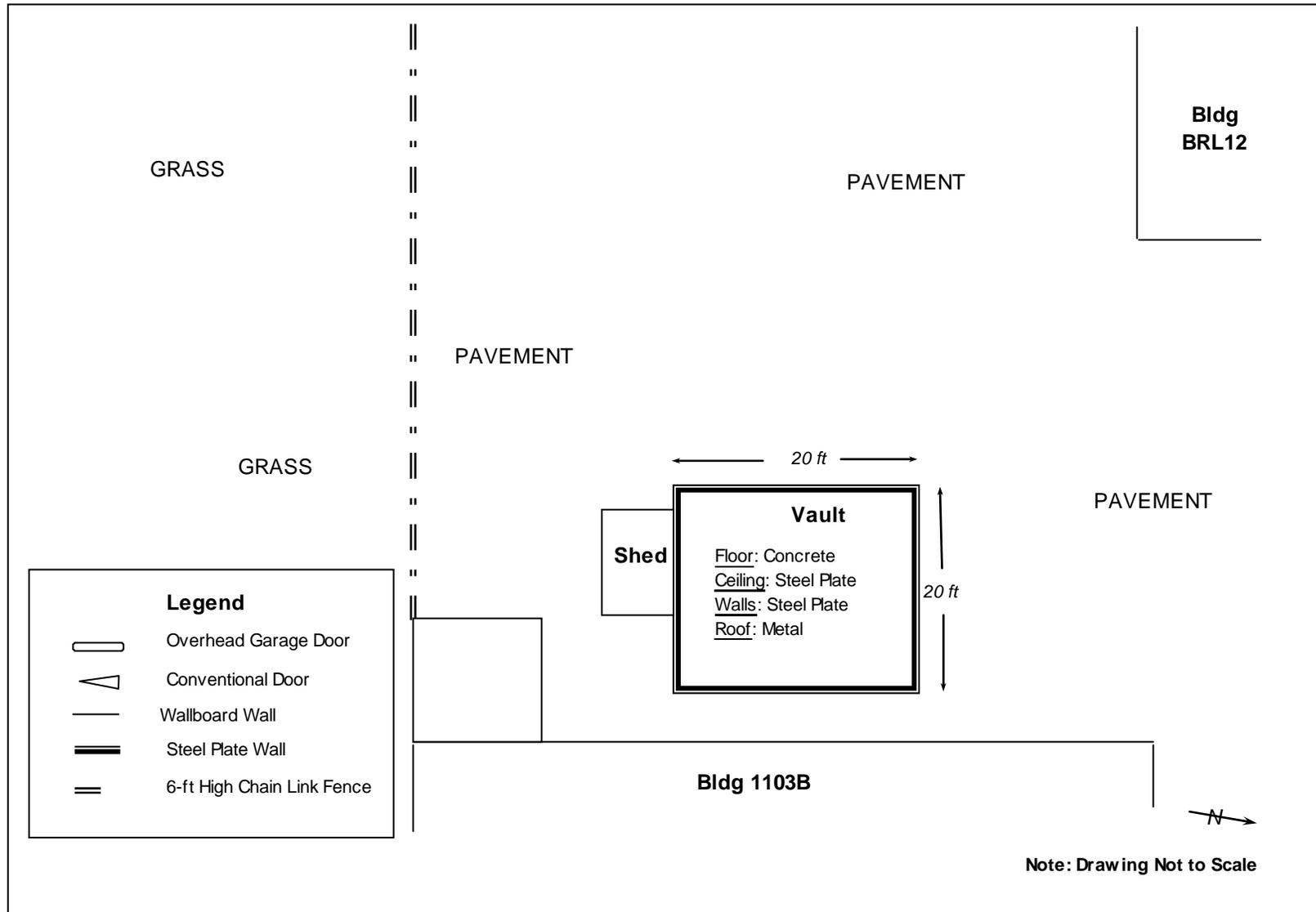


Figure 1-4: Freestanding Vault

## **2.0 SCREENING LIMITS, INSTRUMENTATION, AND METHODOLOGY**

Specific objectives for the Building 1103A area characterization survey were as follows:

- Identify the extent to which residual contamination in Buildings 1103A and BRL12, the associated vault, the adjacent pavement, and nearby grounds exceeds radiation guideline limits; and
- Determine the appropriate disposition for materials exhibiting unacceptable levels of contamination (e.g., decontaminate and reuse, dispose as radiological waste, dispose as mixed radiological/hazardous waste).

To meet the project objectives, the following survey and sampling activities were conducted:

- Gross alpha/beta scan surveys of the building interior and exterior surfaces, including floors, walls, ceilings, and building systems (e.g., pipes, floor drains, ceiling ducts, conduit, etc.);
- Integrated alpha/beta measurements at locations of highest activity observed during the scan surveys;
- GWS of asphalt and ground surfaces;
- Collection and analysis of smear samples of building surfaces in systematic and biased locations; and
- Collection and analysis of volumetric samples of construction materials (e.g., asphalt, paint, concrete, etc.) and soil/sediment.

This section describes the screening limits, instrumentation, and methodology used to perform the characterization survey. In general, field activities were conducted in accordance with the *Work Plan* (CABRERA, 2006a), except as noted in the paragraphs below.

## 2.1 Screening Limits

To provide a basis for characterizing the levels of radiological contamination and evaluating the potential presence of hazardous constituents, screening levels were established as described below.

### 2.1.1 Radioactivity

Radioactivity screening limits for DU activity in the Building 1103A area were developed to represent compliance with the 25-millirem per year (mrem/yr) NRC dose limit specified in 10 CFR 20.1402. The survey screening limits listed in Table 2-1 were developed in accordance with *NUREG 1757: Consolidated NMSS Decommissioning Guidance, Vol. 2* (NRC, 2003). As shown in Table 2-1, transferable surface screening limits are 10% of the building surface screening limits, based on the NRC assumption that removable contamination activity generally comprises 10% of the total contamination activity (NRC, 2003).

The DU building surface and soil screening limits listed in Table 2-1 and described below are considered to be conservative, lower-bounding estimates of potential cleanup criteria and have been used to establish instrument/analysis sensitivity requirements for this survey.

**Table 2-1: Radioactivity Screening Limits**

<b>Radionuclide of Concern</b>	<b>Building Surface Screening Limit (dpm/100 cm<sup>2</sup>)<sup>a</sup></b>	<b>Transferable Activity Limit (dpm/100 cm<sup>2</sup>)<sup>b</sup></b>	<b>Soil Screening Limit (pCi/g)<sup>c</sup></b>
DU	100	10	102

dpm = disintegrations per minute      cm<sup>2</sup> = square centimeters      pCi/g = picocuries per gram

<sup>a</sup> Building surface screening values were derived in accordance with NUREG 1757 (NRC, 2003) using DandD screening methodology (concentrations listed NUREG/CR-5512, Vol. 3, Table 5.19 for P<sub>crit</sub> = 0.90 [NRC, 1999]).

<sup>b</sup> Transferable activity limit represents 10% of the total building surface screening limit, as recommended in NUREG 1757 (NRC, 2003).

<sup>c</sup> Soil screening values were derived based on site-specific DCGLs developed by Argonne National Laboratory for the Transonic Range area of APG (ANL, 1999).

### Surface Activity Screening Limit

Using MARSSIM Section 4.3.4 (NRC, 2000), the sum of ratios equation below, and knowing that there is one alpha decay per decay of each DU isotope, the gross DU surface screening limit of 100 alpha dpm / 100 square centimeters (cm<sup>2</sup>) was derived for building and structure

surfaces (including asphalt pavement). This surface screening limit was calculated using the NRC screening levels presented in Table 5.19 of *NUREG/CR-5512, Vol. 3* (NRC, 1999), and the DU activity fractions discussed in Section 1.4. The referenced NRC screening levels are 90.6 dpm/100 cm<sup>2</sup>, 97.6 dpm/100 cm<sup>2</sup>, and 101 dpm/100 cm<sup>2</sup> for <sup>234</sup>U, <sup>235</sup>U, and <sup>238</sup>U, respectively. The calculated activity fractions are 0.084, 0.012, and 0.904 for <sup>234</sup>U, <sup>235</sup>U, and <sup>238</sup>U, respectively. The surface screening limit of 100 dpm / 100 cm<sup>2</sup> was calculated as follows:

$$\text{Gross DU Surface Screening Limit} = \frac{1}{\left(\frac{f_1}{SL_1}\right) + \left(\frac{f_2}{SL_2}\right) + \left(\frac{f_3}{SL_3}\right)}$$

Where:  $f_{1,2,3}$  = Activity fraction of each DU isotope in APG waste  
 $SL_{1,2,3}$  = NRC screening level for each DU radionuclide

#### Soil Screening Limit

The gross DU soil screening limit of 102 pCi/g was derived by applying the sum of ratios rule to the derived concentration guideline levels (DCGLs) for DU in soil developed by ANL for the Transonic Range area of APG (ANL, 1999). The DCGLs reported for three different source term mix ratios were multiplied by the activity fraction of each uranium isotope in the respective mixes; and the minimum radionuclide-specific DCGLs were selected as soil screening values for this characterization survey. The resulting values used to calculate the gross DU soil screening limit were 32 pCi/g, 4.8 pCi/g, and 190 pCi/g for <sup>234</sup>U, <sup>235</sup>U, and <sup>238</sup>U, respectively. The soil screening limit of 102 pCi/g was calculated as follows:

$$\text{Gross DU Soil Screening Limit} = \frac{1}{\left(\frac{f_1}{SL_1}\right) + \left(\frac{f_2}{SL_2}\right) + \left(\frac{f_3}{SL_3}\right)}$$

Where:  $f_{1,2,3}$  = Activity fraction of each DU isotope in APG waste  
 $SL_{1,2,3}$  = ANL screening level for each DU radionuclide

#### Surface Contamination/Free Release Limit

The surface release limit of 1,000 dpm/100 cm<sup>2</sup> of DU alpha activity, as specified in Army Regulation 11-9: *The Army Radiation Safety Program* (Army, 1999), was used to guide the unrestricted release of tools and equipment used in the characterization effort. Radiological screening of the equipment and tools was documented on Radiological Survey Sheets to record the free release of items from the radiological controlled area.

*2.1.2 Potentially Hazardous Constituents*

Although the primary parameters of interest during the Building 1103A area characterization were the isotopes of uranium that comprise DU ( $^{234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ), additional parameters suspected of being present included asbestos, lead, mercury, and PCBs. The presence of these parameters at certain concentrations could result in the re-classification of radiological waste generated during decommissioning as mixed hazardous/radiological waste.

To evaluate the potentially hazardous nature of contaminated materials identified during the characterization effort, volumetric samples of building materials (e.g., wallboard, ceiling tile, floor tile, etc.) were collected and analyzed for hazardous parameters, as appropriate. Action levels used in the evaluation of these parameters are listed in Table 2-2.

**Table 2-2: Action Levels for Chemicals of Interest**

<b>Parameter</b>	<b>Action Level</b>	<b>Reference</b>
Asbestos	1% by weight	Definition of asbestos-containing material in 40 CFR 763
Lead	5 mg/L	Toxicity characteristic limits specified in 40 CFR 261.24
Mercury	0.2 mg/L	
PCBs	50 ppm	Waste disposal restrictions in 40 CFR 761

mg/L = milligrams per liter

ppm = parts per million

PCBs = polychlorinated biphenyl compounds

**2.2 Direct Radiation Measurements**

Building surfaces were surveyed using direct scan and static measurement techniques to identify areas of above-background radioactivity, as specified in the *Work Plan*. In accordance with the *Work Plan*, the proposed data collection design was re-evaluated as new data became available in the field. As a result, a field modification was implemented to include beta, as well as alpha, measurements during the direct surveys. This allowed for optimization of field resources and adherence to the project schedule by decreasing the amount of time required to identify areas of elevated radioactivity during the scan surveys.

*2.2.1 Surface Scan Surveys*

Surface scanning for alpha and beta activity was performed to identify discrete locations where contaminant concentrations exceeded the DU surface screening limits. Surface scans

of building floors and of the adjacent asphalt parking lot were conducted using a Ludlum Model 43-37 gas proportional detector with an active area of 582 cm<sup>2</sup>. Surface scans of the interior and exterior building walls, ceilings, and other building surfaces were conducted using a Ludlum Model 43-89 scintillation detector with an active area of 126 cm<sup>2</sup>.

Scan measurements were obtained by moving the active area of the detector over the surface of interest at or below the scan speeds specified in the *Work Plan*, as indicated in Table 2-3. At the locations of highest count rates, one-minute integrated counts were performed as described in Section 2.2.2. Scanning was performed with the active area of the detector at a maximum height of approximately 0.5 cm above the surface of interest.

**Table 2-3: Direct Surface Scan Assumptions**

Model No.	Probe Area (cm <sup>2</sup> )	Probe Width (cm)	Efficiency (cpm /dpm)	Bkgrd (cpm)	Scan Speed (cm/sec)	Pause Time (sec)	P(n>=1)	Dwell Time (sec)	P(n>=2)
<b>Alpha Measurements</b>									
43-37	582	15	0.15	10	6	NA	NA	2.5	0.91
43-89	126	9	0.15	3	1	7.3	0.90	NA	NA
<b>Beta Measurements</b>									
43-37	582	15	0.17	400	6	NA	NA	NA	NA
43-89	126	9	0.34	265	1	NA	NA	NA	NA

cm<sup>2</sup> = square centimeters  
cpm = counts per minute  
sec = second

cm = centimeters  
dpm = disintegrations per minute  
P = probability

### 2.2.2 Integrated Surface Measurements

Integrated direct measurements (i.e., static measurements) of surface alpha and beta radioactivity were performed to compare contaminant concentrations at discrete sampling locations to the release criterion and to facilitate statistical testing. Integrated activity measurements were performed using a Ludlum Model 43-89 handheld alpha scintillation detector. The estimated detector sensitivities and assumptions used for this detector are presented in Table 2-4.

Integrated measurements were intended to be performed using one-minute count periods. However, field observations during the first two days of work indicated that a two-minute

count period provided more reliable data with a lower minimum detectable concentration (MDC). Thus, the majority of integrated surface measurements were performed using two-minute count periods. Measurements were recorded on field sheets and summarized on a computerized spreadsheet. Net count rates were calculated as the difference between the measurement count rate and the background count rate. After adjusting the net count rates for the surface area of the detector and the instrument efficiency, the results were used to identify specific locations where the surface screening limit of 100 dpm/100 cm<sup>2</sup> was exceeded.

To confirm the results, approximately 10% of the integrated surface measurements were repeated, and the results were recorded as duplicate measurements.

**Table 2-4: Detector Integrated Measurement Sensitivities and Assumptions**

Model No.	Count Time (min)	Background Count Time (min)	Probe Area (cm <sup>2</sup> )	Efficiency (cpm /dpm)	Background (cpm)	Static MDC (dpm / 100 cm <sup>2</sup> )
<b>Alpha Measurements</b>						
43-89	1	1	126	0.15	3	60
2929	4	20	Smear	0.39	2	8
<b>Beta Measurements</b>						
43-89	2	2	126	0.34	400	130
2929	2	20	Smear	0.21	265	83

min = minutes

cpm = counts per minute

cm<sup>2</sup> = square centimeters

dpm = disintegrations per minute

### 2.3 Smear Sample Surveys

Smear surveys were performed as specified in the *Work Plan*. Smear samples were collected at the locations where integrated measurements were performed to quantify transferable surface alpha and beta radioactivity. Smears were analyzed using a Ludlum Model 2929 dual scaler equipped with a Model 43-10-1 scintillation sample counter. Count times were set at either 2 or 4 minutes for surface smear measurements, and approximately half of the smears were recounted for 5 minutes in an attempt to achieve the lowest practical MDCs. Count times were set at 20 minutes for background measurements. The estimated detector sensitivities and assumptions used for this detector are presented in Table 2-4.

Smear locations and results were recorded on field sheets and summarized on a computerized spreadsheet. Net count rates were calculated as the difference between the measurement count rate and the background count rate. After adjusting the net count rates for the surface area of the smear and the instrument efficiency, the results were used to identify specific locations where the transferable analysis screening limit of 10 dpm/100 cm<sup>2</sup> was exceeded.

To confirm the smear sample analyses, 10% of the smears were re-counted onsite using the Model 2929 and recorded as duplicate measurements. These smears were also evaluated for gross alpha and beta activity at the off-site analytical laboratory. A conversion factor of 2.2 dpm/100 cm<sup>2</sup> per pCi<sup>1</sup> was applied to the analytical results to confirm specific locations where the transferable analysis screening limit of 10 dpm/100 cm<sup>2</sup> was exceeded.

## **2.4 Gamma Walkover Survey**

An outdoor GWS was performed as specified in the *Work Plan*. A Ludlum Model 44-20 three-inch by three-inch (3-in. x 3-in.) sodium iodide (NaI) detector coupled to a Ludlum Model 2221 ratemeter/scaler was used to measure surface gamma activity on the asphalt and grounds. The system was calibrated with cesium-137 (<sup>137</sup>Cs) and enabled with a differential global positioning system (DGPS) so that activity measurements could be spatially referenced.

The GWS was performed following MARSSIM (NRC, 2000) protocol by walking straight parallel lines over each survey unit while moving the detector in a serpentine motion 0.05 to 0.10 m (2 to 4 in.) above the ground surface. Survey passes were approximately one meter apart. Data from the ratemeter was automatically logged into the DGPS unit once per second.

After the survey was completed, the raw data was downloaded from the DGPS and sent to the data processing specialist for export into a geospatial software program. An electronic file with contoured results of the survey was generated and used to identify locations for soil sampling. Approximately half of the designated soil sample locations corresponded to the highest gamma readings recorded during the GWS. The other soil sampling locations were scattered throughout the site in regions that did not contain a biased sampling location. These sampling locations corresponded to the highest relative gamma readings within each localized regions of the surveyed area.

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<sup>1</sup> 1 pCi = 1x10E-12 Ci \* 3.7x10E10 dis/sec per Ci = 0.037 dis/sec \* 60 sec/min = 2.2 dpm

## 2.5 Volumetric Sample Collection and Analysis

Volumetric samples of building materials (e.g., ceiling tiles, paint chips, wallboard, floor tiles, and drain sediment) and soil/sediment samples from outside the buildings were collected and shipped to an accredited offsite laboratory for analysis. In general, the samples were collected as biased samples from locations of highest radioactivity within the surveyed areas. Building materials were selected for sampling based on process knowledge and professional judgment regarding the potential for specific types of materials used in construction prior to the 1970's to contain hazardous constituents (e.g., asbestos in floor tiles, mastic, and flame-retardant materials; lead or other metals in paint; PCBs in paint and adhesives; etc.). Samples were collected and handled as specified in the *Work Plan*, and standard chain-of-custody procedures were employed.

Volumetric samples of building materials were collected using a utility knife or other instrument appropriate for the type of material being sampled. A concrete coring machine was used to collect samples of concrete and asphalt, and to access the underlying soil. Soil and sediment samples were collected using a hand auger or stainless steel trowel, as appropriate, and homogenized in a stainless steel bowl prior to containerization. During the homogenization of soil samples, grass, twigs, stones, and other non-soil items were removed from the sample material. Although no field duplicate samples were obtained, the laboratory performed QC analyses appropriate for the individual test methods used. These are discussed in detail in Section 4.2.

Analytical data generated for the volumetric samples of soil and building materials were used to identify specific locations where either the soil screening limit of 102 pCi/g or the chemical action levels for asbestos, PCBs, or lead were exceeded. Alpha spectrometry results were used to calculate the activity concentration of DU in the samples by summing the reported concentrations of the individual uranium isotopes. Gamma spectroscopy results for thorium-234 ( $^{234}\text{Th}$ ) were used to calculate the amount of DU in the samples by assuming secular equilibrium between  $^{238}\text{U}$  and  $^{234}\text{Th}$ , and adjusting the reported activity concentrations to account for the isotopic composition of DU. As discussed in Section 1.4, the DU in this area is assumed to contain 90.4%  $^{238}\text{U}$ . Thus, the activity concentration of DU in each sample is calculated as follows:

$$DU = \frac{^{234}\text{Th}}{0.904}$$

where: DU = Activity concentration of depleted uranium (pCi/g)  
 $^{234}\text{Th}$  = Activity concentration of surrogate  $^{234}\text{Th}$  (pCi/g)

### **3.0 SURVEY RESULTS**

Characterization activities conducted in the Building 1103A area included radiological surveys (both direct and removable), as well as the collection and analysis of building material, asphalt, sediment, and soil samples, as described in the *Work Plan* (CABRERA, 2006a). This section discusses the results of the survey and sampling activities. Detailed results are presented in Appendix B for the building surveys, Appendix C for the pavement and grounds surveys, Appendix D for the collection and analysis of volumetric samples, and Appendix E for the sampling and analysis of asbestos-containing material (ACM).

#### **3.1 Building 1103A**

Building 1103A houses the main machine shop used for the disassembly of firing range targets contaminated with DU. The Main Area of Building 1103A is constructed of cinder block exterior walls, a concrete slab floor, and a flat tar-and-chip roof. The ceiling is covered in some places with fiberboard. Under the same roof is a small Entry Area, which includes the furnace room, bathroom, meeting room, and changing room. The Entry Area has a drop-type acoustic tile ceiling, sheetrock walls, and tile flooring. The walls separating the Entry and Main Areas consist of sheetrock, and are lined with steel plates on the Main Area side.

On the south side of the building is a Shop Area, which is a wood-frame addition to the main building. This area has a concrete slab floor and a pitched shingle roof. Steel plates line the lower portion of the walls in this area, and fiberglass insulation is present between the wood studs and overhead beams.

Building 1103A contains functioning ventilation, electrical, water supply, and sewer systems. The ventilation system has fiber filters on the air intake vents and exposed ductwork attached to the ceiling. The electrical system panel is located in the Shop Area, and electrical conduit runs along the walls and ceiling throughout the building to supply energy to light fixtures and wall outlets. There is a full bathroom in the Entry Area with sink, toilet, and shower facilities. This area was used for personnel and equipment decontamination during building operations involving radioactive material.

Results of the Building 1103A survey are presented in Appendix B-1, along with diagrams of the survey locations. Field data and analytical results from the volumetric sampling conducted in Building 1103A are presented in Appendix D. Below is a summary of the

survey and sampling results, presented separately by functional element (e.g., walls, ceilings, floors, etc.) and by area (e.g., Main Area, Entry Area, and Shop Area).

### *3.1.1 Interior Walls*

Results of the interior wall surveys conducted in Building 1103A are summarized in Table 3-1. The table presents summary statistics for the surveys conducted in the main area, shop area, and entry area. Statistics presented on the table include the average (i.e., arithmetic mean), standard deviation, and maximum integrated measurements obtained during the survey, as measured in disintegrations per minute (dpm) per 100 square centimeters (cm<sup>2</sup>), as well as the number of measurements obtained in each area.

The survey data indicate large areas of surface contamination on the interior walls of Building 1103A. Both the building surface and transferable activity screening limits (100 and 10 dpm/cm<sup>2</sup>, respectively) were exceeded at numerous interior wall locations in the Main and Shop Areas of Building 1103A. In general, the highest radioactivity was measured on the walls in the vicinity of cutting and shearing equipment. No interior wall locations in the Entry Area exceeded the surface or transferable activity screening limits.

Volumetric samples of wallboard were collected from the location exhibiting the highest concentration of removable activity in the building (i.e., east wall of the Main Area, near the Shop Area) and from the north wall of the changing room in the Entry Area. These samples, designated WL-A09 and WL-A11, respectively, were analyzed at the off-site laboratory for isotopic uranium, PCBs, and RCRA metals. The analytical results presented in Appendix D indicate that neither sample contained constituents at concentrations higher than the radiological volumetric screening limit specified in Table 2-1 or the chemical action levels specified in Table 2-2.

Volumetric samples of wallboard and insulation from behind the wallboard in the Entry Area were collected and analyzed for asbestos, as described in the *Report of Asbestos Containing Material Survey* included in Appendix E. These samples were designated S-4 and S-7, respectively. Analytical results indicate that neither wall sample contained detectable asbestos.

The asbestos report also notes that the interior portions of the two fire doors in Building 1103A may potentially contain asbestos. Although no destructive testing was conducted to

confirm this suspicion, common manufacturing practices at the time the building was constructed included the use of ACM in fire doors.

**Table 3-1: Interior Wall Survey Results for Building 1103A**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Main Area</b>		
Average	68	28
Standard Deviation	42	25
Maximum	172	88
Number of Data Points	18	18
<b>Shop Area</b>		
Average	80	16
Standard Deviation	62	13
Maximum	276	56
Number of Data Points	16	16
<b>Entry Area</b>		
Average	8	2.2
Standard Deviation	7	1.3
Maximum	20	4.3
Number of Data Points	8	8

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.1.2 Ceilings

Results of the ceiling surveys conducted in Building 1103A are summarized in Table 3-2. Both the building surface and transferable activity screening limits were exceeded at numerous ceiling locations within Building 1103A. With few exceptions, ceiling locations that exceeded the screening limits consisted of horizontal surfaces such as ducts, vents, light fixtures, conduits, and the tops of ceiling beams and panels, where airborne radioactive dust has settled. In contrast, the bottom surfaces of ceiling boards in the Main and Shop Areas exhibited no exceedances of the surface screening limit and only two exceedances of the transferable screening limit.

A volumetric sample of filter media was collected from the air vent on the east wall of the Main Area, near the Shop Area. This sample, designated WL-A05, was analyzed at the off-site laboratory for isotopic uranium. The analytical results presented in Appendix D indicate that the sample contained 13.7 pCi/g <sup>234</sup>U, 1.78 pCi/g <sup>235</sup>U, and 99 pCi/g <sup>238</sup>U, which exceeds the volumetric screening limit of 102 pCi/g when all isotopic concentrations are considered.

Volumetric samples of ceiling tile were collected from the Entry Area in the bathroom (CL-A13), changing room (CL-A15), and meeting room (CL-A17); and two paint chip samples were collected from the ceiling in the Main Area (CLPT-A01 and CLPT-A02). The samples were analyzed at the off-site laboratory for isotopic uranium, PCBs, and RCRA metals. The analytical results presented in Appendix D indicate that none of these samples contained constituents at concentrations higher than the radiological volumetric screening limit specified in Table 2-1 or the chemical action levels specified in Table 2-2.

**Table 3-2: Ceiling Survey Results for Building 1103A**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Main Area</b>		
Average	10	0.4
Standard Deviation	8	0.7
Maximum	26	1.3
Number of Data Points	10	10
<b>Main Area (Horizontal Surfaces)</b>		
Average	1245	284
Standard Deviation	1045	198
Maximum	2654	644
Number of Data Points	12	12
<b>Shop Area</b>		
Average	33	7.2
Standard Deviation	15	6.2
Maximum	52	18
Number of Data Points	8	8
<b>Shop Area (Horizontal Surfaces)</b>		
Average	711	159
Standard Deviation	771	145
Maximum	1562	315
Number of Data Points	3	3
<b>Entry Area (Horizontal Surfaces)</b>		
Average	375	68
Standard Deviation	301	69
Maximum	812	179
Number of Data Points	5	5

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

Volumetric samples of ceiling board from the Main Area and air duct materials (i.e., flap and gasket) from the furnace room in the Entry Area were collected and analyzed for asbestos, as described in the *Report of Asbestos Containing Material Survey* included in Appendix E.

These samples were designated S-6, S-8, and S-9, respectively. Analytical results indicate that none of the samples contained detectable asbestos.

### *3.1.3 Floors*

Results of the floor surveys conducted in Building 1103A are summarized in Table 3-3. Both the building surface and transferable activity screening limits were exceeded at numerous floor locations within Building 1103A. All 10 floor survey locations in the Main Area exceeded both screening limits, the two floor survey locations in the Shop Area exceeded the surface screening limit, and a few floor locations in the Entry Area (i.e., the changing room and the bathroom) exceeded either one or both limits.

A volumetric sample of floor tile was collected from the bathroom in the Entry Area. This sample (FL-A19) was analyzed at the off-site laboratory for isotopic uranium, PCBs, and RCRA metals. The analytical results presented in Appendix D indicate that the bathroom tile did not contain any constituents at concentrations higher than the radiological volumetric screening limit specified in Table 2-1 or the chemical action levels specified in Table 2-2.

Core borings were conducted at five floor locations in Building 1103A. Samples of the concrete flooring and underlying soil were obtained from each location. A 3 to 6-inch layer of compacted gravel was encountered between the concrete and the soil; however, no samples of this material were collected. At boring location No. 2 (i.e., the expansion joint between the Main Area and the Shop Area), a wood footing frame was encountered directly beneath the concrete slab. A sample of this wood was collected, and the boring was moved a few inches toward the Shop Area in order to obtain an unobstructed core sample. The compacted gravel layer at this boring location was 10 to 12 inches thick.

The concrete samples were processed at the off-site laboratory, where a ¼-inch cross section of each core top and bottom was sliced off and ground to a consistency suitable for analysis. The processed concrete samples (FL-R43-Top through FL-R47-Top and FL-R43-Bottom through FL-R47-Bottom) and the footing frame sample (FL-A21) were analyzed for isotopic uranium. The analytical results for the flooring material presented in Appendix D indicate that the footing frame sample (boring location No. 2) contained 11.1 pCi/g <sup>234</sup>U, 1.24 pCi/g <sup>235</sup>U, and 85 pCi/g <sup>238</sup>U. In addition, the top of one of the concrete samples (from boring location No. 4) contained 17 pCi/g <sup>234</sup>U, 1.71 pCi/g <sup>235</sup>U, and 132 pCi/g <sup>238</sup>U. None of the other concrete samples exceeded the volumetric screening limit of 102 pCi/g specified in Table 2-1.

Samples of the top six inches of underlying soil were collected from each floor boring location (SO-A17, SO-A20, SO-A30, SO-A33, and SO-A36). Deeper soil samples (SS-A-24 and SS-A27) were also collected at boring location No. 2 from 6 to 12 inches and from 12 to 18 inches, respectively, below the gravel/soil interface. All of the underlying soil samples were analyzed at the off-site laboratory by gamma spectroscopy and RCRA metals. The analytical results presented in Appendix D indicate that none of the samples contained any constituents at concentrations higher than the radiological volumetric screening limit specified in Table 2-1 or the chemical action levels specified in Table 2-2.

Volumetric samples of floor tile and mastic were collected from the Entry Area and analyzed for asbestos, as described in the *Report of Asbestos Containing Material Survey* included in Appendix E. These samples were designated S-2 and S-3 for the floor tile and associated mastic, and S-5 for the mastic beneath the brown baseboard. Analytical results indicate that the floor tile and associated mastic in the Entry Area contain greater than 1% asbestos and thus, meet the regulatory definition of ACM.

**Table 3-3: Floor Survey Results for Building 1103A**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Main Area</b>		
Average	432	60
Standard Deviation	239	36
Maximum	864	124
Number of Data Points	10	10
<b>Shop Area</b>		
Average	386	7.0
Standard Deviation	59	1.5
Maximum	428	8.0
Number of Data Points	2	2
<b>Entry Area</b>		
Average	87	7.8
Standard Deviation	73	7.0
Maximum	236	20
Number of Data Points	7	7

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

*3.1.4 Exterior Walls*

Results of the exterior wall surveys conducted at Building 1103A are summarized in Table 3-4. Only one exterior wall location (i.e., south wall near the entrance to the Shop Area) exceeded the surface activity screening limit, and no locations exceeded the transferable activity screening limit. No volumetric samples were collected from the exterior walls of Building 1103A.

**Table 3-4: Exterior Wall Survey Results for Building 1103A**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>East</b>		
Average	13	0.1
Standard Deviation	13	0.5
Maximum	36	1.0
Number of Data Points	12	12
<b>South</b>		
Average	43	1.6
Standard Deviation	85	3.1
Maximum	268	9.9
Number of Data Points	9	9
<b>West</b>		
Average	12	0.3
Standard Deviation	6	1.0
Maximum	20	2.3
Number of Data Points	8	8
<b>North</b>		
Average	22	0.2
Standard Deviation	13	0.6
Maximum	42	1.0
Number of Data Points	8	8

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

*3.1.5 Downspouts and Drains*

Two downspouts were surveyed on the exterior of Building 1103A. One was in the center of the west wall, south of the ventilation system, and the other was on the northwest corner of the building. The downspouts and grounds directly beneath them were surveyed with a pancake Geiger-Mueller (GM) detector, and smear samples were collected from the discharge openings. No discrete areas of elevated radioactivity were observed. A surface soil sample was collected from the ground most likely to be impacted by discharge from the downspout

on the northwest corner (SO-G39). The analytical results presented in Appendix D indicate that radioactivity in the soil was within the soil screening limit of 102 pCi/g specified in Table 2-1.

Smear samples were collected from three drains in the Entry Area of Building 1103A to evaluate the potential presence of DU in the drain sediment. Smears were collected from inside the bathroom sink, shower, and washing machine drains, and analyzed at the off-site laboratory for isotopic uranium. The analytical results presented in Appendix D indicate that none of the drains contained DU in concentrations greater than the screening limit.

### **3.2 Building BRL12**

Building BRL12 was built to provide additional space for machining operations associated with the dismantlement of DU-contaminated targets, as well as shielded storage space for staging the contaminated targets prior to disassembly. The main area (i.e., Central Room) of Building BRL12, where machining was performed, has a concrete floor, sheetrock walls (some of which are lined with steel), and acoustic tile ceiling. There are two air conditioning units mounted in the west wall of the building. The only utility system in the building is the electrical system, which is used to power the air conditioners, light fixtures, and wall outlets.

There are steel-lined storage vaults on the north and south ends of Building BRL12. Both vaults have concrete floors and steel-lined walls and ceilings. A single light fixture hangs from the ceiling in each vault. There is also a small office area situated between the main room and the north end vault. The office has sheetrock walls, tiled floor, and acoustic tile ceiling.

Results of the Building BRL12 survey are presented in Appendix B-2, along with diagrams of the survey locations. Analytical results from the volumetric sampling conducted at Building BRL12 are presented in Appendix D. Below is a summary of the survey and sampling results, presented separately by functional element (e.g., walls, ceilings, floors, etc.) and by area (e.g., Central Room, North Vault, South Vault, and Office).

#### *3.2.1 Interior Walls*

Results of the interior wall surveys conducted in Building BRL12 are summarized in Table 3-5. The survey data indicate that none of the interior walls in Building BRL12 exceeded the building surface or transferable activity screening limits. The highest radioactivity

measurements were obtained on the south and west walls of the Central Room, in the general vicinity of machining operations.

A volumetric sample of wallboard was collected from the Central Room of Building BRL12 and analyzed for asbestos, as described in the *Report of Asbestos Containing Material Survey* contained in Appendix E. Analytical results for this sample (S-12) indicate no detectable asbestos.

No other volumetric samples were collected from the interior walls of Building BRL12.

**Table 3-5: Interior Wall Survey Results for Building BRL12**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Central Room</b>		
Average	9	4.4
Standard Deviation	12	3.2
Maximum	40	8.7
Number of Data Points	12	12
<b>North Vault</b>		
Average	-1	0.8
Standard Deviation	7	1.0
Maximum	10	2.3
Number of Data Points	6	6
<b>South Vault</b>		
Average	1	0.3
Standard Deviation	3	0.7
Maximum	6	1.3
Number of Data Points	6	6

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.2.2 Ceilings

Results of the ceiling surveys conducted in Building BRL12 are summarized in Table 3-6. The survey data indicate that neither the building surface nor transferable activity screening limits were exceeded at any of the ceiling survey locations in Building BRL12. The highest radioactivity was measured at the ceiling location in the approximate center of the main room.

A paint chip sample was collected from the ceiling of the North Vault (CLPT-B03). The sample was analyzed at the off-site laboratory for isotopic uranium, PCBs, and RCRA metals.

The analytical results presented in Appendix D indicate that the sample did not contain any constituents at concentrations higher than the radiological volumetric screening limit specified in Table 2-1 or the chemical action levels specified in Table 2-2.

Visual inspection of the Building BRL12 ceilings did not identify any suspect ACM. Thus, no volumetric samples were collected for asbestos analysis, as discussed in the *Report of Asbestos Containing Material Survey* included in Appendix E.

**Table 3-6: Ceiling Survey Results for Building BRL12**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Central Room</b>		
Average	19	0.7
Standard Deviation	15	0.9
Maximum	36	1.3
Number of Data Points	3	3
<b>North Vault</b>		
Average	0	0.4
Standard Deviation	0	0.6
Maximum	0	0.8
Number of Data Points	2	2
<b>South Vault</b>		
Average	4	1.4
Standard Deviation	0	1.5
Maximum	4	2.4
Number of Data Points	2	2

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.2.3 Floors

Results of the floor surveys conducted in Building BRL12 are summarized in Table 3-7. Both the building surface and transferable activity screening limits were exceeded at numerous floor survey locations within Building BRL12. Although a few locations in the Central Room exceeded one or both screening limits, the highest radioactivity measurements were obtained in the North Vault, where data for all floor survey locations exceeded the building surface activity screening limit, and all but one exceeded the transferable activity screening limit. In addition, the scan survey results indicated several hot spot locations on the floors in both end vaults where visible DU fragments were observed.

Volumetric samples of floor tile and mastic were collected from the Office and analyzed for asbestos, as described in the *Report of Asbestos Containing Material Survey* included in Appendix E. These samples were designated S-10 and S-11 for the floor tile and associated mastic, respectively. Analytical results indicate that the floor tile contains greater than 1% asbestos and, thus, meets the regulatory definition of ACM.

No other volumetric samples of flooring material were collected from Building BRL12.

**Table 3-7: Floor Survey Results for Building BRL12**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Central Room</b>		
Average	76	7.4
Standard Deviation	55	4.1
Maximum	186	14
Number of Data Points	9	9
<b>Office</b>		
Average	98	7.5
Standard Deviation	NA	NA
Maximum	98	7.5
Number of Data Points	1	1
<b>North Vault</b>		
Average	4030	274
Standard Deviation	6132	470
Maximum	14798	1107
Number of Data Points	5	5
<b>South Vault</b>		
Average	43	5.9
Standard Deviation	23	4.1
Maximum	68	12
Number of Data Points	4	4

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.2.4 Exterior Walls

Results of the exterior wall surveys conducted at Building BRL12 are summarized in Table 3-8. Neither the building surface nor transferable activity screening limits were exceeded at any of the exterior wall locations surveyed. No volumetric samples were collected from the exterior walls of Building BRL12.

**Table 3-8: Exterior Wall Survey Results for Building BRL12**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>East</b>		
Average	7	1.0
Standard Deviation	8	1.6
Maximum	22	3.6
Number of Data Points	8	8
<b>South</b>		
Average	6	0.6
Standard Deviation	5	1.2
Maximum	12	2.3
Number of Data Points	4	4
<b>West</b>		
Average	4	0.3
Standard Deviation	7	0.6
Maximum	12	1.0
Number of Data Points	8	8
<b>North</b>		
Average	5	0.9
Standard Deviation	6	1.1
Maximum	12	2.3
Number of Data Points	4	4

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.2.5 Downspouts

Three downspouts were surveyed on the exterior of Building BRL12. Downspout locations were on the southwest, northwest, and northeast corners of the building. The downspouts and grounds directly beneath them were surveyed with a pancake GM detector, and smear samples were collected from the discharge openings. No discrete areas of elevated radioactivity were observed. A surface soil sample was collected from the ground most likely to be impacted by discharge from the downspout on the northeast corner (SO-G40). The analytical results presented in Appendix D indicate that radioactivity in the soil was slightly less than the soil screening limit of 102 pCi/g specified in Table 2-1.

### 3.3 Freestanding Vault

There is a Freestanding Vault situated directly southeast of Building BRL12. Like the BRL12 end vaults, this vault was used for the storage of contaminated targets. It has a concrete floor,

and the walls and ceiling are completely lined with steel. A single light fixture hangs from the ceiling. Attached to the southern end of the vault is a wooden tool shed where maintenance equipment such as a tractor and snow plow are stored.

Results of the Freestanding Vault surveys are presented in Appendix B-3, along with diagrams of the survey locations. Analytical results from the volumetric sampling conducted at the vault are presented in Appendix D. A summary of the survey and sampling results is presented below.

### 3.3.1 Interior Walls

Results of the interior wall surveys conducted in the Freestanding Vault are summarized in Table 3-9. The survey data indicate that one of the wall locations (east wall, 2 meter high) slightly exceeded the building surface and transferable activity screening limits. No other interior wall locations exceeded the screening limits. No volumetric samples were collected from the interior walls of the Freestanding Vault.

**Table 3-9: Interior Wall Survey Results for the Freestanding Vault**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Vault</b>		
Average	16	3.3
Standard Deviation	37	4.2
Maximum	104	12.6
Number of Data Points	8	8

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.3.2 Ceiling

Results of the ceiling surveys conducted in the Freestanding Vault are summarized in Table 3-10. The survey data indicate that neither the building surface nor transferable activity screening limits were exceeded at any ceiling survey locations.

A paint chip sample was collected from the ceiling of the vault (CLPT-C04) and analyzed off-site for isotopic uranium, PCBs, and RCRA metals. The analytical results presented in Appendix D indicate that the sample material contained 21 mg/L lead, which is above the action level of 5 mg/L. No other constituents were present at concentrations higher than the

radiological volumetric screening limit specified in Table 2-1 or the chemical action levels specified in Table 2-2.

**Table 3-10: Ceiling Survey Results for Freestanding Vault**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Vault</b>		
Average	1	0.1
Standard Deviation	1	0.3
Maximum	2	0.3
Number of Data Points	2	2

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.3.3 Floors

Results of the floor surveys conducted in the Freestanding Vault are summarized in Table 3-11. The survey data indicate that none of the floor survey locations exceeded the building surface or transferable activity screening limits. No volumetric samples were collected from the floor of the Freestanding Vault.

**Table 3-11: Floor Survey Results for Freestanding Vault**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Vault</b>		
Average	46	3.0
Standard Deviation	14	2.6
Maximum	56	4.8
Number of Data Points	2	2

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.3.4 Exterior Walls

Results of the exterior wall surveys conducted at the Freestanding Vault and adjacent Tool Shed are summarized in Table 3-12. The survey data indicate that neither the building surface nor transferable activity screening limits were exceeded at any of the exterior wall survey

locations. No volumetric samples were collected from the exterior walls of the Freestanding Vault.

**Table 3-12: Exterior Wall Survey Results for Freestanding Vault/Tool Shed**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>Vault - East</b>		
Average	9	1.5
Standard Deviation	16	1.1
Maximum	20	2.3
Number of Data Points	2	2
<b>Vault - South</b>		
Average	3	0.1
Standard Deviation	7	0.8
Maximum	10	1.3
Number of Data Points	4	4
<b>Vault - West</b>		
Average	23	0.3
Standard Deviation	10	0.6
Maximum	38	0.8
Number of Data Points	4	4
<b>Vault - North</b>		
Average	12	1.2
Standard Deviation	3	0.7
Maximum	16	2.3
Number of Data Points	4	4
<b>Tool Shed</b>		
Average	5	0.6
Standard Deviation	7	1.1
Maximum	18	2.3
Number of Data Points	8	8

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

### 3.4 Building 1103B

Building 1103B is situated east of the freestanding vault. No DU operations were performed in this building; however, it was included in the characterization survey because it is adjacent to the Building 1103A area pavement. The north and west exterior walls of Building 1103B were surveyed to evaluate possible impacts due to airborne migration of DU-contaminated dust. Results of the surveys conducted at Building 1103B are presented in Appendix B-4,

along with diagrams of the survey locations. A summary of the survey results is presented below.

*3.4.1 Exterior Walls*

Results of the exterior wall surveys conducted at Building 1103A are summarized in Table 3-13. Neither the building surface nor transferable activity screening limits were exceeded at any of the exterior wall locations surveyed. No volumetric samples were collected from the exterior walls of Building 1103B.

**Table 3-13: Exterior Wall Survey of Building 1103B**

Statistical Parameter	Sample $\alpha$ Count Rate (dpm/100 cm <sup>2</sup> )	
	Direct Reading	Smear
<b>West</b>		
Average	13	1.0
Standard Deviation	4	1.8
Maximum	16	2.3
Number of Data Points	2	2
<b>North</b>		
Average	17	0.8
Standard Deviation	7	1.0
Maximum	32	2.3
Number of Data Points	12	12

dpm/100 cm<sup>2</sup> = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm<sup>2</sup> for direct readings and 10 dpm/100 cm<sup>2</sup> for smear results.

*3.4.2 Downspouts*

Two downspouts were surveyed on the exterior of Building 1103B. One was on the northwest corner of the building, and the other was in the center of the west wall. A third downspout was present on the southwest corner of the building; however, it was not surveyed because the area was densely covered with thorny shrubs. The accessible downspouts and grounds directly beneath them were surveyed with a pancake GM detector, and smear samples were collected from the discharge openings. No discrete areas of elevated radioactivity were observed.

### **3.5 Pavement and Grounds**

The outdoor area of potential impact includes approximately one-half acre of asphalt pavement between the buildings and vaults (i.e., Central Asphalt), the small parking lot east of the perimeter fence enclosing the Building 1103A area (i.e., Adjacent Asphalt), and approximately one-half acre of grass-covered grounds within or adjacent to the Building 1103A area (i.e., Grounds).

#### *3.5.1 Central Asphalt*

The Central Asphalt area, which extends from the south side of Building 1103A to the southern fence, was the site of loading, unloading, and staging of contaminated targets, as well as for the transfer of targets among the disassembly buildings and storage areas. On at least one occasion, contaminated items were dismantled on the asphalt in front of Building BRL12 by using an acetylene torch. The asphalt is cracked in many places, allowing for water seepage, and is prone to slight changes in elevation depending on the moisture content of the underlying soil. Small areas of yellow discoloration and/or DU fragments are present in several locations.

The Central Asphalt was surveyed using the GWS instrumentation discussed in Section 2.4. Results of the GWS are presented in Appendix C, with a graphical depiction of the data presented in Figure C-1. As indicated by the GWS results, count rates of up to 164,039 cpm were recorded during the Central Asphalt survey. Locations exhibiting the highest surface activity generally coincide with areas that were heavily trafficked during target management operations. These include locations along the eastern perimeter fence near the access gate, as well as the area between Building BRL12 and the Freestanding Vault.

Eight locations in the Central Asphalt area were selected for sampling based on the GWS results. Six of these locations were in the most contaminated areas, as indicated by the cpm measurements recorded during the GWS. The other two locations were scattered to expand the sample coverage of the surveyed area. At each of the sampling locations, shallow soil samples were collected from the top 6 inches of soil underlying the asphalt. At two locations, a deeper sample (from 6 to 12 inches below the asphalt/soil interface) was also collected. The soil samples were analyzed at the off-site laboratory by gamma spectroscopy. A sample of asphalt was collected at one of the soil sampling locations and analyzed for isotopic uranium ( $^{234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ ).

Analytical results from the Central Asphalt sampling are presented in Appendix D. Of the eight shallow soil samples collected, five (SO-G07, SO-G08, SO-G09, SO-P11, and SO-G12) exhibited  $^{234}\text{Th}$  concentrations that exceeded the soil screening limit of 102 pCi/g. These samples were collected from five of the six sampling locations at which the GWS results exhibited a statistical Z-score of greater than 3.0. At one of the shallow sample locations (SO-G07), the  $^{234}\text{Th}$  concentration in the associated deep soil sample (SS-G14) also exceeded the soil screening limit. Isotopic uranium results for the asphalt sample (AS-P05) were less than the screening limit specified in Table 2-1, although it should be noted that this sample was not collected from one of the six biased locations.

### *3.5.2 Adjacent Asphalt*

The Adjacent Asphalt lies east of Building 1103A and north of Building 1103B. It is presently used as a parking lot for employees working in nearby buildings. This area was included in the survey to evaluate possible impacts due to airborne migration of DU-contaminated dust and/or waterborne migration of DU-contaminated runoff.

The Adjacent Asphalt survey was conducted as a general scanning survey using the gas proportional floor monitor. Results of this survey, which are presented in Appendix C, indicate that beta count rates in this area ranged from background (approximately 150 cpm) to approximately 1,000 cpm. The highest count rates were observed in cracks and depressions in the pavement, as well as along the eastern edge of the parking lot where the pavement and soil meet. Although no integrated alpha measurements were obtained, the scan data suggests that some locations may potentially exceed the screening limits specified in Table 2-1.

### *3.5.3 Grounds*

The Grounds consist of the lawn adjacent to Building 1103A, as well as the grassy areas south and west of the Central Asphalt. Grounds were included in the survey to evaluate possible impacts due to airborne migration of DU-contaminated dust and/or waterborne migration of DU-contaminated runoff.

The Grounds were surveyed using the GWS instrumentation discussed in Section 2.4. Results of this survey are presented in Appendix C, with a graphical depiction of the data presented in Figure C-1. As indicated by the GWS results, count rates of up to 26,043 cpm were recorded during the Grounds survey. All survey locations exhibited statistical Z-scores of less than 1.0.

Four locations in the Grounds areas were selected for soil sampling. Since there were no discrete areas of significantly elevated activity identified during the GWS, the locations were scattered to provide full coverage of the surveyed area. At each location, shallow soil samples were collected from the top 6 inches of soil beneath the grass cover and analyzed at the off-site laboratory by gamma spectroscopy.

Analytical results from the soil sampling conducted on the grounds are presented in Appendix D. None of the samples exhibited  $^{234}\text{Th}$  concentrations that exceeded the soil screening limit of 102 pCi/g specified in Table 2-1.

## 4.0 QUALITY ASSURANCE/QUALITY CONTROL

Survey and sampling activities were performed in accordance with the quality assurance (QA) and quality control (QC) procedures presented in the *Work Plan* (CABRERA, 2006a) and associated *QAPP* (CABRERA, 2006c) to ensure consistent and repeatable results. The personnel performing the activities were trained in the technical, QC, and health and safety aspects of the project, as well as in calibration, maintenance, and operating procedures for their assigned tasks. This section documents the results of QA/QC activities performed during this characterization effort.

Based on the information presented in this section, the survey data were deemed authentic, appropriately documented, and technically defensible. The survey methods used to collect the data were appropriate for the types of media and contaminants being measured; the field and laboratory instrumentation met the required performance and sensitivity requirements; and the data generated were representative of the areas and materials of interest.

### 4.1 Survey Instrumentation QC

The survey instruments specified in the *Work Plan* were used to collect characterization data for the Building 1103A area. Instrumentation was used in accordance with written procedures, and was subject to daily QC requirements, as specified in the *QAPP*. Instruments used to obtain radiological data, including DGPS equipment, were inspected for physical damage, current calibration, and erroneous readings in accordance with applicable procedures and/or protocols. Results of QC checks were recorded in field logbooks and summarized on a computerized spreadsheet. Instrumentation that did not meet the specified requirements of calibration, inspection, or response check was removed from service, and replacement instruments were procured or reasonable substitutions were made, as necessary, to complete the work.

#### 4.1.1 Minimum Detectable Concentrations

To demonstrate the ability to detect radioactivity at the screening limits listed in Table 2-1, MDCs were calculated based on the Strom & Stansbury MDC equation (i.e., Equation 3-11 of *NUREG 1507* [NRC, 1998]). MDCs were calculated for each instrument used in obtaining radiation measurements, as presented in Table 2-4. The calculation of static MDCs indicated that the field instrumentation was able to achieve the required sensitivities for alpha

measurements, but not for beta. Thus, while both alpha and beta measurements were recorded during the survey, only the alpha results were used to compare survey data to the respective transferable and direct screening limits specified in Table 2-1.

#### *4.1.2 Instrument Calibration*

Instruments used during the characterization survey were inspected prior to use to ensure satisfactory operation and current calibration traceable to the National Institute of Standards and Technology (NIST). Calibration records were shipped with the equipment and maintained onsite for review and inspection. Copies of the calibration certificates are included in Appendix F-1.

#### *4.1.3 Instrument QC Checks*

Prior to use, project instrumentation underwent initial QC checks by comparing instrument responses to benchmark values. QC checks of radiation detectors and meters included source checks to ensure consistent responses when exposed to known radiation sources. QC checks of DGPS units included checks for satellite availability and positional accuracy. Records of initial and daily performance checks are included in Appendix F-2.

Initial and daily QC checks of radiation detectors were performed in a dedicated count room, in a building adjacent to the Building 1103A area. QC source checks consisted of a one-minute integrated count performed in the count room with the designated source positioned in a reproducible geometry. This procedure was repeated ten times to establish average instrument response for each detector. The initial averages and control limits calculated for each instrument provided the respective benchmark values for subsequent QC checks.

For quantitative instruments (i.e., those used to report activity concentrations such as dpm per 100 cm<sup>2</sup>), an acceptance criterion of +/- 3-sigma ( $3\sigma$ ) was used. For qualitative instruments (i.e., dose rate meters and friskers), an acceptance criterion of +/- 20% of the source check true value was used. If any daily QC check was found to be outside of its acceptance criteria, the QC check was repeated. If the second QC check was also outside the acceptance criteria, the instrument was examined to check for external contamination or damage, and a third QC check was performed. If the third QC check was outside of its acceptance criteria range, the instrument was taken out of service until evaluated and approved by the RSO.

## 4.2 Sampling and Analysis QC

Analytical test methods and sample volume, preservation, and holding time requirements were met, as presented in the *Work Plan*. Standard methodology was used for sample collection, identification, documentation, handling, packaging, shipping, and chain-of-custody, as described in the *QAPP*.

The analytical test methods used to analyze radionuclides in volumetric samples at the off-site laboratory achieved MDCs that were at or below the soil screening criteria presented in Table 2-1. In addition, the analytical test methods used to analyze chemical constituents at the off-site laboratory achieved method detection limits (MDLs) of at least 20% of the action levels specified in Table 2-2.

To confirm the quality of sampling and analysis techniques used for this characterization effort, precision and accuracy were evaluated for the data generated during the characterization effort as described below.

### 4.2.1 Precision

Precision is defined as the degree to which two or more measurements are in agreement. Field precision is measured by comparing field duplicate results, and analytical precision is measured by comparing laboratory duplicate results. Field duplicate samples were intended for collection at a rate of 10%. However, due to a field error, no field duplicates of volumetric samples were collected for analysis.

Laboratory duplicates were analyzed as planned, at a rate of one per 20 samples for each analysis performed on each matrix. All laboratory duplicate results were within the laboratory's internal acceptance criteria, as defined in the laboratory quality assurance plan (LQAP), except for the following:

- The isotopic uranium laboratory duplicate analysis performed on ceiling sample CL-A13 was outside the laboratory's precision control limit for  $^{234}\text{U}$  and  $^{238}\text{U}$ . The poor precision was attributed to the heterogeneous nature of sample CL-A13.
- The gamma spectroscopy laboratory duplicate analysis performed on soil sample SO-P13 was outside the laboratory's precision control limit for  $^{234\text{m}}\text{Pa}$  and  $^{234}\text{Th}$ . However, results for the other eight radionuclides in the same laboratory duplicate analysis were within the laboratory control limit. As a result, the overall laboratory

acceptance criteria of >75% of the results exhibiting acceptable precision was met, and the overall laboratory duplicate analysis performed on soil sample SO-P13 was deemed acceptable by the laboratory.

Based on the evaluation of the laboratory duplicate data, laboratory precision was deemed adequate for the data generated for this characterization effort.

As a qualitative indicator of the agreement between field and laboratory results, duplicate measurements of smear sample activity were collected at 10% of the building surface survey locations. These smears were counted onsite using the Ludlum Model 2929 scalar coupled with the Model 43-10-1 sample counter, and sent to the off-site laboratory for confirmatory alpha/beta activity analysis. For each of the smears evaluated, onsite count rate data compared favorably with the off-site analytical results in identifying locations where the transferable screening limit was exceeded.

#### *4.2.2 Accuracy*

Accuracy is defined as the degree to which the reported measurement represents the true value. Analytical accuracy is assessed through the evaluation of laboratory blanks, laboratory control samples (LCSs), tracer recoveries (for isotopic uranium analysis only), surrogate recoveries (for PCB analysis only), and spike recoveries (for metals only). Based on the evaluation of these samples, the overall analytical accuracy was deemed adequate for the data generated for this characterization effort.

Laboratory Method Blanks – Laboratory blanks are analyzed to evaluate the potential contamination of samples due to preparation and analytical procedures. Laboratory method blanks are digested/extracted/analyzed exactly like the field samples, and are designed to represent the matrix of interest as closely as possible. Laboratory method blanks were prepared and analyzed with each digestion/extraction/analysis batch. In addition, initial and continuing calibration blanks were analyzed for the metals analysis at a rate of one per ten samples. Results of the laboratory blank analyses were less than the laboratory MDCs or reporting limits (RLs) except for the following:

- $^{234}\text{U}$  (0.049 +/- 0.028 pCi/g) and  $^{235}\text{U}$  (0.027 +/- 0.021 pCi/g) were detected slightly above the laboratory MDC in the isotopic uranium method blank associated with samples WL-A05, WL-A09, CL-A13, WL-A11, and FL-A21. However, the  $^{234}\text{U}$

and  $^{235}\text{U}$  concentrations detected in the method blank were below the requested MDC.

Laboratory Control Samples – The LCS is a laboratory spike sample that originates from a source other than the source of the calibration standards, and serves as a zero-blind check on the laboratory's accuracy. The LCSs were prepared and analyzed along with each digestion/extraction/analysis batch. For this characterization effort, all LCS results were within the laboratory acceptance criteria.

Tracer Recoveries – A tracer is an isotope of the radionuclide of interest that is added to the samples prior to analysis in order to assess potential bias from the chemical separation or other processes employed in the analysis on a sample-by-sample basis. Uranium-232 ( $^{232}\text{U}$ ) was added as a tracer to all samples undergoing isotopic uranium analysis for this characterization effort. All tracer recoveries were within the laboratory acceptance criteria except for the following:

- The tracer recoveries for samples FL-R46-Top (17.6%), WL-A05 (21.0%), and FL-A21 (27.6%) were below the laboratory's lower control limit of 30%. However, since the spectral quality was adequate for accurate identification and the tracer recoveries were >15% for these samples, the sample results were deemed usable by the laboratory.

Surrogate Recoveries – Surrogates are compounds that are not commonly found in the natural environment that have similar chemical structures and similar chemical behavior as the compounds of interest. The surrogates dechlorobiphenyl (DCB) and tetrachloro-metaxylene (TMX) were added to PCB samples prior to extraction to assess extraction efficiency and analytical bias on a sample-by-sample basis. All surrogate recoveries were within the laboratory's acceptance criteria except for the following:

- The DCB recovery for sample FL-A19 (44%) was below the laboratory's lower control limit of 60%. However, since the TMX recovery in the sample was within the laboratory control limits, the sample results were deemed usable by the laboratory.

Matrix Spike (MS) and Matrix Spike Duplicates (MSD) – MS/MSD analyses are performed by the laboratory to estimate the extent of bias in the analytical measurements of chemical constituents. The analytical laboratory performed MS/MSDs for the metals analyses by

adding a known quantity of each analyte to representative media, and analyzing the spiked media. Bias in the results was quantified by determining the percent recovery of the spike amount. Percent recoveries were compared to a performance criterion of  $100 \pm 20\%$ . Percent recoveries outside this range were investigated for possible discrepancies in measurement bias. For the spiked metals samples analyzed during this characterization effort, percent recoveries of 98 to 100% were achieved.

### **4.3 Data Management and Documentation**

Management of the field and analytical data generated during the characterization effort was conducted in accordance with the general requirements of the *Work Plan* and *QAPP*.

#### *4.3.1 Field Data*

Field and QC data was recorded in logbooks and/or field sheets, scanned, and uploaded to the project computer. Data collected each day was summarized on computerized spreadsheets, as appropriate. Electronic copies of the field sheets and data spreadsheets were reviewed by the CABRERA Field Site Manager (FSM) and transmitted to the CABRERA Project Manager (PM) by email on a daily basis. In addition, a backup copy of each electronic file was maintained on compact disc (CD) or memory stick to prevent data loss.

#### *4.3.2 Analytical Data*

Samples collected during the characterization effort were identified by a unique number code that accompanied the sample from collection through analysis and data review. Standardized chain of custody procedures were followed from sample collection through sample analysis. The condition of shipping coolers and enclosed sample containers was documented upon receipt at the analytical laboratory. The laboratory transmitted the completed chain of custody form and cooler receipt checklist to the PM to confirm each sample shipment.

Analytical data reports containing results of the requested analyses were transmitted to the CABRERA PM. Each data package contained an electronic data deliverable (EDD) spreadsheet summarizing the analytical results, as well as an electronic file containing the entire case narrative and supporting data. The electronic files were uploaded to the corporate server and backed up on CD. Laboratory data reports are included in Appendix D.

## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

A characterization survey was performed in potentially impacted buildings and grounds in the Building 1103A area of APG. Results of the surveys and sample analyses were used to identify specific areas of DU contamination in the buildings and grounds, as well as any contaminated building materials that might also contain either asbestos, PCBs, and/or hazardous concentrations of metals. To provide a visual reference to the various areas of the site, photographs taken during the initial site walk in December 2005 are included in Appendix G.

This section presents the conclusions of the characterization survey conducted in each location of the Building 1103A area, and provides recommendations on how this information should be incorporated in the remediation approach to be outlined in the *Decommissioning Plan*. Where appropriate, conclusions drawn based on characterization data from a small number of discrete locations within a particular area are assumed to be applicable to that area in its entirety.

### **5.1 Building 1103A**

Inside Building 1103A, direct measurement and smear survey results indicate that radiological screening limits were exceeded at numerous locations. The highest measurements were recorded on horizontal surfaces near the ceilings (i.e., ducts, vents, light fixtures, and conduits) and on the floors in the Main and Shop Areas. There were also exceedances of the screening limits on the walls in the Main and Shop Areas of the building, particularly in the vicinity of cutting and shearing equipment. In addition, some exceedances were recorded in the Entry Area on the floors in the changing room and bathroom, as well as above the ceiling tiles in various locations.

Analytical results for a sample of filter media collected from an air vent in the Main Area indicate uranium isotopes at activity concentrations higher than the screening limit. Samples of floor tile and associated mastic collected from the Entry Area were shown to contain greater than 1% asbestos; thus, the floor tile and mastic in the Entry Area are considered ACM. The interior fire doors are also considered ACM based on assumptions regarding historical manufacturing practices. Analytical results for volumetric samples of ceiling paint, wallboard, and ceiling tile indicate no exceedances of either the radiological screening limit or chemical action levels.

Analytical results for volumetric samples of the concrete floors indicate uranium isotopes at activity concentrations greater than the screening limit at one location in the Main Area. This sample location is in the center of machining operations, approximately equidistant from the shearing table, lathe, and drill press. The screening limit was exceeded in the top ¼-inch layer of concrete sample but not in bottom ¼-inch layer. In addition, a sample of the wood footing frame encountered beneath the concrete expansion joint separating the Main and Shop Area floors exhibited uranium isotopes at activity concentrations greater than the screening limit. However, none of the soil samples underlying the concrete floor contained radioactivity in excess of the soil screening limit of 102 pCi/g.

On the exterior of Building 1103A, direct measurement and smear survey results indicate that radiological screening limits were exceeded in only one area: on the south wall near the entrance to the Shop Area. No other exceedances were observed on the exterior walls or downspouts, or in the soil beneath the downspouts.

Based on the conclusions of the characterization survey for Building 1103A, it is recommended that the following considerations be incorporated in the remediation approach for this building:

- The top ¼-inch layer of the concrete floor throughout the Main and Shop Areas is assumed to be contaminated.
- The floor in the Entry Area (i.e., changing room and bathroom) exhibits limited areas of contamination that should be further delineated to identify discrete areas of contamination.
- Air vent filters throughout the building are assumed to be volumetrically contaminated.
- Ducts, vents, light fixtures, conduits, ceiling tiles, and any other horizontal surfaces where dust may accumulate are assumed to be contaminated.
- The tile floor and associated mastic in the Entry Area, as well as the two interior fire doors are considered ACM and should be managed accordingly.

## **5.2 Building BRL12**

Inside Building BRL12, direct measurement and smear survey results indicate that radiological screening limits were exceeded at numerous floor locations. The highest measurements were recorded on the floor in the North Vault. Several floor locations in the Central Room and one in the South Vault also exceeded one or both screening limits. No wall or ceiling locations in this building exhibited radioactivity greater than the screening limits; however, the survey identified several locations in the Central Room (i.e., in the vicinity of machining operations) where measurements were somewhat elevated.

A sample of floor tile collected from the Office was shown to contain greater than 1% asbestos; thus, the Office floor tiles are considered ACM. Analytical results for a paint chip sample collected from the ceiling of the North Vault indicate no exceedances of either the radiological screening limit or chemical action levels.

On the exterior of Building BRL12, direct measurement and smear survey results for the walls and downspouts indicate no exceedances of the radiological screening limits. However, analytical results for a soil sample collected from the ground beneath the downspout on the northeast corner of the building indicate radioactivity at a concentration slightly less than the soil screening limit of 102 pCi/g.

Based on the conclusions of the characterization survey for Building BRL12, it is recommended that the following considerations be incorporated in the remediation approach for this building:

- The top ¼-inch layer of the concrete floor in the North Vault is assumed to be contaminated.
- The floors in the Central Room and South Vault exhibit limited areas of contamination that should be further delineated to identify discrete areas of contamination.
- Filter media in the air conditioners is assumed to be volumetrically contaminated, similar to the air vent filters evaluated in Building 1103A.
- The tile floor in the Office is considered ACM and should be managed accordingly.

### **5.3 Freestanding Vault**

Inside the Freestanding Vault, direct measurement and smear survey results indicate that radiological screening limits were slightly exceeded at one location (i.e., the east interior wall, 2 meters high). No ceiling, floor, or other interior wall locations exhibited radioactivity greater than the screening limits.

Analytical results for a paint chip sample collected from the ceiling of the Freestanding Vault indicate the presence of lead at a concentration greater than the chemical action level. Thus, the paint on the walls and ceilings of this structure is assumed to be lead-based. No other screening limit or action level exceedances were indicated for this sample.

On the exterior of the Freestanding Vault, direct measurement and smear survey results for the walls and downspouts indicate no exceedances of the radiological screening limits.

Based on the conclusions of the characterization survey for the Freestanding Vault, it is recommended that the following considerations be incorporated in the remediation approach for this building:

- The east interior wall exhibits at least one area of contamination that should be further delineated to identify discrete areas of contamination.
- The paint on the walls and ceiling is assumed to be lead-based, and should be managed as hazardous or mixed waste, as appropriate.

### **5.4 Building 1103B**

On the exterior of Building 1103B, direct measurement and smear survey results for the walls and downspouts indicate no exceedances of the radiological screening limits. Based on these conclusions, Building 1103B does not appear to require remediation.

### **5.5 Pavement and Grounds**

Results of the GWS conducted on the Central Asphalt indicate multiple locations where radioactivity may exceed screening criteria in the asphalt and/or underlying soil. In five locations where surface count rates (as measured using a 3 x 3 NaI detector) exhibited a statistical Z-score of 3.0 or higher, analytical results for the top 6-inches of underlying soil indicated radioactivity concentrations that were greater than the soil screening limit of 102

pCi/g. In one of these locations, results of the associated deep soil sample also exceeded the screening limit.

Results of the Adjacent Asphalt survey indicated that elevated radioactivity was present in cracks and depressions in the pavement, as well as along the eastern edge of the parking lot where the pavement and soil meet. Although no conclusive measurements were obtained, it is suspected that some of these locations may exceed the screening limit.

Results of the GWS conducted on the Grounds indicate no exceedances of radiological screening criteria. None of the surveyed locations exhibited a statistical Z-score of greater than 3.0, and none of the soil samples exhibited radioactivity concentrations of greater than the soil screening limit of 102 pCi/g.

Based on the conclusions of the characterization survey for the Pavement and Grounds, it is recommended that the following considerations be incorporated in the remediation approach for these areas:

- The Central Asphalt is assumed to be contaminated in areas where GWS results indicate a Z-score of 3.0 or greater. Both the asphalt and the top 6 inches of soil underlying the asphalt are included in this assumption.
- The deeper soil in the contaminated areas of the Central Asphalt should be evaluated further upon removal of the asphalt and top 6 inches of soil to identify any areas of residual soil contamination.
- The Adjacent Asphalt exhibits limited areas of contamination that should be further delineated to identify discrete areas of contamination.

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- NRC, 2003. *Consolidated NMSS Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria*. NUREG-1757, Vol. 2. U.S. Nuclear Regulatory Commission. September 2003.
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**APPENDIX A**

**ARL NUCLEAR MATERIALS LICENSE**

**MATERIALS LICENSE**

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p style="text-align: center;">Licensee</p> <p>1. Department of the Army U. S. Army Research, Development and Engineering Command Army Research Laboratory</p> <p>2. Aberdeen Proving Ground, Maryland 21005-5066</p>	<p>In accordance with the letter dated January 13, 2005,</p> <p>3. License number SMB-141 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date June 30, 2011</p> <hr/> <p>5. Docket No. 040-06394 Reference No.</p>	
<p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Natural Uranium</p> <p>B. Depleted Uranium</p> <p>C. Thorium</p> <p>D. Transuranics and technetium-99 contaminants in depleted uranium</p>	<p>7. Chemical and/or physical form</p> <p>A. Metal and metal oxide</p> <p>B. Metal and metal oxide</p> <p>C. Metal and metal oxide</p> <p>D. Contaminants contained in depleted uranium metal and metal oxide</p>	<p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. 100 kilograms</p> <p>B. 200,000 kilograms</p> <p>C. 100 kilograms</p> <p>D. Not to exceed 100 picocuries per gram (pCi/g) per transuranic radionuclide and 500 pCi/g total transuranics; not to exceed 500 pCi/g technetium-99</p>
<p>9. Authorized use:</p> <p>A. through D. (1) Research and development as defined in 10 CFR 30.4; (2) fabrication, modification, and testing of components, parts and/or devices; (3) laboratory analysis and measurement studies; (4) calibration of the licensee's instruments; (5) munitions testing; and (6) processing of waste of other Department of the Army tenants located at Aberdeen Proving Ground.</p>		

**CONDITIONS**

10. Licensed material may be used or stored at the licensee's facilities located at Aberdeen Proving Ground and at temporary job sites of the licensee anywhere in the United States.

**MATERIALS LICENSE  
SUPPLEMENTARY SHEET**

License Number

SMB-141

Docket or Reference Number

040-06394

Amendment No. 27

11. A. Licensed material shall only be used by, or under the supervision of, individuals designated, in writing, by the Radiation Safety Committee. The licensee shall maintain records of individuals designated as users for 3 years following the last use of licensed material by the individual.
- B. The Radiation Safety Officer for this license is Richard A. Markland.
12. The licensee shall not use licensed material in or on human beings except as provided otherwise by specific condition of this license.
13. The licensee shall not use licensed material in field applications where it is released except as provided otherwise by specific condition of this license.
14. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Application dated April 13, 2001 [011140434]
- B. Letter dated July 30, 2001 [ML012200458]

For the U.S. Nuclear Regulatory Commission

Date December 19, 2005

By



Elizabeth Ulrich  
Commercial and R&D Branch  
Division of Nuclear Materials Safety  
Region I  
King of Prussia, Pennsylvania 19406

Monday, December 19, 2005 2:38:53 PM

NUCLEAR REGULATORY COMMISSION  
DOCKET NO. 040-06394  
December 7, 2005

Environmental Assessment Related to Issuance of a License Amendment  
of U.S. Nuclear Regulatory Commission Materials License No. SMB-141,  
Department of the Army in Aberdeen, Maryland

## **Introduction**

The U.S. Nuclear Regulatory Commission (NRC) has prepared this environmental assessment (EA) of the amendment of the Department of the Army's Materials License Number SMB-141, and the release of its Transonic Range, located at Aberdeen Proving Grounds, Aberdeen, Maryland, for unrestricted use. The Transonic Range is operated by the Department of the Army in Aberdeen Proving Grounds, Aberdeen, Maryland. The Department of the Army was authorized by NRC since April 12, 1961, to use radioactive materials for munitions testing and research and development purposes at the site. Actual use of licensed material at the Transonic Range began in 1973. In 2005, the Department of the Army ceased operations with licensed materials at the Transonic Range site and requested that NRC release the site for unrestricted use. The Department of the Army has conducted surveys of the Transonic Range and determined that the site meets the license termination criteria in Subpart E of 10 CFR Part 20. The NRC staff has evaluated the Department of the Army's request and the results of the surveys, and has developed an EA in accordance with the requirements of 10 CFR Part 51. Based on the staff evaluation, the conclusion of the EA is a Finding of No Significant Impact (FONSI) on human health and the environment for the proposed licensing action. The Department of the Army requested release for unrestricted use of the land mass and buildings located at Aberdeen Proving Grounds, Aberdeen, Maryland, as authorized by the NRC License No. SMB-141. The land mass contained within the Transonic Range is approximately 53,000 square meters and the two remaining structures have a total footprint of 80 square meters. This tract of land is located within an active U.S. Army testing and research facility.

License No. SMB-141 was issued in 1961 and amended periodically since that time. NRC-licensed activities performed at the Transonic Range site were limited to research and development and munitions testing using projectiles containing depleted uranium. Activities involving depleted uranium testing at the Transonic Range were conducted from 1973 to 1979. Outdoor areas were affected by the use of licensed materials.

## **The Proposed Action**

The proposed action is to amend Materials License No. SMB-141 and release the Transonic Range, Aberdeen Proving Grounds, Aberdeen, Maryland, for unrestricted use. By letter dated January 13, 2005, the Department of the Army stated that no further actions are required to remediate the Transonic Range and requested release of the range for unrestricted use. The Department of the Army stated that licensed activities ceased completely in January 2005. Based on the licensee's historical knowledge of the site and the conditions of the facility, the licensee determined that only routine decontamination activities, in accordance with licensee radiation safety procedures, were required. A decommissioning plan was not required to be

Department of the Army  
Environmental Assessment

submitted to the NRC. The licensee surveyed the Transonic Range, decontaminated or remediated areas as needed, and provided documentation that the Range meets the license termination criteria specified in Subpart E of 10 CFR Part 20, and does not require additional decommissioning activities to be performed. The licensee demonstrated this using the screening criteria described in 65 FR 37186.

### **Need for the Proposed Action**

The purpose of the proposed action is to amend NRC Materials License No. SMB-141, to allow for the release of the Transonic Range for unrestricted use. The licensee needs this license change because it no longer plans to conduct licensed activities at the Transonic Range. NRC is fulfilling its responsibilities under the Atomic Energy Act to make a timely decision on a proposed license amendment for release of facilities for unrestricted use that ensures protection of public health and safety and the environment. The licensee has requested the action to reduce their regulatory burden since they no longer intend to conduct licensed activities at this location.

### **Environmental Impacts of the Proposed Action**

The affected environment was described in the Introduction. The licensee has completed all remediation at the site. The NRC staff has reviewed the surveys performed by the Department of the Army to demonstrate compliance with the 10 CFR 20.1402 license termination criteria. Based on its review, the staff has determined that the affected environment and environmental impacts associated with the release for unrestricted use of the Transonic Range are bounded by the impacts evaluated by the "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities" (NUREG-1496). The staff also finds that the proposed release for unrestricted use of the Transonic Range is in compliance with Title 10, Code of Federal Regulations, Part 20.1402, "Radiological Criteria for Unrestricted Use." The NRC has found no other activities in the area that could result in cumulative impacts.

### **Environmental Impacts of the Alternatives to the Proposed Action**

Since the Transonic Range has already been surveyed and found acceptable for release for unrestricted use, the only alternative to the proposed action of amendment of the license and release of the Transonic Range for unrestricted use is denial of the proposed action (i.e. no action). Denial of the application would result in no change in current environmental impacts. The environmental impacts of the proposed action and the alternative action are similar.

### **Agencies and Persons Consulted**

The NRC staff has determined that the proposed action will not affect listed species or critical habitat. Therefore, no further consultation is required under Section 7 of the Endangered Species Act. Likewise, the NRC staff have determined that the proposed action is not the type of activity that has the potential to cause effects on historic properties. Therefore, no further consultation is required under Section 106 of the National Historic Preservation Act.

Department of the Army  
Environmental Assessment

NRC provided a draft of its Environmental Assessment to the Maryland Department of the Environment for review. On September 29, 2005, the Maryland Department of the Environment responded by telephone and agreed with the conclusions of the EA.

### **Conclusions**

Based on its review, the NRC staff has concluded that the completed action complies with 10 CFR Part 20. The NRC staff have prepared this EA in support of the proposed action to amend License No. SMB-141. On the basis of the EA, NRC has concluded that there are no significant environmental impacts and the license amendment does not warrant the preparation of an Environmental Impact Statement. Accordingly, it has been determined that a Finding of No Significant Impact is appropriate.

### **List of Preparers**

James Schmidt, Health Physicist, Division of Nuclear Materials Safety, Region I  
Betsy Ullrich, Senior Health Physicist, Division of Nuclear Materials Safety, Region I

### **List of References**

1. NRC License No. SMB-141 inspection and licensing records.
2. "Remediation and Final Status Survey, Transonic Range Depleted Uranium Study Area - Structures", Cabrera Services, dated December 28, 2004 [ADAMS Accession Nos. ML050280349 and ML050280354].
3. "Radiological Final Status survey, Transonic Range - Land Areas, Depleted Uranium Study Area", Cabrera Services, dated November 2004 [ADAMS Accession No. ML050280341].
4. Federal Register Notice, Volume 65, No. 114, page 37186, dated Tuesday, June 13, 2000, "Use of Screening Values to Demonstrate Compliance With The Federal Rule on Radiological Criteria for License Termination."
5. Title 10 Code of Federal Regulations, Part 20, Subpart E, "Radiological Criteria for License Termination."
6. Title 10, Code of Federal Regulations, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."
7. NUREG-1496, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities."

The application for the license amendment and supporting documentation are available for inspection at NRC's Public Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. Any questions with respect to this action should be

Department of the Army  
Environmental Assessment

referred to Betsy Ullrich, Commercial and R&D Branch, Division of Nuclear Materials Safety,  
Region I, 475 Allendale Road, King of Prussia, Pennsylvania 19406, telephone (610) 337-5040,  
fax (610) 337-5269.

Dated at King of Prussia, Pennsylvania this 7<sup>th</sup> day of December 2005

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

James P. Dwyer, Chief  
Commercial and R&D Branch  
Division of Nuclear Materials Safety  
Region I

**APPENDIX B**

**BUILDING SURVEY RESULTS**

- B1: Building 1103A**
- B2: Building BRL12**
- B3: Freestanding Vault/Tool Shed**
- B4: Building 1103B**

**APPENDIX B-1**

**BUILDING 1103A  
SURVEY RESULTS**

**Radiological Survey Results  
Building 1103A**

Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>INTERIOR WALLS</b>							
<b>Main Area - North Interior Wall</b>							
WL1-1103A-132	52.0		469 (2min)	WL-1103A-101	4.5		2929 (2min)
WL1-1103A-133	74.0		469 (2min)	WL-1103A-102	10.1	yes	2929 (5min)
WL1-1103A-134	40.0		469 (2min)	WL-1103A-103	9.9		2929 (2min)
WL1-1103A-135	66.0		469 (2min)	WL-1103A-104	9.9		2929 (2min)
WL1-1103A-136	36.0		469 (2min)	WL-1103A-105	0.9		2929 (5min)
WL1-1103A-137	16.0		469 (2min)	WL-1103A-106	1.4		2929 (5min)
<b>Main Area - East Interior Wall (near lathe and drill press)</b>							
WL2-1103A-138	26.0		469 (2min)	WL-1103A-107	7.4		2929 (2min)
WL2-1103A-139	32.0		469 (2min)	WL-1103A-108	10.9	yes	2929 (5min)
<b>Main Area - West Interior Wall</b>							
WL3-1103A-126	52.0		469 (2min)	WL-1103A-95	15.0	yes	2929 (2min)
WL3-1103A-127	50.0		469 (2min)	WL-1103A-96	41.7	yes	2929 (2min)
WL3-1103A-128	100.0	yes	469 (2min)	WL-1103A-97	51.9	yes	2929 (2min)
WL3-1103A-129	34.0		469 (2min)	WL-1103A-98	5.9		2929 (5min)
WL3-1103A-130	92.0		469 (2min)	WL-1103A-99	41.7	yes	2929 (2min)
WL3-1103A-131	130.0	yes	469 (2min)	WL-1103A-100	57.0	yes	2929 (2min)
<b>Main Area - East Interior Wall (near Shop Area)</b>							
WL4-1103A-148	44.0		469 (2min)	WL-1103A-117	40.5	yes	2929 (2min)
WL4-1103A-149	172.0	yes	469 (2min)	WL-1103A-118	87.5	yes	2929 (2min)
<b>Main Area - South Interior Wall (adjacent to Shop Area)</b>							
WL5-1103A-150	126.0	yes	469 (2min)	WL-1103A-119	49.4	yes	2929 (2min)
WL5-1103A-151	90.0		469 (2min)	WL-1103A-120	53.2	yes	2929 (2min)
<b>Shop Area - North Interior Wall</b>							
WL6-1103A-152	44.0		469 (2min)	WL-1103A-121	4.8		2929 (2min)
WL6-1103A-153	92.0		469 (2min)	WL-1103A-122	8.9		2929 (5min)
WL6-1103A-166	70.0		469 (2min)	WL-1103A-135	6.1		2929 (2min)
WL6-1103A-167	58.0		469 (2min)	WL-1103A-136	13.7	yes	2929 (2min)
<b>Shop Area - East Interior Wall</b>							
WL7-1103A-154	114.0	yes	469 (2min)	WL-1103A-123	31.6	yes	2929 (2min)
WL7-1103A-155	80.0		469 (2min)	WL-1103A-124	22.6	yes	2929 (2min)
WL7-1103A-156	116.0	yes	469 (2min)	WL-1103A-125	7.4		2929 (2min)
WL7-1103A-157	276.0	yes	469 (2min)	WL-1103A-126	20.1	yes	2929 (2min)
<b>Shop Area - South Interior Wall</b>							
WL8-1103A-158	76.0		469 (2min)	WL-1103A-127	18.8	yes	2929 (2min)
WL8-1103A-159	102.0	yes	469 (2min)	WL-1103A-128	18.8	yes	2929 (2min)

**Radiological Survey Results  
Building 1103A**

Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>Shop Area - West Interior Wall</b>							
WL9-1103A-160	8.0		469 (2min)	WL-1103A-129	-0.3		2929 (2min)
WL9-1103A-161	8.0		469 (2min)	WL-1103A-130	4.3		2929 (5min)
WL9-1103A-162	82.0		469 (2min)	WL-1103A-131	18.8	yes	2929 (2min)
WL9-1103A-163	42.0		469 (2min)	WL-1103A-132	15.0	yes	2929 (2min)
WL9-1103A-164	32.0		469 (2min)	WL-1103A-133	12.0	yes	2929 (5min)
WL9-1103A-165	84.0		469 (2min)	WL-1103A-134	55.7	yes	2929 (2min)
<b>Entry Area - North Interior Wall in Changing Room</b>							
WL11A-1103A-140	20.0		469 (2min)	WL-1103A-109	4.3		2929 (5min)
WL11A-1103A-141	0.0		469 (2min)	WL-1103A-110	3.6		2929 (2min)
<b>Entry Area - North Interior Wall in Meeting Room</b>							
WL12A-1103A-142	4.0		469 (2min)	WL-1103A-111	1.0		2929 (2min)
WL12A-1103A-143	8.0		469 (2min)	WL-1103A-112	1.3		2929 (5min)
<b>Entry Area - South Interior Wall in Meeting Room</b>							
WL12C-1103A-144	-2.0		469 (2min)	WL-1103A-113	2.3		2929 (5min)
WL12C-1103A-145	12.0		469 (2min)	WL-1103A-114	1.0		2929 (2min)
<b>Entry Area - North Wall of Bathroom</b>							
WL12C-1103A-146	12.0		469 (2min)	WL-1103A-115	3.3		2929 (5min)
WL12C-1103A-147	12.0		469 (2min)	WL-1103A-116	1.0		2929 (2min)
<b>CEILINGS</b>							
<b>Main Area - Ceiling</b>							
CL-1103A-168	6.0		469 (2min)	CL-1103A-137	1.3		2929 (5min)
CL-1103A-169	4.0		469 (2min)	CL-1103A-138	1.0		2929 (2min)
CL-1103A-170	-2.0		469 (2min)	CL-1103A-139	-0.3		2929 (2min)
CL-1103A-171	14.0		469 (2min)	CL-1103A-140	1.0		2929 (2min)
CL-1103A-172	16.0		469 (2min)	CL-1103A-141	0.8		2929 (5min)
CL-1103A-173	26.0		469 (2min)	CL-1103A-142	-0.3		2929 (2min)
CL-1103A-174	8.0		469 (2min)	CL-1103A-143	-0.3		2929 (2min)
CL-1103A-175	10.0		469 (2min)	CL-1103A-144	1.0		2929 (2min)
CL-1103A-176	0.0		469 (2min)	CL-1103A-145	0.3		2929 (5min)
CL-1103A-177	16.0		469 (2min)	CL-1103A-146	-0.3		2929 (2min)
<b>Main Area - Ceiling Ducts, Vents, Light Fixtures, Conduits</b>							
CL-1103A-187	464.0	yes	199350 (2min)	CL-1103A-156	160.2	yes	2929 (2min)
CL-1103A-188	2654.0	yes	199350 (2min)	CL-1103A-157	483.3	yes	2929 (2min)
CL-1103A-189	2438.0	yes	199350 (2min)	CL-1103A-158	394.3	yes	2929 (2min)
CL-1103A-190	2622.0	yes	199350 (2min)	CL-1103A-159	363.7	yes	2929 (2min)
CL-1103A-191	140.0	yes	199350 (2min)	CL-1103A-160	10.1	yes	2929 (2min)
CL-1103A-192	96.0		199350 (2min)	CL-1103A-161	5.9		2929 (5min)
CL-1103A-193	768.0	yes	199350 (2min)	CL-1103A-162	272.1	yes	2929 (2min)

**Radiological Survey Results  
Building 1103A**

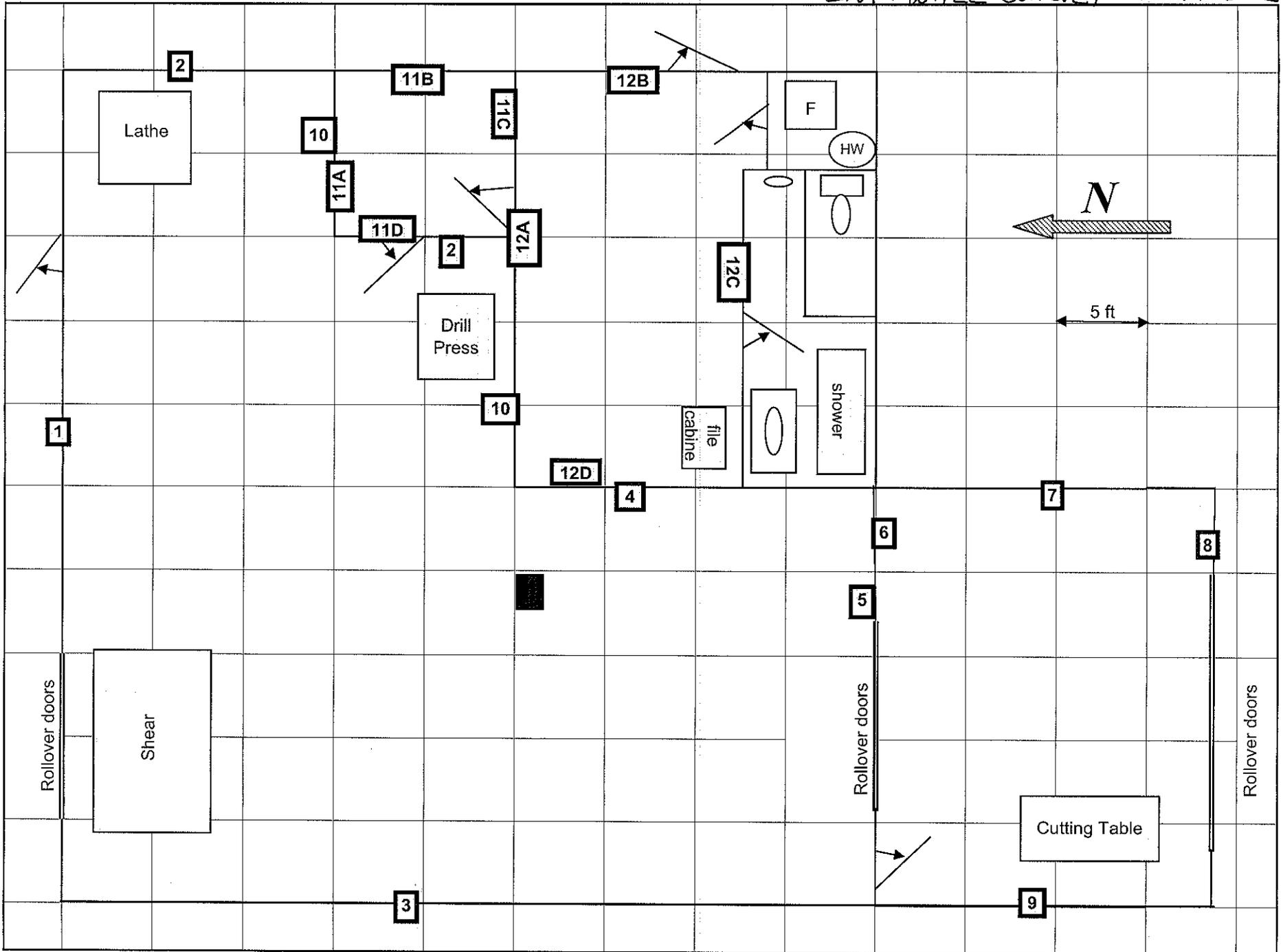
Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
CL-1103A-194	1060.0	yes	199350 (2min)	CL-1103A-163	375.2	yes	2929 (2min)
CL-1103A-195	2456.0	yes	199350 (2min)	CL-1103A-164	643.6	yes	2929 (2min)
CL-1103A-200	1588.0	yes	199350 (2min)	CL-1103A-169	331.9	yes	2929 (2min)
CL-1103A-201	238.0	yes	199350 (2min)	CL-1103A-170	333.2	yes	2929 (2min)
CL-1103A-202	414.0	yes	199350 (2min)	CL-1103A-171	33.0	yes	2929 (2min)
<b>Shop Area - Ceiling and High Walls</b>							
CL-1103A-178	44.0		469 (2min)	CL-1103A-147	8.7		2929 (2min)
CL-1103A-179	28.0		469 (2min)	CL-1103A-148	2.3		2929 (2min)
CL-1103A-180	32.0		469 (2min)	CL-1103A-149	15.0	yes	2929 (2min)
CL-1103A-181	50.0		469 (2min)	CL-1103A-150	3.8		2929 (5min)
CL-1103A-182	20.0		469 (2min)	CL-1103A-151	4.8		2929 (2min)
CL-1103A-183	52.0		469 (2min)	CL-1103A-152	17.6	yes	2929 (2min)
CL-1103A-184	10.0		469 (2min)	CL-1103A-153	-0.3		2929 (2min)
CL-1103A-185	30.0		469 (2min)	CL-1103A-154	5.9		2929 (5min)
<b>Shop Area - Ceiling Ducts, Fixtures, Conduits</b>							
CL-1103A-203	58.0		199350 (2min)	CL-1103A-172	27.9	yes	2929 (2min)
CL-1103A-204	1562.0	yes	199350 (2min)	CL-1103A-173	134.7	yes	2929 (2min)
CL-1103A-205	512.0	yes	199350 (2min)	CL-1103A-174	315.4	yes	2929 (2min)
<b>Entry Area - Ceiling in Changing Room (Horizontal Surface)</b>							
CL-1103A-186	812.0	yes	199350 (2min)	CL-1103A-155	179.3	yes	2929 (2min)
<b>Entry Area - Above Ceiling in Changing Room</b>							
CL-1103A-196	156.0	yes	199350 (2min)	CL-1103A-165	20.2	yes	2929 (2min)
<b>Entry Area - Above Ceiling in Meeting Room</b>							
CL-1103A-197	36.0		199350 (2min)	CL-1103A-166	2.3		2929 (5min)
<b>Entry Area - Above Ceiling in Bathroom</b>							
CL-1103A-198	452.0	yes	199350 (2min)	CL-1103A-167	64.8	yes	2929 (2min)
<b>Entry Area - Above Ceiling at Furnace Room Door</b>							
CL-1103A-199	418.0	yes	199350 (2min)	CL-1103A-168	74.9	yes	2929 (2min)
<b>FLOORS</b>							
<b>Main Area - Floor</b>							
FL-1103A-3	208.0	yes	469 (1min)	FL-1103A-3	18.8	yes	2929 (4min)
FL-1103A-4	428.0	yes	469 (1min)	FL-1103A-4	17.6	yes	2929 (4min)
FL-1103A-5	692.0	yes	469 (1min)	FL-1103A-5	81.2	yes	2929 (4min)
FL-1103A-6	864.0	yes	469 (1min)	FL-1103A-6	123.8	yes	2929 (4min)
FL-1103A-7	496.0	yes	469 (1min)	FL-1103A-7	84.4	yes	2929 (4min)
FL-1103A-8	232.0	yes	469 (1min)	FL-1103A-8	36.0	yes	2929 (4min)
FL-1103A-9	300.0	yes	469 (1min)	FL-1103A-9	88.8	yes	2929 (4min)
FL-1103A-10	252.0	yes	469 (1min)	FL-1103A-10	77.4	yes	2929 (4min)
FL-1103A-11	184.0	yes	469 (1min)	FL-1103A-11	36.0	yes	2929 (4min)
FL-1103A-12	664.0	yes	469 (1min)	FL-1103A-12	35.4	yes	2929 (4min)

**Radiological Survey Results  
Building 1103A**

Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>Shop Area - Floor</b>							
FL-1103A-1	428.0	yes	469 (1min)	FL-1103A-1	8.0		2929 (4min)
FL-1103A-2	344.0	yes	469 (1min)	FL-1103A-2	5.9		2929 (5min)
<b>Entry Area - Floor in Changing Room</b>							
FL-1103A-13	60.0		469 (1min)	FL-1103A-13	15.5	yes	2929 (5min)
FL-1103A-14	236.0	yes	469 (1min)	FL-1103A-14	19.5	yes	2929 (4min)
<b>Entry Area - Floor in Meeting Room</b>							
FL-1103A-15	36.0		469 (1min)	FL-1103A-15	6.9		2929 (5min)
FL-1103A-16	32.0		469 (1min)	FL-1103A-16	1.8		2929 (5min)
FL-1103A-17	76.0		469 (1min)	FL-1103A-17	5.5		2929 (4min)
<b>Entry Area - Floor in Bathroom</b>							
FL-1103A-18	124.0	yes	469 (1min)	FL-1103A-18	3.6		2929 (4min)
<b>Entry Area - Floor in Furnace Room</b>							
FL-1103A-19	48.0		469 (1min)	FL-1103A-19	1.7		2929 (4min)
<b>EXTERIOR WALLS</b>							
<b>East Wall - northern portion</b>							
WL-1103A-306	36.0		469 (2min)	WL-1103A-287	1.0		2929 (2min)
WL-1103A-307	-8.0		469 (2min)	WL-1103A-288	0.3		2929 (5min)
WL-1103A-308	26.0		469 (2min)	WL-1103A-289	-0.3		2929 (2min)
WL-1103A-309	18.0		469 (2min)	WL-1103A-290	-0.3		2929 (2min)
WL-1103A-310	18.0		469 (2min)	WL-1103A-291	-0.3		2929 (2min)
WL-1103A-311	14.0		469 (2min)	WL-1103A-292	-0.3		2929 (5min)
WL-1103A-312	16.0		469 (2min)	WL-1103A-293	0.3		2929 (5min)
WL-1103A-313	24.0		469 (2min)	WL-1103A-294	-0.3		2929 (2min)
<b>East Wall - southern portion</b>							
WL-1103A-281	4.0		199350 (2min)	WL-1103A-262	0.8		2929 (5min)
WL-1103A-282	6.0		199350 (2min)	WL-1103A-263	0.3		2929 (5min)
WL-1103A-283	8.0		199350 (2min)	WL-1103A-264	-0.3		2929 (5min)
WL-1103A-284	-6.0		199350 (2min)	WL-1103A-265	0.8		2929 (5min)
<b>South Wall - eastern portion</b>							
WL-1103A-277	18.0		199350 (2min)	WL-1103A-258	0.3		2929 (5min)
WL-1103A-278	12.0		199350 (2min)	WL-1103A-259	0.3		2929 (5min)
WL-1103A-279	16.0		199350 (2min)	WL-1103A-260	-0.3		2929 (5min)
WL-1103A-280	18.0		199350 (2min)	WL-1103A-261	0.8		2929 (5min)
<b>South Wall - western portion</b>							
WL-1103A-285	-2.0		469 (2min)	WL-1103A-266	0.8		2929 (5min)
WL-1103A-286	16.0		469 (2min)	WL-1103A-267	0.8		2929 (5min)
WL-1103A-287	268.0	yes	469 (2min)	WL-1103A-268	9.9		2929 (2min)
WL-1103A-288	32.0		469 (2min)	WL-1103A-269	1.3		2929 (5min)
WL-1103A-289	6.0		469 (2min)	WL-1103A-270	1.0		2929 (2min)

**Radiological Survey Results  
Building 1103A**

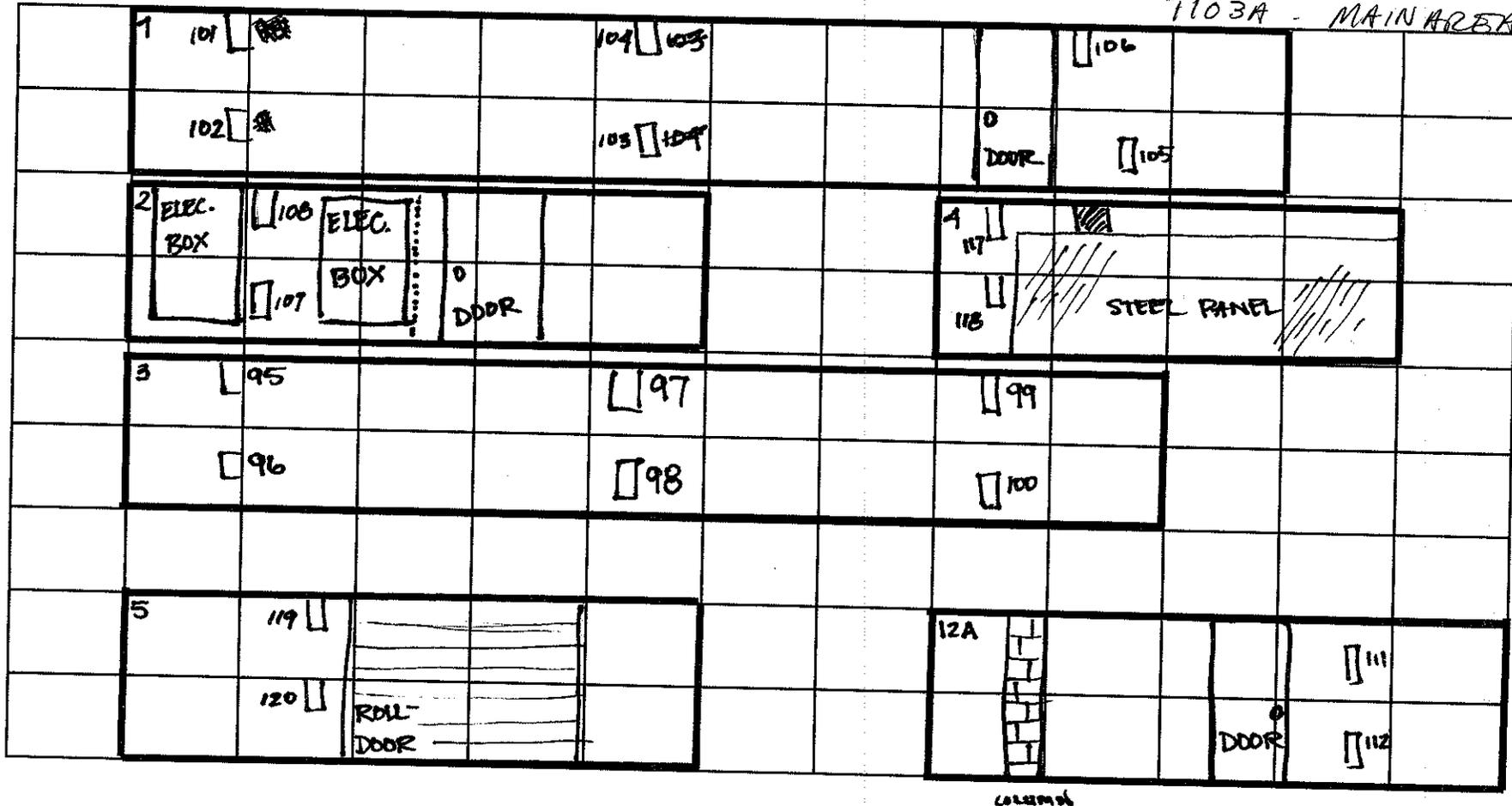
Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>West Wall - northern portion</b>							
WL-1103A-298	20.0		469 (2min)	WL-1103A-279	0.3		2929 (5min)
WL-1103A-299	10.0		469 (2min)	WL-1103A-280	-0.3		2929 (2min)
<b>West Wall - southern portion</b>							
WL-1103A-300	4.0		469 (2min)	WL-1103A-281	1.3		2929 (5min)
WL-1103A-301	8.0		469 (2min)	WL-1103A-282	-0.3		2929 (2min)
WL-1103A-302	4.0		469 (2min)	WL-1103A-283	-0.3		2929 (2min)
WL-1103A-303	10.0		469 (2min)	WL-1103A-284	-0.3		2929 (5min)
WL-1103A-304	16.0		469 (2min)	WL-1103A-285	2.3		2929 (5min)
WL-1103A-305	20.0		469 (2min)	WL-1103A-286	-0.3		2929 (2min)
<b>North Wall</b>							
WL-1103A-290	26.0		469 (2min)	WL-1103A-271	0.8		2929 (5min)
WL-1103A-291	-2.0		469 (2min)	WL-1103A-272	-0.3		2929 (2min)
WL-1103A-292	42.0		469 (2min)	WL-1103A-273	-0.3		2929 (5min)
WL-1103A-293	24.0		469 (2min)	WL-1103A-274	0.3		2929 (5min)
WL-1103A-294	22.0		469 (2min)	WL-1103A-275	0.8		2929 (5min)
WL-1103A-295	14.0		469 (2min)	WL-1103A-276	-0.3		2929 (5min)
WL-1103A-296	16.0		469 (2min)	WL-1103A-277	1.0		2929 (2min)
WL-1103A-297	30.0		469 (2min)	WL-1103A-278	-0.3		2929 (2min)



Building 1103A  
2 MINUTE COUNTS  
5.23.06

INT. WALL SURVEY

1103A - MAIN AREA



12A -  
ENTRY  
AREA

Scanned 5/23/06

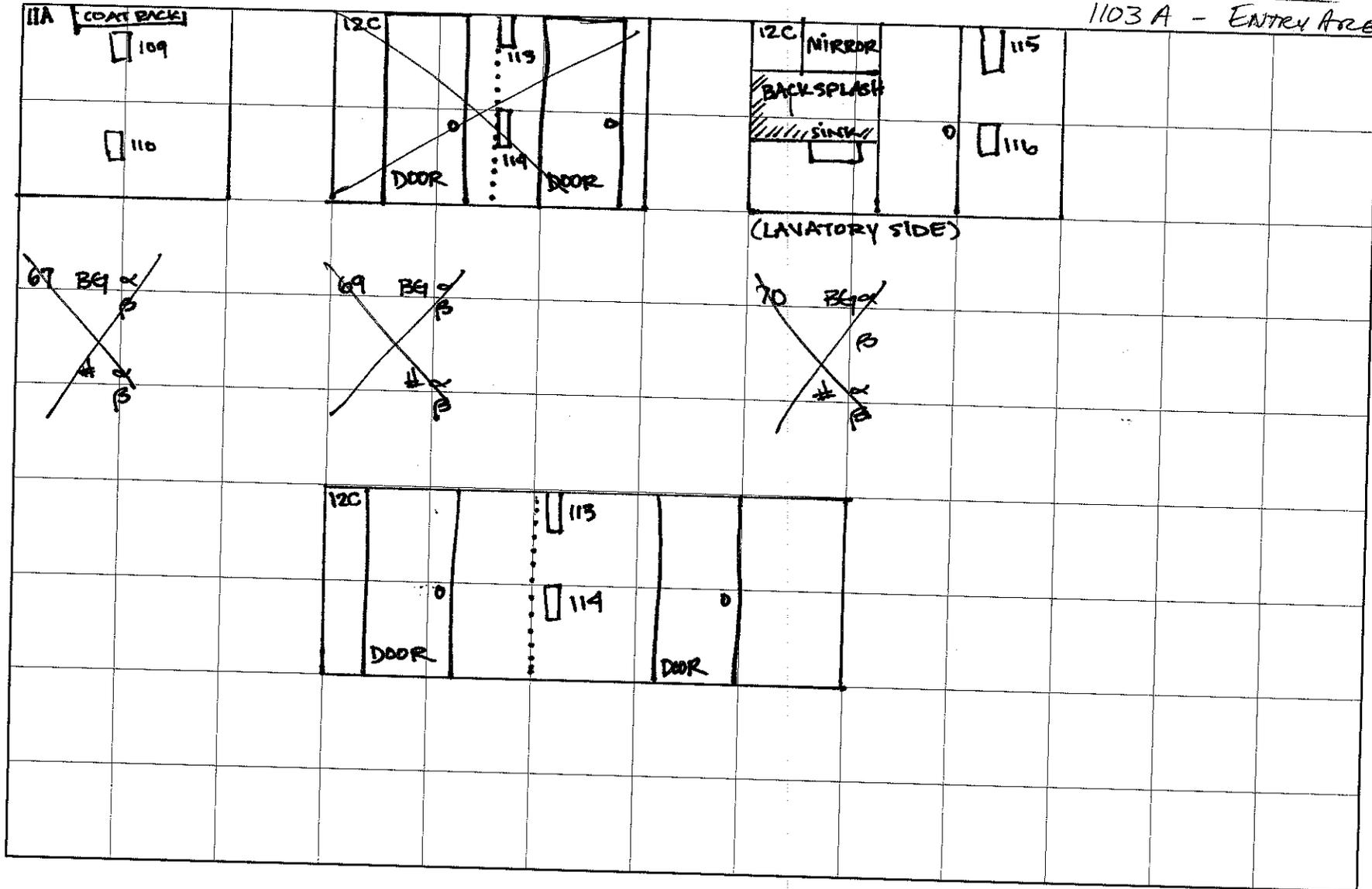
BUILDING 1103A

5-23-06

2 MINUTE COUNTS

INT. WALL SURVEY

1103A - ENTRY AREA



scanned 5/23/06

*[Signature]*

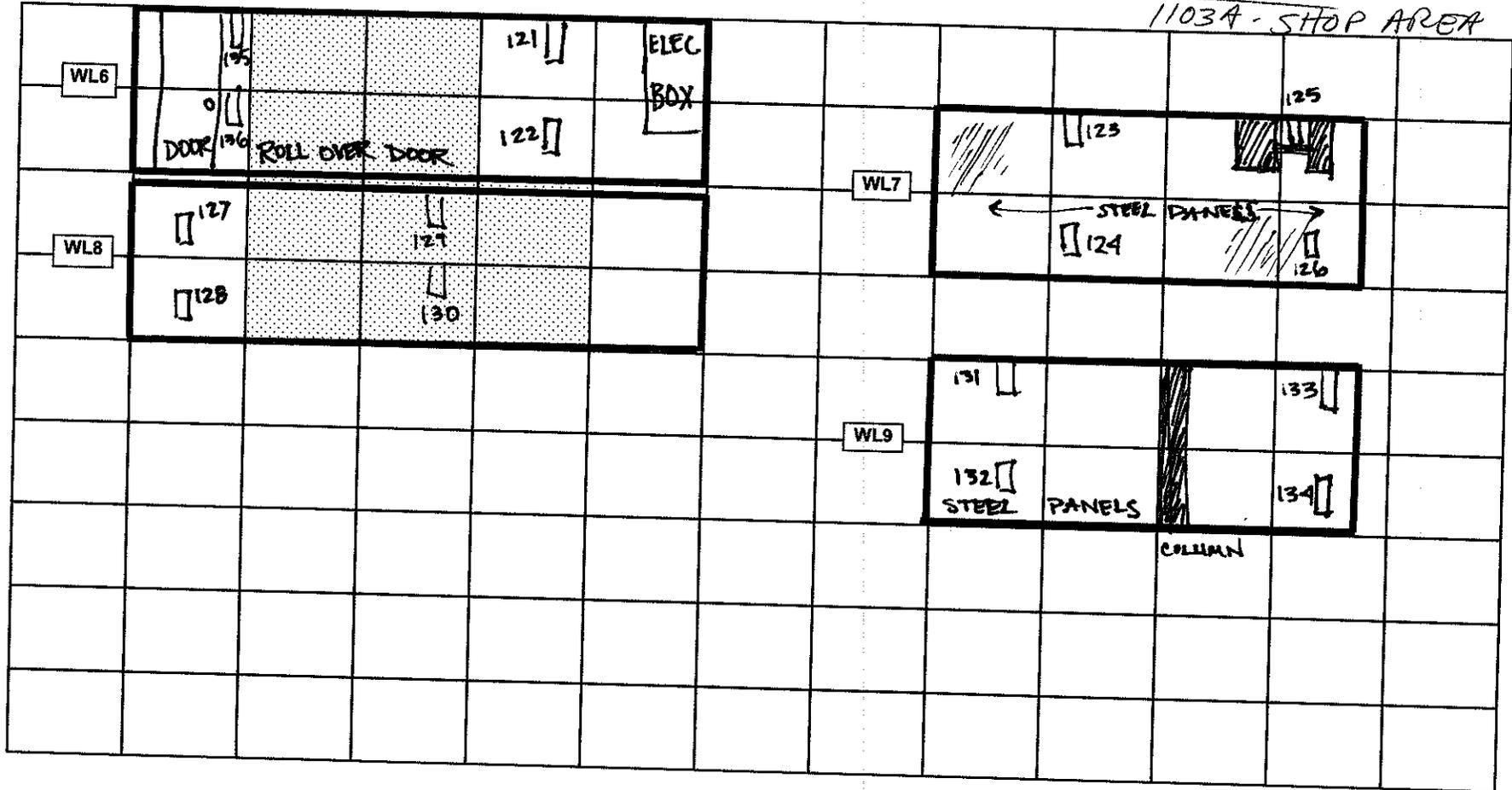
BUILDING 1103A ENTRY

2 MINUTE COUNTS

5.23.06

INT. WALL SURVEY

1103A - STOP AREA



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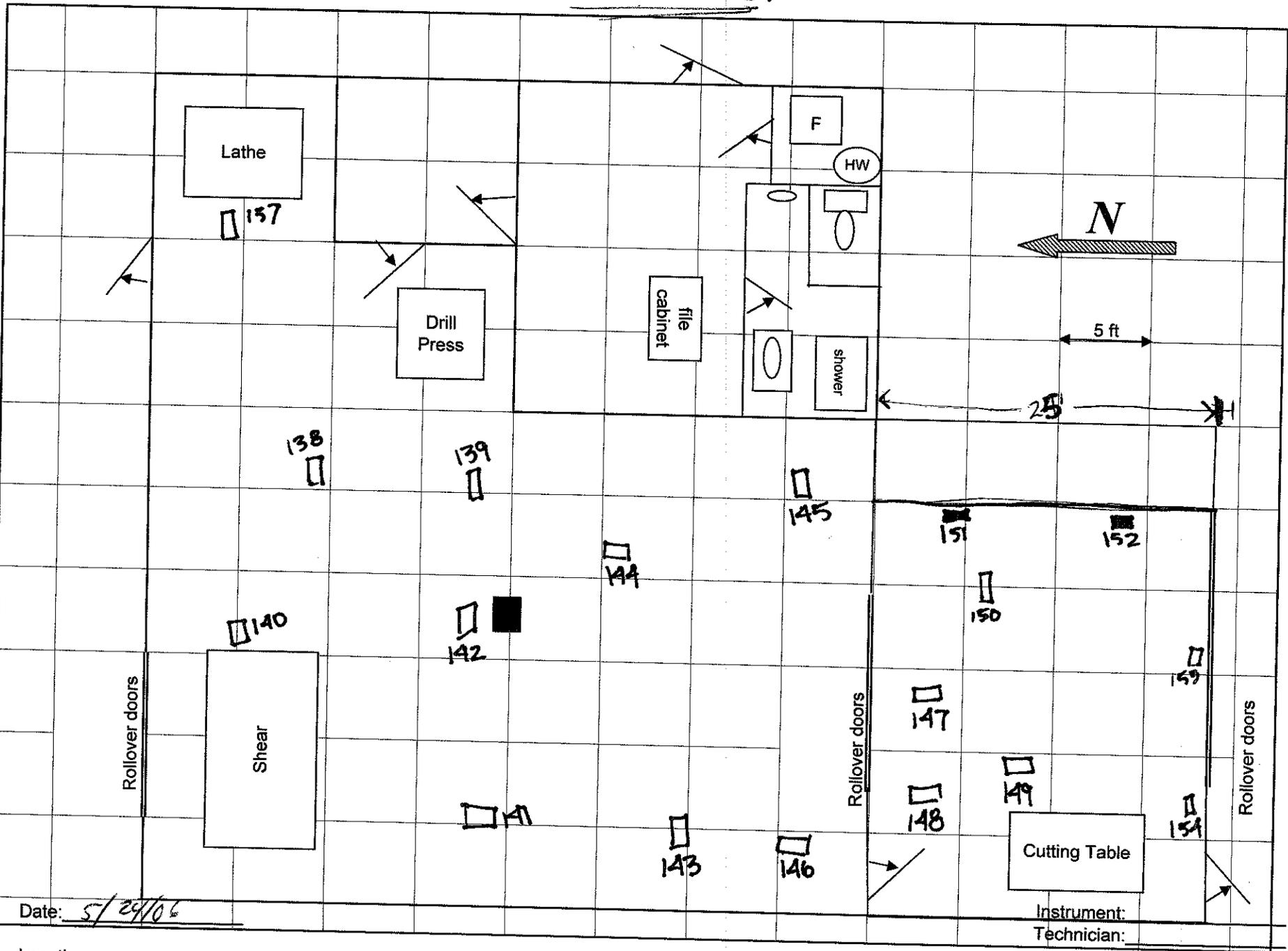
ff

rescanned 5/24/06

ff

Building 1103A  
CEILING SURVEY

□ : CEILING  
 ■ : HIGH WALL NEAR CEILING



Account 5/29/06  
 O'Connell 5/19/06

Date: 5/29/06

Location: \_\_\_\_\_

Instrument:  
 Technician:

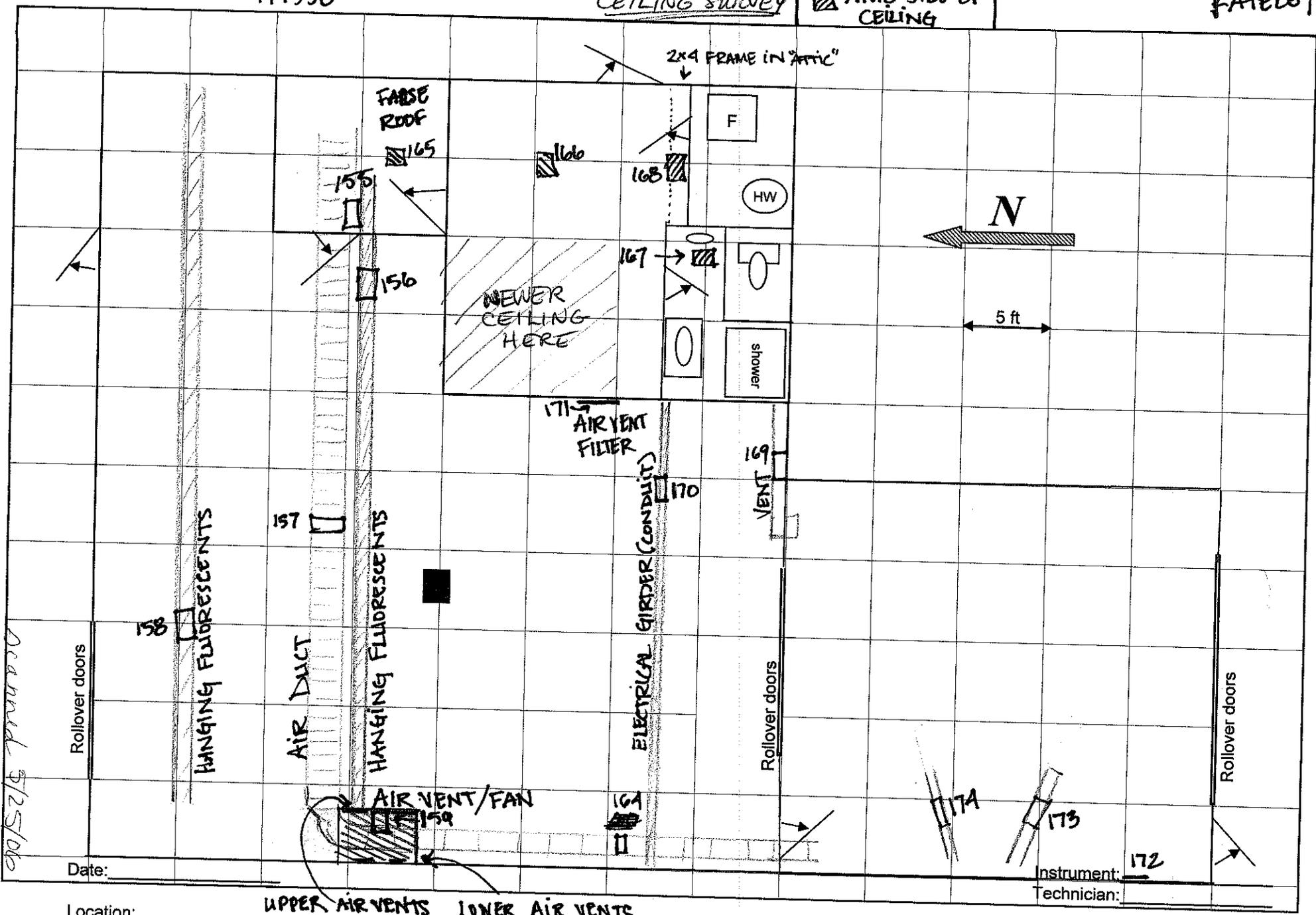
HORIZONTAL SURFACE READINGS  
INST: 43-89 #199350

Building 1103A  
CEILING SURVEY

5-25-06

CLARKE  
& ATELEY

ATTIC SIDE OF  
CEILING



Command 5/25/06

Date: \_\_\_\_\_

Location: \_\_\_\_\_

UPPER AIR VENTS 160 & 161  
LOWER AIR VENTS 162 & 163

Instrument: \_\_\_\_\_  
Technician: \_\_\_\_\_

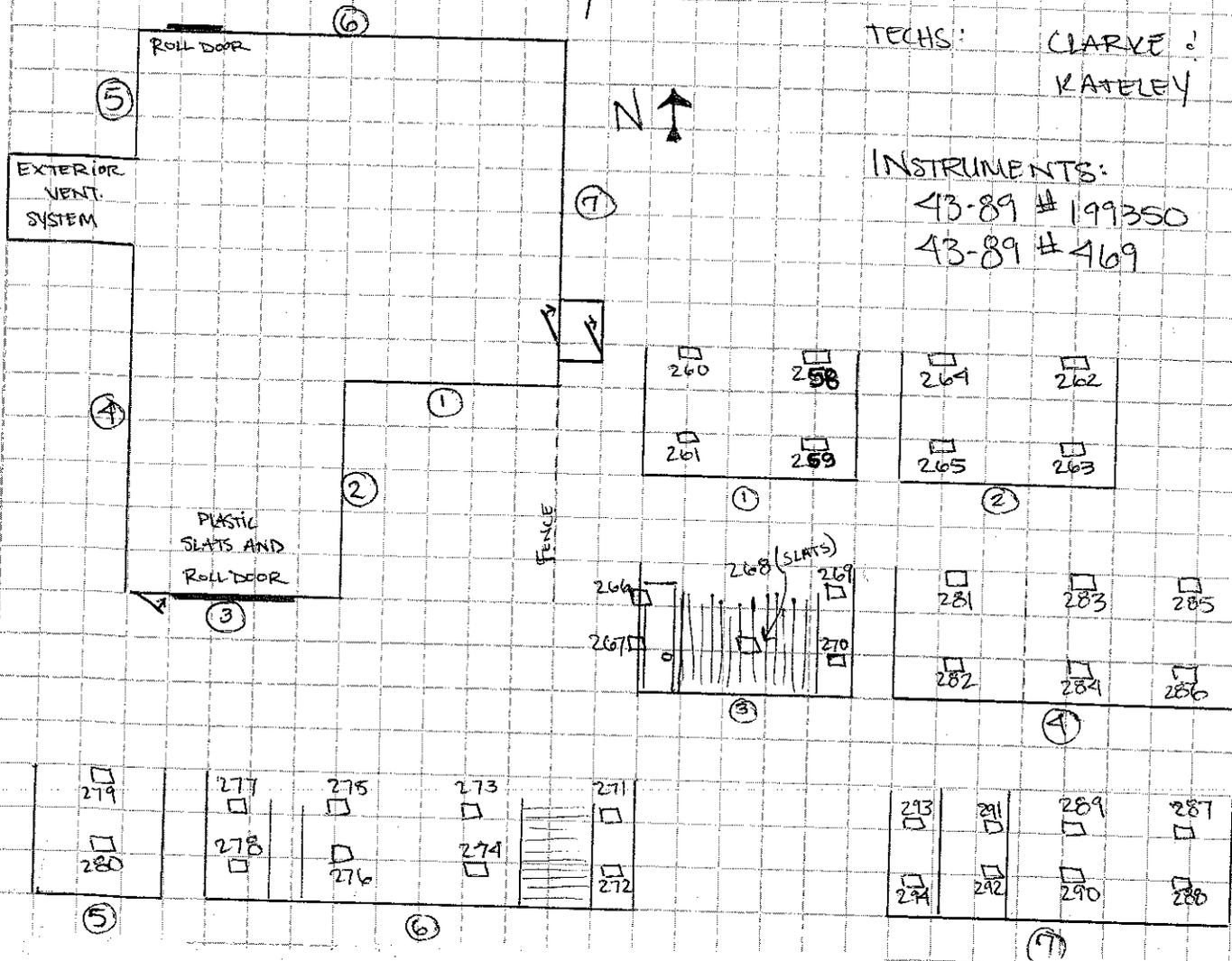
# BUILDING 1103A External Wall Survey

DATE: 5-31-06

TECHS: CLARKE!  
KATELEY

INSTRUMENTS:

43-89 # 199350  
43-89 # 469



**APPENDIX B-2**

**BUILDING BRL12  
SURVEY RESULTS**

**Radiological Survey Results  
Building BRL12**

Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>INTERIOR WALLS</b>							
<b>Central Room - walls at 1 meter height</b>							
WL4-BRL12-106	-2		469 (2min)	WL-BRL12-86	1.3		2929 (5min)
WL5-BRL12-107	6		469 (2min)	WL-BRL12-87	2.3		2929 (5min)
WL5-BRL12-107b	0		469 (2min)	WL-BRL12-88	7.4		2929 (2min)
WL6-BRL12-108	4		469 (2min)	WL-BRL12-89	8.7		2929 (2min)
WL7-BRL12-109	20		469 (2min)	WL-BRL12-90	3.8		2929 (5min)
WL8-BRL12-110	6		469 (2min)	WL-BRL12-91	6.1		2929 (2min)
<b>Central Room - walls at 2 meter height</b>							
WL4-BRL12-117	8		469 (2min)	WL-BRL12-82	-0.3		2929 (2min)
WL5-BRL12-118	0		469 (2min)	WL-BRL12-74	2.3		2929 (2min)
WL6-BRL12-119	2		469 (2min)	WL-BRL12-75	4.5		2929 (5min)
WL6-BRL12-120	40		469 (2min)	WL-BRL12-76	0.4		2929 (5min)
WL7-BRL12-121	14		469 (2min)	WL-BRL12-77	8.7		2929 (2min)
WL8-BRL12-122	8		469 (2min)	WL-BRL12-78	7.4		2929 (2min)
<b>North Vault - walls at 1 meter height</b>							
WL1-BRL12-103	2		469 (2min)	WL-BRL12-83	1.0		2929 (2min)
WL2-BRL12-104	10		469 (2min)	WL-BRL12-84	-0.3		2929 (5min)
WL3-BRL12-105	0		469 (2min)	WL-BRL12-85	2.3		2929 (2min)
<b>North Vault - walls at 2 meter height</b>							
WL1-BRL12-114	-12		469 (2min)	WL-BRL12-71	0.9		2929 (5min)
WL2-BRL12-115	-4		469 (2min)	WL-BRL12-72	-0.3		2929 (2min)
WL3-BRL12-116	0		469 (2min)	WL-BRL12-73	1.4		2929 (5min)
<b>South Vault - walls at 1 meter height</b>							
WL9-BRL12-111	6		469 (2min)	WL-BRL12-92	0.3		2929 (5min)
WL10-BRL12-112	-6		469 (2min)	WL-BRL12-93	-0.3		2929 (2min)
WL11-BRL12-113	0		469 (2min)	WL-BRL12-94	0.8		2929 (5min)
<b>South Room - walls at 2 meter height</b>							
WL9-BRL12-123	0		469 (2min)	WL-BRL12-79	-0.3		2929 (2min)
WL10-BRL12-124	2		469 (2min)	WL-BRL12-80	1.3		2929 (5min)
WL11-BRL12-125	2		469 (2min)	WL-BRL12-81	-0.3		2929 (2min)
<b>CEILINGS</b>							
<b>Central Room - ceiling</b>							
CL-BRL12-216	12		199350 (2min)	CL-1103A-185	1.1		2929 (2min)
CL-BRL12-217	8		199350 (2min)	CL-1103A-186	-0.3		2929 (5min)
CL-BRL12-218	36		199350 (2min)	CL-1103A-187	1.3		2929 (5min)
<b>North Vault - ceiling</b>							
CL-BRL12-219	0		199350 (2min)	CL-1103A-188	0.8		2929 (5min)
CL-BRL12-220	0		199350 (2min)	CL-1103A-189	-0.1		2929 (2min)

**Radiological Survey Results  
Building BRL12**

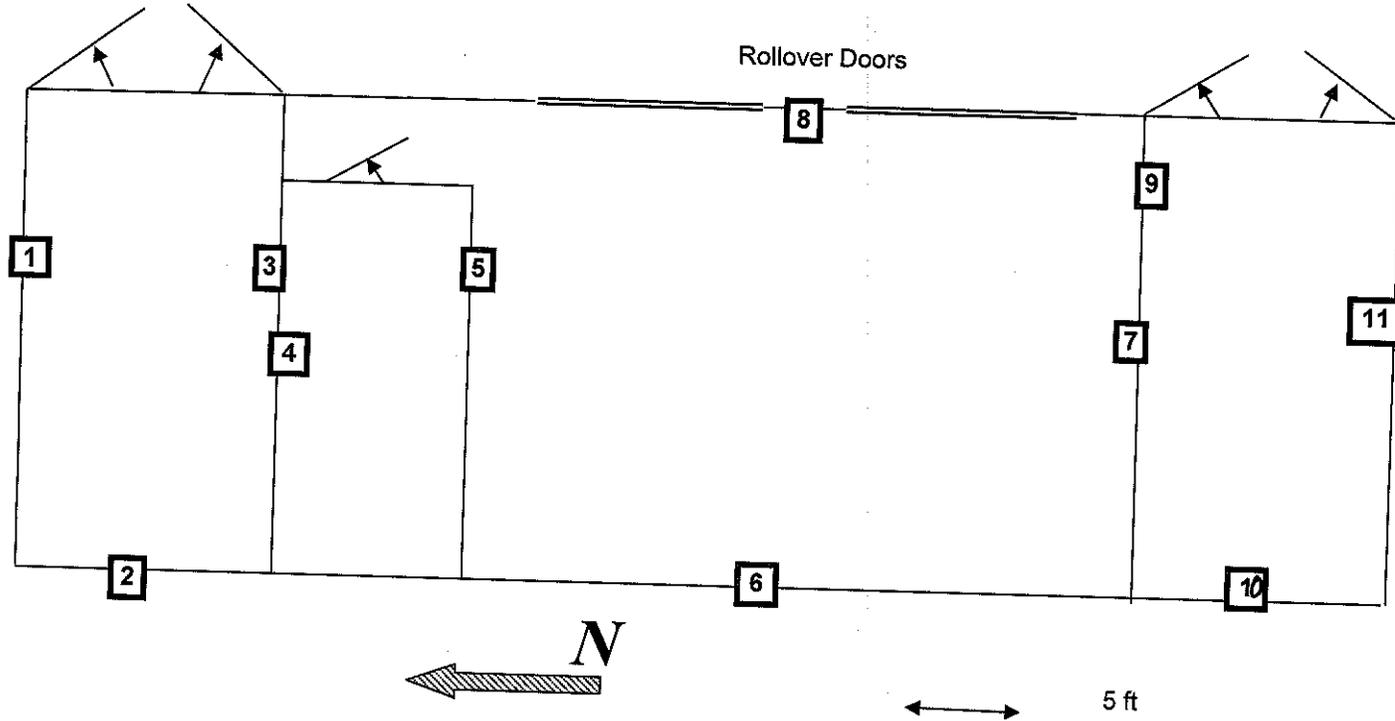
Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>South Vault - ceiling</b>							
FL-BRL12-223	4		199350 (2min)	FL-1103A-192	0.3		2929 (5min)
FL-BRL12-224	4		199350 (2min)	FL-1103A-193	2.4		2929 (2min)
<b>FLOORS</b>							
<b>Central Room - floor</b>							
FL-BRL12-206	64		199350 (2min)	FL-1103A-175	13.9	yes	2929 (2min)
FL-BRL12-207	110	yes	199350 (2min)	FL-1103A-176	10.1	yes	2929 (2min)
FL-BRL12-208	126	yes	199350 (2min)	FL-1103A-177	8.8		2929 (2min)
FL-BRL12-209	76		199350 (2min)	FL-1103A-178	6.9		2929 (5min)
FL-BRL12-210	186	yes	199350 (2min)	FL-1103A-179	11.3	yes	2929 (2min)
FL-BRL12-211	32		199350 (2min)	FL-1103A-180	1.1		2929 (2min)
FL-BRL12-212	34		199350 (2min)	FL-1103A-181	3.7		2929 (2min)
FL-BRL12-213	10		199350 (2min)	FL-1103A-182	3.3		2929 (5min)
FL-BRL12-214	50		199350 (2min)	FL-1103A-183	7.5		2929 (2min)
<b>Office - floor</b>							
FL-BRL12-215	98		199350 (2min)	FL-1103A-184	7.5		2929 (2min)
<b>North Vault - floor</b>							
FL-BRL12-221	14798	yes	199350 (2min)	FL-1103A-190	1106.7	yes	2929 (2min)
FL-BRL12-222	2514	yes	199350 (2min)	FL-1103A-191	86.4	yes	2929 (2min)
FL-BRL12-20	132	yes	469 (1min)	FL-BRL12-20	4.8		2929 (5min)
FL-BRL12-21	208	yes	469 (1min)	FL-BRL12-21	11.8	yes	2929 (4min)
FL-BRL12-22	2500	yes	469 (1min)	FL-BRL12-22	161.3	yes	2929 (4min)
<b>South Vault - floor</b>							
FL-BRL12-227	16		199350 (2min)	FL-1103A-196	3.8		2929 (5min)
FL-BRL12-228	54		199350 (2min)	FL-1103A-197	5.0		2929 (2min)
FL-BRL12-23	68		469 (1min)	FL-BRL12-23	2.8		2929 (5min)
FL-BRL12-24	32		469 (1min)	FL-BRL12-24	11.8	yes	2929 (4min)
<b>EXTERIOR WALLS</b>							
<b>East Wall</b>							
WL-BRL12-255	6		199350 (2min)	WL-BRL12-236	-0.3		2929 (2min)
WL-BRL12-256	-6		199350 (2min)	WL-BRL12-237	-0.3		2929 (5min)
WL-BRL12-257	6		199350 (2min)	WL-BRL12-238	0.3		2929 (5min)
WL-BRL12-258	8		199350 (2min)	WL-BRL12-239	-0.3		2929 (2min)
WL-BRL12-259	6		199350 (2min)	WL-BRL12-240	3.6		2929 (2min)
WL-BRL12-260	22		199350 (2min)	WL-BRL12-241	2.8		2929 (5min)
WL-BRL12-261	2		199350 (2min)	WL-BRL12-242	0.3		2929 (5min)
WL-BRL12-262	14		199350 (2min)	WL-BRL12-243	2.3		2929 (2min)

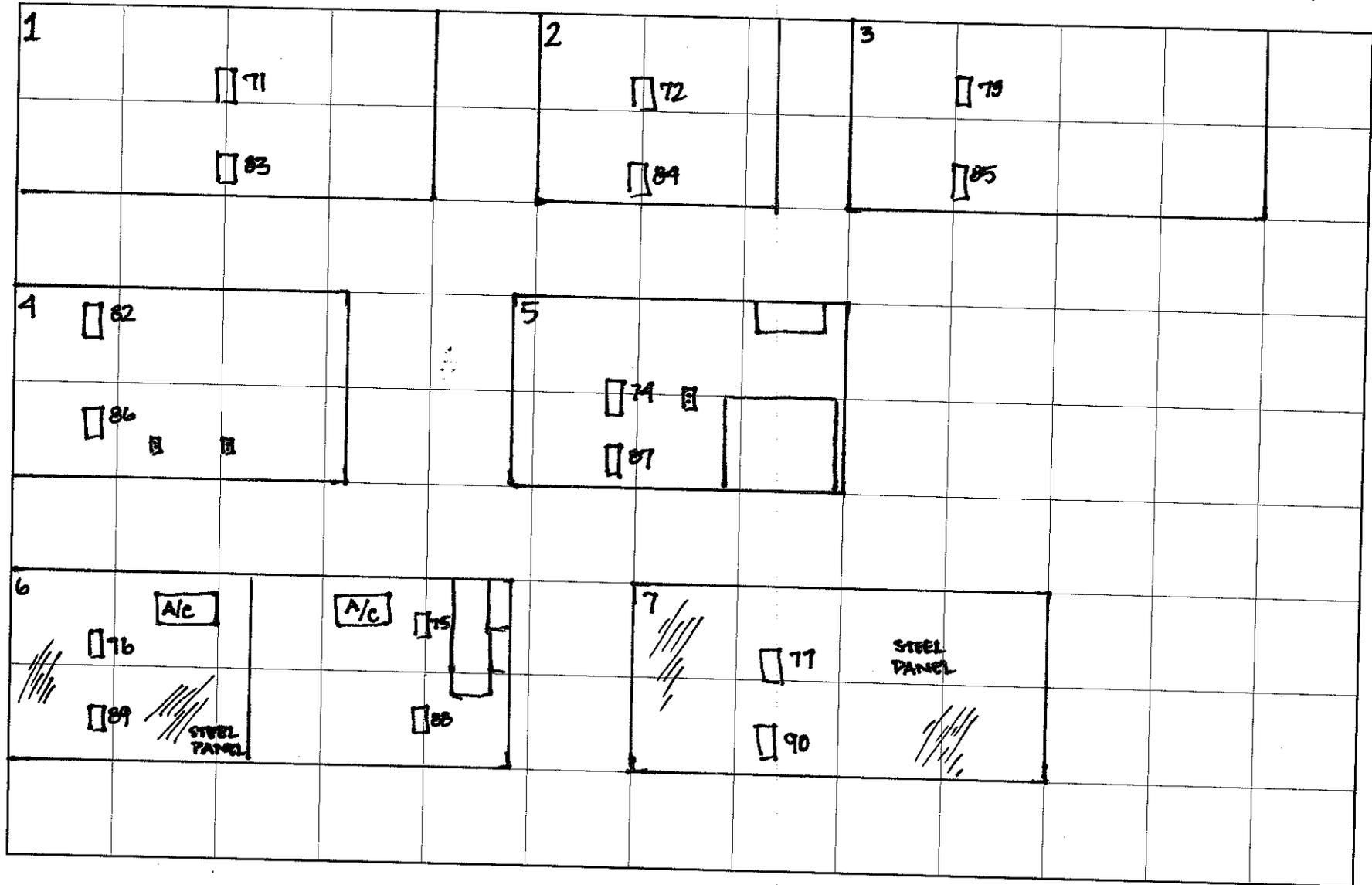
**Radiological Survey Results  
Building BRL12**

Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>South Wall</b>							
WL-BRL12-239	12		199350 (2min)	WL-BRL12-220	0.8		2929 (5min)
WL-BRL12-240	0		199350 (2min)	WL-BRL12-221	2.3		2929 (2min)
WL-BRL12-241	4		199350 (2min)	WL-BRL12-222	-0.3		2929 (2min)
WL-BRL12-242	8		199350 (2min)	WL-BRL12-223	-0.3		2929 (5min)
<b>West Wall</b>							
WL-BRL12-243	10		199350 (2min)	WL-BRL12-224	0.3		2929 (5min)
WL-BRL12-244	-10		199350 (2min)	WL-BRL12-225	-0.3		2929 (2min)
WL-BRL12-245	2		199350 (2min)	WL-BRL12-226	1.0		2929 (2min)
WL-BRL12-246	10		199350 (2min)	WL-BRL12-227	-0.3		2929 (2min)
WL-BRL12-247	-2		199350 (2min)	WL-BRL12-228	1.0		2929 (2min)
WL-BRL12-248	6		199350 (2min)	WL-BRL12-229	0.3		2929 (5min)
WL-BRL12-249	4		199350 (2min)	WL-BRL12-230	0.8		2929 (5min)
WL-BRL12-250	12		199350 (2min)	WL-BRL12-231	-0.3		2929 (2min)
<b>North Wall</b>							
WL-BRL12-251	-2		199350 (2min)	WL-BRL12-232	0.8		2929 (5min)
WL-BRL12-252	2		199350 (2min)	WL-BRL12-233	-0.3		2929 (2min)
WL-BRL12-253	12		199350 (2min)	WL-BRL12-234	2.3		2929 (2min)
WL-BRL12-254	6		199350 (2min)	WL-BRL12-235	0.8		2929 (5min)

Building BRL12 (Vault)

# INTERIOR WALL SURVEY LOCATIONS

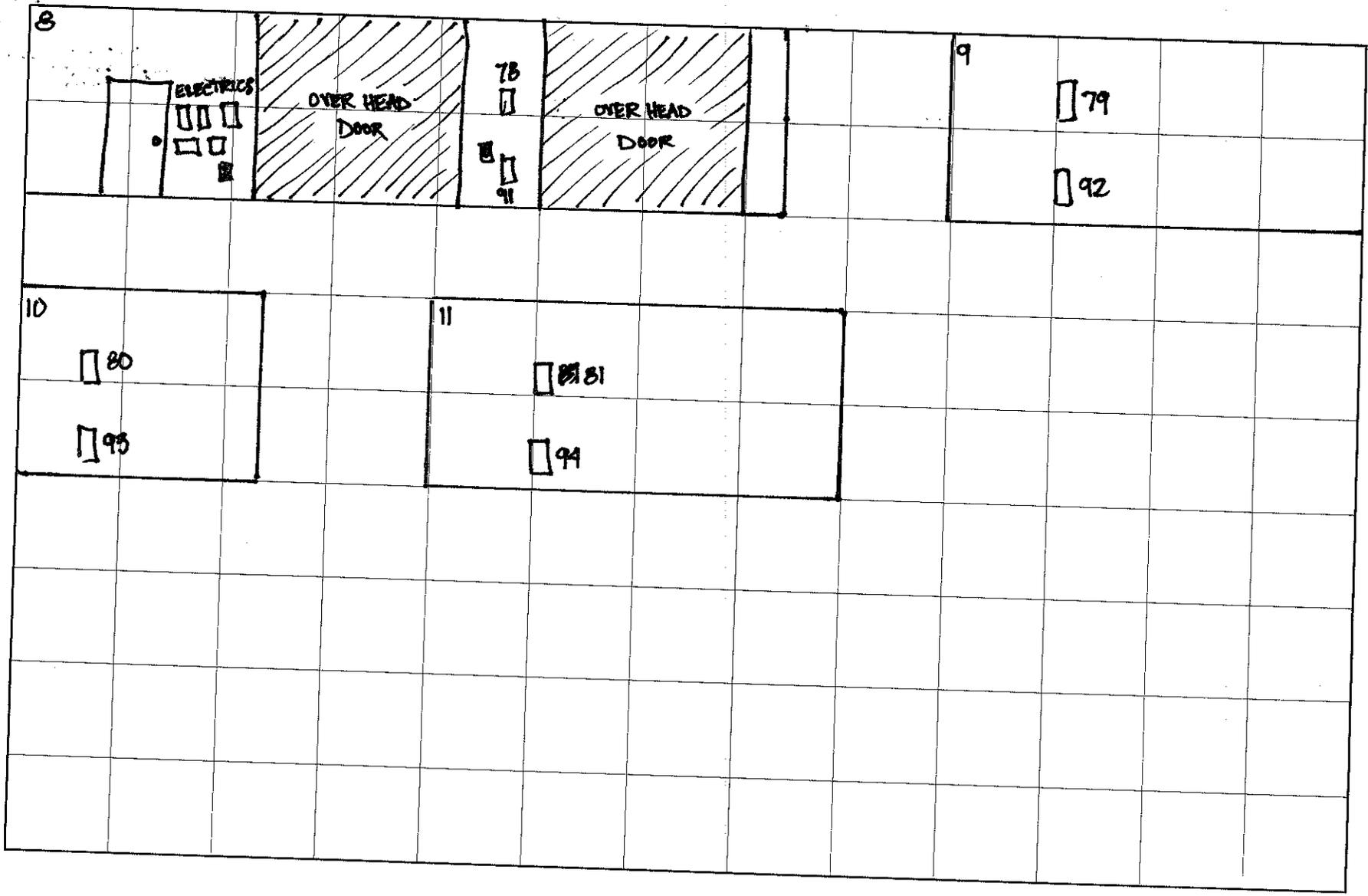




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*[Signature]*

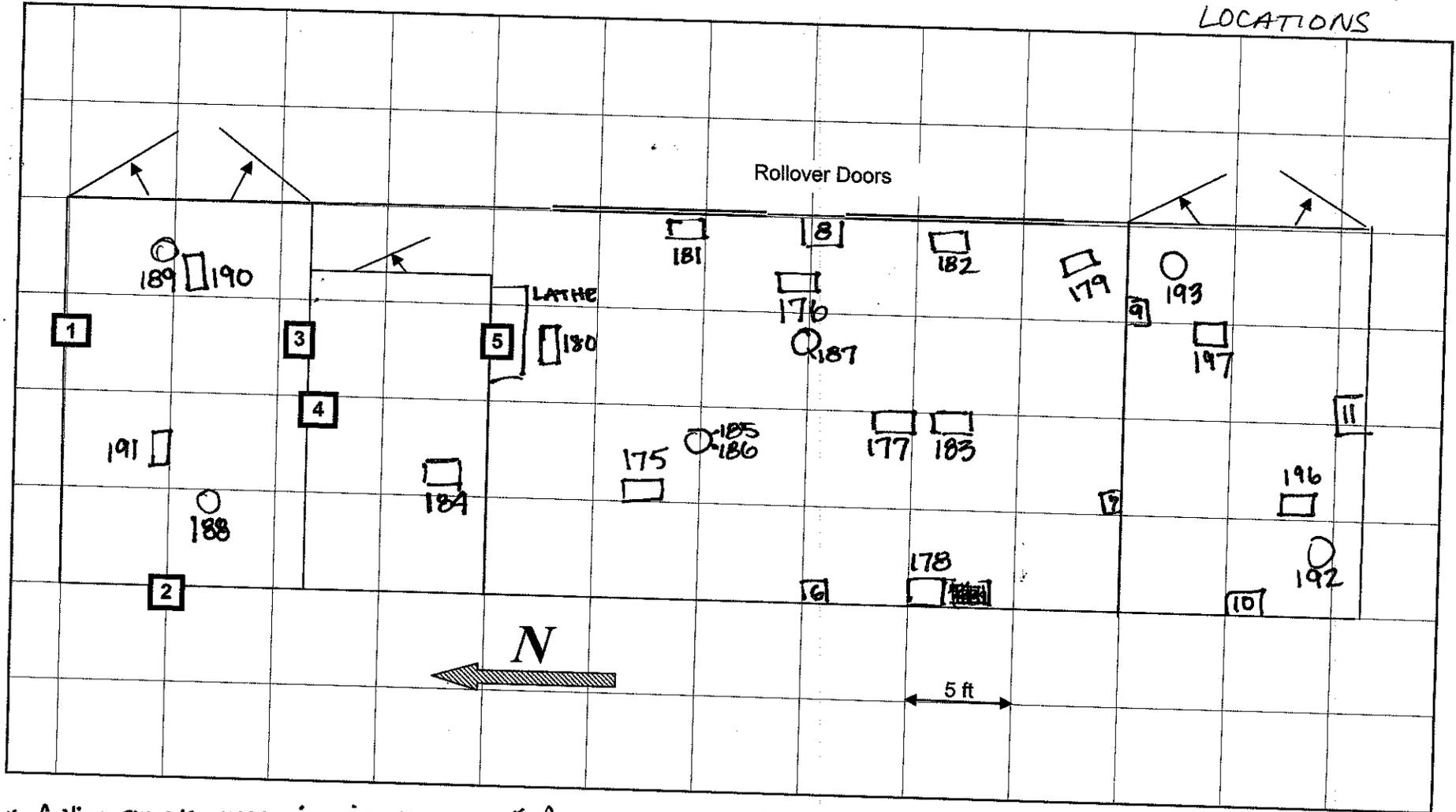
BRL12  
WALL ART page 2 f2

SURVEY LOCATIONS  
5/22/06  
(INTERIOR WALLS)



Scanned 5/22/06  
JH

Scanned 5-26-06



- \* Ceiling surveys NOTED IN CIRCLES
- \* Floor surveys NOTED IN RECTANGLES

- \* Average scan on floor w/ 43.37 # 092765 ranges from 300 → 2000 cpm (MAIN ROOM)
- \* HOTSPOTS NOTED & SAMPLED FURTHER. w/ 43.89 # 199350 (MAIN ROOM)

CLARKE  
KATELEY

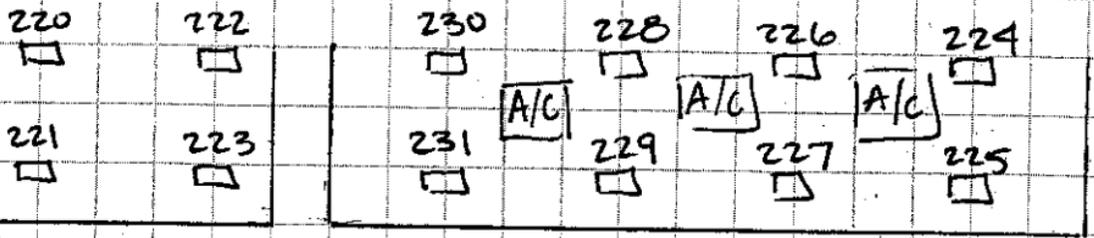
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5-26-06

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BRL 12

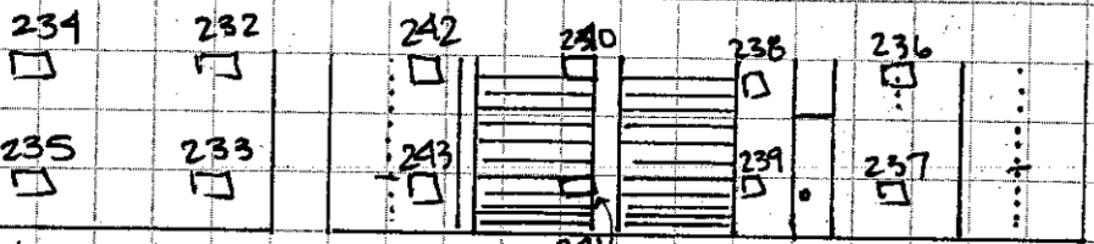
5.30.06

# EXTERNAL WALL SURVEY



SOUTH WALL

WEST WALL



NORTH WALL

EAST WALL

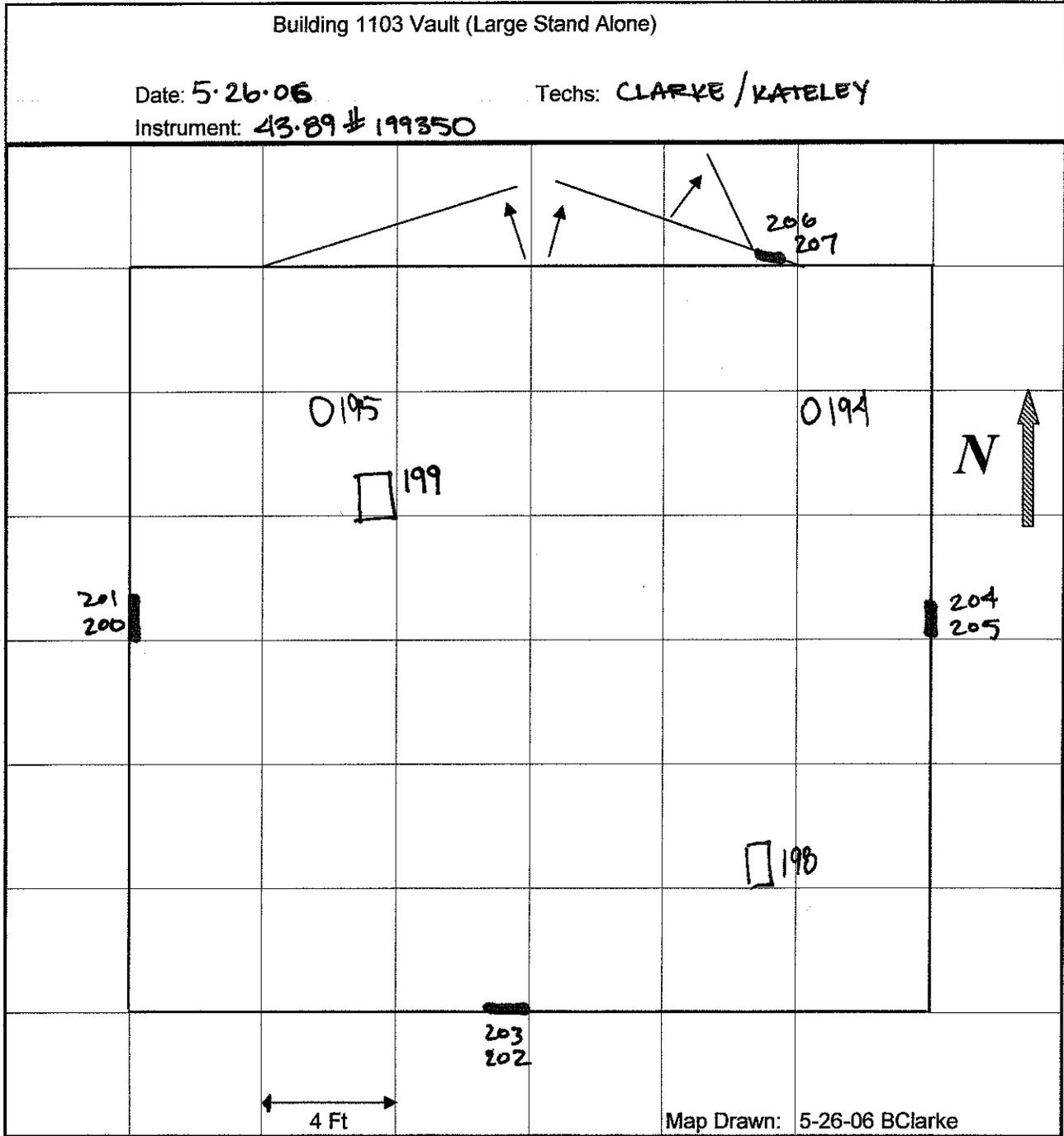
**APPENDIX B-3**

**FREESTANDING VAULT / TOOL SHED  
SURVEY RESULTS**

**Radiological Survey Results  
Freestanding Vault/Shed**

Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>INTERIOR WALLS</b>							
WL-VAULT-231	10		199350 (2min)	WL-VAULT-200	0.3		2929 (5min)
WL-VAULT-232	-2		199350 (2min)	WL-VAULT-201	5.0		2929 (2min)
WL-VAULT-233	-18		199350 (2min)	WL-VAULT-202	-0.1		2929 (2min)
WL-VAULT-234	0		199350 (2min)	WL-VAULT-203	2.3		2929 (5min)
WL-VAULT-235	20		199350 (2min)	WL-VAULT-204	3.8		2929 (5min)
WL-VAULT-236	104	yes	199350 (2min)	WL-VAULT-205	12.6	yes	2929 (2min)
WL-VAULT-237	8		199350 (2min)	WL-VAULT-206	-0.1		2929 (2min)
WL-VAULT-238	6		199350 (2min)	WL-VAULT-207	2.3		2929 (5min)
<b>CEILING</b>							
CL-VAULT-225	2		199350 (2min)	FL-VAULT-194	-0.1		2929 (2min)
CL-VAULT-226	0		199350 (2min)	FL-VAULT-195	0.3		2929 (5min)
<b>FLOOR</b>							
FL-VAULT-229	56		199350 (2min)	FL-VAULT-198	4.8		2929 (5min)
FL-VAULT-230	36		199350 (2min)	FL-VAULT-199	1.1		2929 (2min)
<b>EXTERIOR WALLS</b>							
<b>East Wall</b>							
WL-VAULT-326	20		469 (2min)	WL-VAULT-307	2.3		2929 (2min)
WL-VAULT-327	-2		469 (2min)	WL-VAULT-308	0.8		2929 (5min)
<b>South Wall</b>							
WL-VAULT-322	8		469 (2min)	WL-VAULT-303	-0.3		2929 (2min)
WL-VAULT-323	-6		469 (2min)	WL-VAULT-304	-0.3		2929 (5min)
WL-VAULT-324	10		469 (2min)	WL-VAULT-305	1.3		2929 (5min)
WL-VAULT-325	0		469 (2min)	WL-VAULT-306	-0.3		2929 (2min)
<b>West Wall</b>							
WL-VAULT-318	16		469 (2min)	WL-VAULT-299	0.8		2929 (5min)
WL-VAULT-319	22		469 (2min)	WL-VAULT-300	-0.3		2929 (2min)
WL-VAULT-320	38		469 (2min)	WL-VAULT-301	-0.3		2929 (2min)
WL-VAULT-321	16		469 (2min)	WL-VAULT-302	0.8		2929 (5min)
<b>North Wall</b>							
WL-VAULT-314	10		469 (2min)	WL-VAULT-295	2.3		2929 (2min)
WL-VAULT-315	16		469 (2min)	WL-VAULT-296	0.8		2929 (5min)
WL-VAULT-316	12		469 (2min)	WL-VAULT-297	0.8		2929 (5min)
WL-VAULT-317	10		469 (2min)	WL-VAULT-298	1.0		2929 (2min)
<b>Tool Shed</b>							
WL-SHED-328	2		469 (2min)	WL-SHED-309	2.3		2929 (2min)
WL-SHED-329	2		469 (2min)	WL-SHED-310	0.8		2929 (5min)
WL-SHED-330	4		469 (2min)	WL-SHED-311	-0.3		2929 (5min)
WL-SHED-331	-2		469 (2min)	WL-SHED-312	-0.3		2929 (2min)
WL-SHED-332	18		469 (2min)	WL-SHED-313	-0.3		2929 (2min)
WL-SHED-333	-2		469 (2min)	WL-SHED-314	-0.3		2929 (5min)
WL-SHED-334	8		469 (2min)	WL-SHED-315	0.8		2929 (5min)
WL-SHED-335	8		469 (2min)	WL-SHED-316	2.3		2929 (2min)

FREESTANDING VAULT  
INTERIOR SURVEY  
LOCATIONS



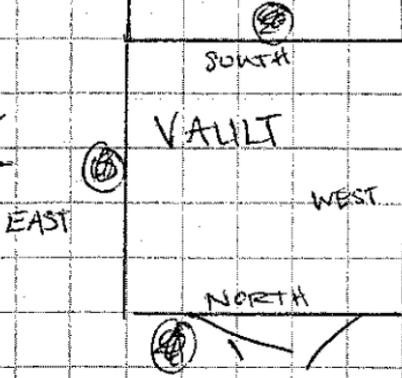
Smear #'s 200 → 207  
marked on walls @  
1:2 meter heights

\* circles are ceiling locations  
\* rectangles are floor locations

Scanned 5-26-06

5-31-06

Lawnmower shed

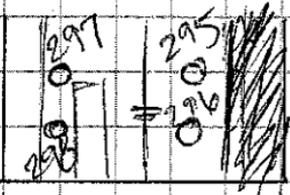


flamingo holding building

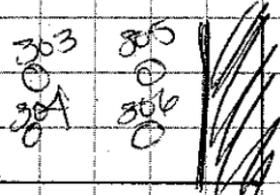
INSTRUMENT:  
43.89 #169

CLARKE :

KATELEY

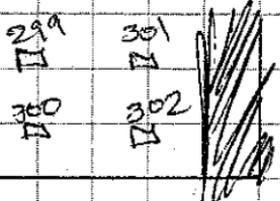
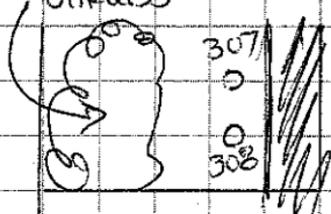


NORTH WALL



SOUTH WALL  
(UNDER SHED ROOF)

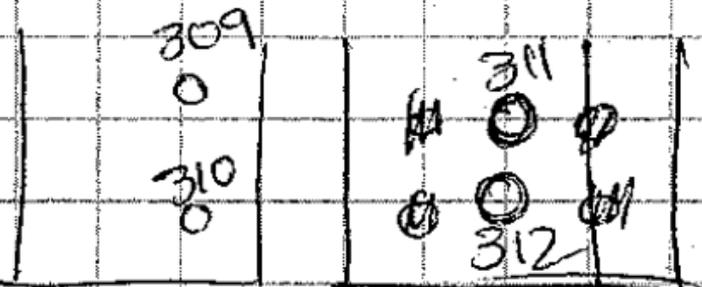
THORNY SHRUBS



SHELF ON BACK OF STANDALONE

VAULT

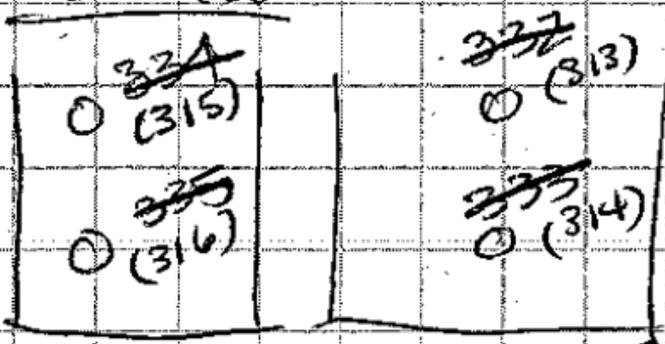
INSIDE



EAST  
WALL

SOUTH  
WALL

OUTSIDE



EAST  
WALL

SOUTH  
WALL

**APPENDIX B-4**

**BUILDING 1103B  
SURVEY RESULTS**

**Radiological Survey Results  
Building 1103B Exterior Walls**

Direct Measurements				Smear Measurements			
Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 100 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)	Sample ID#	Sample $\alpha$ (dpm/100 cm <sup>2</sup> )	$\alpha >$ 10 dpm / 100 cm <sup>2</sup> ?	Instrument (count time)
<b>EXTERIOR WALLS</b>							
<b>North Wall</b>							
WL-1103B-263	32		199350 (2min)	WL-1103B-244	0.3		2929 (5min)
WL-1103B-264	12		199350 (2min)	WL-1103B-245	0.8		2929 (5min)
WL-1103B-265	22		199350 (2min)	WL-1103B-246	-0.3		2929 (5min)
WL-1103B-266	20		199350 (2min)	WL-1103B-247	1.8		2929 (5min)
WL-1103B-267	12		199350 (2min)	WL-1103B-248	-0.3		2929 (5min)
WL-1103B-268	22		199350 (2min)	WL-1103B-249	2.3		2929 (5min)
WL-1103B-269	22		199350 (2min)	WL-1103B-250	1.8		2929 (5min)
WL-1103B-270	22		199350 (2min)	WL-1103B-251	0.3		2929 (5min)
WL-1103B-271	16		199350 (2min)	WL-1103B-252	0.3		2929 (5min)
WL-1103B-272	8		199350 (2min)	WL-1103B-253	2.3		2929 (5min)
WL-1103B-273	8		199350 (2min)	WL-1103B-254	-0.3		2929 (5min)
WL-1103B-274	12		199350 (2min)	WL-1103B-255	0.3		2929 (5min)
<b>West Wall</b>							
WL-1103B-275	10		199350 (2min)	WL-1103B-256	2.3		2929 (5min)
WL-1103B-276	16		199350 (2min)	WL-1103B-257	-0.3		2929 (5min)

# BUILDING 1103B EXTERNAL WALL SURVEY

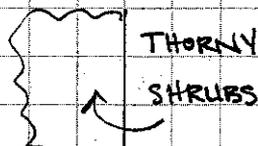
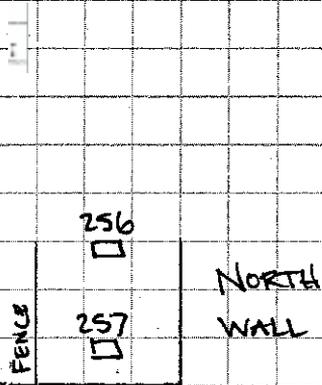
5.30.06

5'  
↔  
SCALE

TECHS:  
~~INSTRUMENT:~~  
CLARKE:  
KATELEY

INSTRUMENT:  
43-89 # 199350

Direct#	$\alpha$	$\beta$
263	19	451
264RG	5	329
264	11	430
265	14	417
266	13	385
266d	13	392
267	9	438
268	14	418
269	14	528
270	14	529
271	11	535
272	7	519
273	7	499
274	9	471
275	8	507
276	12	407
276d	17	554
276RG	4	418



WEST WALL

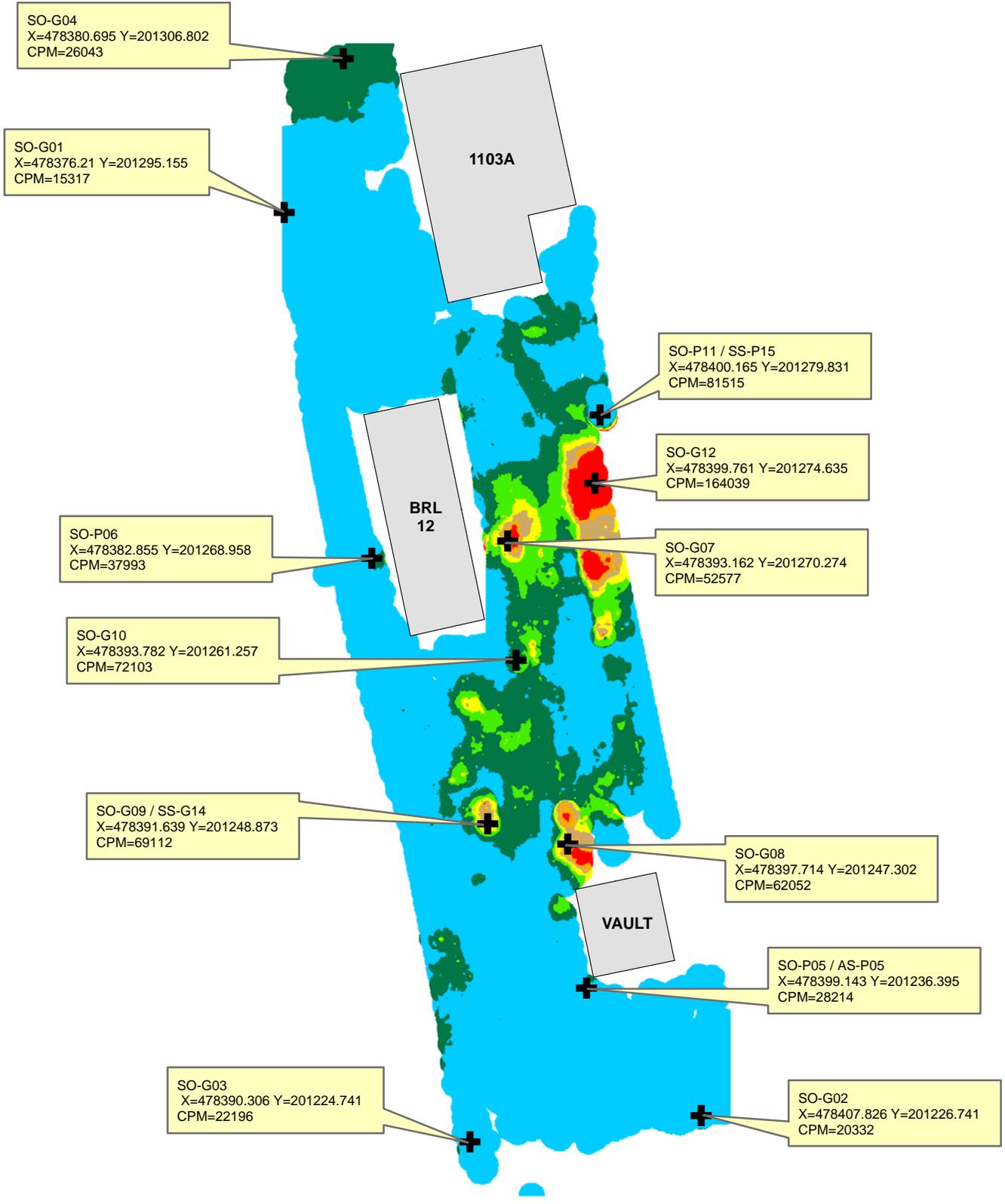
## **APPENDIX C**

### **PAVEMENT AND GROUNDS SURVEY RESULTS**

- C1: Central Asphalt Area Pavement and Grounds - Figure**
- C2: Central Asphalt Area Pavement and Grounds - Data**
- C3: Adjacent Asphalt Parking Lot**

**APPENDIX C-1**

**CENTRAL ASPHALT PAVEMENT AND GROUNDS  
SURVEY RESULTS – FIGURE**



**Legend**

- Sample Locations
- 1 m CPM Contour
- 1,960 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000
- 30,001 - 35,000
- 35,001 - 40,000
- 40,001 - 45,000
- 45,001 - 164,000

**Building 1103A Area  
Aberdeen Proving Ground, MD**

**Gamma Walkover Survey Results  
and Sample Locations**

Date: 12/2006	File Name: Fig C-1
Project #: 05-3060.06	Prepared By: BP

**Figure  
C-1**

**APPENDIX C-2**

**CENTRAL ASPHALT PAVEMENT AND GROUNDS  
SURVEY RESULTS – DATA  
(ON CD)**

**Building 1103A Area Characterization Survey  
Gamma Walkover Survey Results**

<b>CPM</b>	<b>Northing</b>	<b>Easting</b>	<b>ZSCORE</b>	<b>Surface Sample ID</b>	<b>Subsurface Sample ID</b>	<b>CPM VALUE STATISTICS</b>	
<b>164039</b>	<b>201274.635</b>	<b>478399.761</b>	<b>17.21</b>	<b>SO-G12</b>		<b>Mean</b>	<b>17834.69</b>
106438	201273.908	478400.096	10.43			<b>Standard Error</b>	<b>147.66</b>
100800	201275.31	478399.797	9.77			<b>Median</b>	<b>16185</b>
94821	201274.434	478399.74	9.06			<b>Mode</b>	<b>21298</b>
93084	201275.15	478399.541	8.86			<b>Standard Deviation</b>	<b>8494.20</b>
<b>81515</b>	<b>201279.831</b>	<b>478400.165</b>	<b>7.50</b>	<b>SO-P11</b>	<b>SS-P15</b>	<b>Sample Variance</b>	<b>72151503.47</b>
78082	201279.964	478400.42	7.09			<b>Kurtosis</b>	<b>43.71</b>
77182	201274.097	478398.15	6.99			<b>Skewness</b>	<b>4.54</b>
<b>72103</b>	<b>201261.257</b>	<b>478393.782</b>	<b>6.39</b>	<b>SO-G10</b>		<b>Range</b>	<b>162129</b>
71520	201275.996	478399.414	6.32			<b>Minimum</b>	<b>1910</b>
70500	201268.368	478399.24	6.20			<b>Maximum</b>	<b>164039</b>
<b>69112</b>	<b>201248.873</b>	<b>478391.639</b>	<b>6.04</b>	<b>SO-G09</b>	<b>SS-G14</b>	<b>Sum</b>	<b>59015003</b>
68423	201250.38	478391.371	5.96			<b>Count</b>	<b>3309</b>
67985	201273.737	478399.718	5.90				
66605	201274.796	478398.23	5.74				
<b>62052</b>	<b>201247.302</b>	<b>478397.714</b>	<b>5.21</b>	<b>SO-G08</b>			
60502	201279.957	478400.035	5.02				
57953	201268.906	478400.808	4.72				
56360	201279.966	478400.422	4.54				
56296	201273.474	478399.849	4.53				
54975	201268.978	478399.376	4.37				
54592	201272.585	478398.437	4.33				
54313	201246.919	478397.493	4.30				
52684	201249.501	478397.501	4.10				
52590	201276.756	478399.391	4.09				
<b>52577</b>	<b>201270.274</b>	<b>478393.162</b>	<b>4.09</b>	<b>SO-G07</b>			
52528	201273.271	478398.546	4.08				
52495	201246.883	478397.494	4.08				
52440	201267.678	478399.671	4.07				
52349	201263.203	478400.367	4.06				
51905	201249.883	478391.394	4.01				
51785	201246.001	478398.642	4.00				
51768	201246.993	478397.526	4.00				
51576	201249.679	478397.649	3.97				
51382	201249.564	478397.597	3.95				
51275	201248.91	478397.279	3.94				
51017	201249.457	478397.435	3.91				
50851	201249.517	478397.578	3.89				
50709	201249.335	478397.47	3.87				
49974	201249.689	478397.631	3.78				
49793	201271.142	478394.719	3.76				
49753	201270.938	478392.806	3.76				
49438	201268.28	478400.684	3.72				
49415	201249.589	478397.635	3.72				

More 3,250 additional data points available on CD.

**APPENDIX C-3**

**ADJACENT ASPHALT PARKING LOT  
SURVEY RESULTS**

Survey of parking lot east of 1103A yard

Performed 5-30-06 using 43-37 and a 2224

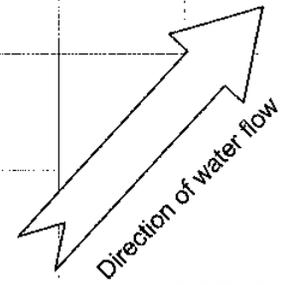


Surveyed by W. Fillingame and R Markland

Surveys in this 10m x 10m area using a 43-37 show contamination starting at the gate and dropping off to background at about 10m.

Background was ~150 CPM on the asphalt. Count rates ranged from a high of ~1000CPM to background at 10m. Contamination did seem to be concentrated in the cracks and low spots on the surface.

Survey along this (east) edge of the parking lot indicated that there is contamination in the low spots here and higher readings where the lot meets the soil. Readings from detectable above 150cpm background to 600 to 700 at the grassy edge



Building 1103B

East gate to 1103A Yard



North

**APPENDIX D**

**VOLUMETRIC SAMPLE  
COLLECTION AND ANALYSIS RESULTS**

- D1: Sample Collection Field Sheets**
- D2: Chemical Analysis Results**
- D3: Isotopic Uranium Results**
- D4: Gamma Spectroscopy Results**
- D5: Smear Sample Results**
- D6: Analytical Laboratory Data Packages (on CD)**

**APPENDIX D-1**

**SAMPLE COLLECTION FIELD SHEETS**





PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Asphalt Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID AS-POS QC SAMPLES COLLECTED n/a

**SAMPLE DATA**

DEPTH OF SAMPLE 0-0.5 FT (BGS) TYPE OF SOIL:  
 TYPE OF SAMPLE:  DISCRETE  ORGANIC  
 COMPOSITE  SAND  
 GRAVEL  
 CLAY  
 OTHER asphalt  
 LOCATION COORDINATES <sup>also 11/26/07</sup>  
~~145075/591304~~  
478399.143/201236.395

**EQUIPMENT INFORMATION**

EQUIPMENT USED: DECON FLUIDS USED:  
 HAND CORER / AUGER  DI WATER N2 PURGE  
 S.S. SPOON  POTABLE WATER  
 S.S. SHOVEL / TROWEL  LIQUINOX SOLUTION  
 S.S. SPATULA  OTHER DI Water  
 GEOPROBE  
 OTHER \_\_\_\_\_ RINSATE BLANK ID \_\_\_\_\_

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION AFTER SAMPLE COLLECTION DETECTOR METER  
28,214 cpm \_\_\_\_\_ cpm Type: 44-20 Type: 2221  
 Serial No.: PR215468 Serial No.: 218559

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

1) Black/grey chunk of asphalt, ~3" x 5" x 0.5" (plastic bag)  
 2) ~6" x 2" asphalt core, black w/white & grey stones embedded in it (wrapped separately).  
 -See SO-POS for location description.

**SAMPLE ANALYSES**

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 801.1M	None	1 @ 18 oz. plastic	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES Two asphalt samples associated with SO-POS.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6/1/06  
 LOCATION ID 1103A ACTIVITY TIME START 0730 END 0830 CONTAINER TIME —  
 FIELD SAMPLE ID CL-A13 QC SAMPLES COLLECTED n/a

<b>SAMPLE DATA</b>  TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE  LOCATION COORDINATES <u>bathroom</u>		<b>MATERIAL:</b> <input type="checkbox"/> WALLBOARD (WL) <input checked="" type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER		<b>EQUIPMENT INFORMATION</b>  EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input checked="" type="checkbox"/> OTHER <u>razor knife</u>		<b>DECON FLUIDS USED:</b> <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>  RINSATE BLANK ID _____	
--	--	---	--	--	--	--	--

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
~3" x 3" x 0.5" chunk of sheetrock ceiling tile, relatively intact w/ one corner crumbling; tan exterior and white/grey interior.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

NOTES  
Two samples were collected from this location.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6/1/06  
 LOCATION ID 1103A ACTIVITY TIME START 0730 END 0830 CONTAINER TIME -  
 FIELD SAMPLE ID CL-A15 (2) QC SAMPLES COLLECTED NIA

<b>SAMPLE DATA</b>  TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE  LOCATION COORDINATES: <u>Inner office</u>		<b>MATERIAL:</b> <input type="checkbox"/> WALLBOARD (WL) <input checked="" type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	<b>EQUIPMENT INFORMATION</b>  EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input checked="" type="checkbox"/> OTHER <u>razor knife</u>	<b>DECON FLUIDS USED:</b> <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>  RINSATE BLANK ID _____
--	--	---	--	--

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
~3" x 4" x 0.5" piece of drop-ceiling tile; harder, pebbly outer surface w/ insulation on interior side; dry.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**  
Two samples were collected from this location.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6/1/06  
 LOCATION ID 1103A-<sup>Outer</sup> office ACTIVITY TIME START 0730 END 0830 CONTAINER TIME -  
 FIELD SAMPLE ID CL-A17 (2) QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL.) <input checked="" type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input checked="" type="checkbox"/> OTHER <u>razor knife</u>	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
LOCATION COORDINATES <u>Outer office</u>			RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
~ 4" x 7" x 0.5" piece of drop-ceiling tile; harder, pebbly outer surface w/insulation on interior side; dry.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 800.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/8010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**  
Two samples were collected from this location.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 0915 END 1210 CONTAINER TIME -  
 FIELD SAMPLE ID CLPT-A01 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input checked="" type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI water</u>
LOCATION COORDINATES <u>Smear #142</u>			RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>42/275B</u> cpm	_____ cpm	Type: <u>43-89</u> Serial No.: <u>469</u>	Type: <u>2224</u> Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Grey paint chips, peeling off of ceiling.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

Location was in NW corner of main work room.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 0915 END 1210 CONTAINER TIME -  
 FIELD SAMPLE ID CLPT-A02 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input checked="" type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
LOCATION COORDINATES <u>Smear #137</u>			RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>4.2/3158</u> cpm	_____ cpm	Type: <u>43-89</u> Serial No.: <u>469</u>	Type: <u>2224</u> Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

Grey paint chips, peeling from ceiling.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

NOTES

location was in the middle of the main work room, along the east wall.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 5-26-06  
 LOCATION ID BRL12 ACTIVITY TIME START 0730 END 1200 CONTAINER TIME -  
 FIELD SAMPLE ID CLPT-B03 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input checked="" type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI water</u> RINSATE BLANK ID _____
LOCATION COORDINATES <u>Smear #188</u>			

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>1.2/1713</u> cpm	_____ cpm	Type: <u>43-89</u> Serial No.: <u>199350</u>	Type: <u>2224</u> Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Tan/cream colored paint chips, peeling from ceiling.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 800.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

Location was in main shop room.

SAMPLED BY: B. Clarke / D. Kately  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-26-06  
 LOCATION ID Vault ACTIVITY TIME START 0730 END 1200 CONTAINER TIME -  
 FIELD SAMPLE ID CLPT-C04 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input checked="" type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u> RINSATE BLANK ID _____
LOCATION COORDINATES <u>Smear #195</u>			

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>1.2/1164B</u> cpm	_____ cpm	Type: <u>43-89</u> Serial No.: <u>199350</u>	Type: <u>2224</u> Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

Rust-color paint chips, peeling from ceiling.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 800.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

NOTES

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID FL-A19 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input checked="" type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	EQUIPMENT USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u> RINSATE BLANK ID _____
LOCATION COORDINATES <u>bathroom</u>			

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-80M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 800.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

NOTES

SAMPLED BY: W. Driscoll / W. Fillingame  
 RECEIVED BY: W. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START \_\_\_\_\_ END \_\_\_\_\_ CONTAINER TIME -  
 FIELD SAMPLE ID FL-A21 QC SAMPLES COLLECTED n/a

SAMPLE DATA		MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE:	<input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input checked="" type="checkbox"/> OTHER <i>footing material</i>	EQUIPMENT USED:	DECON FLUIDS USED:
LOCATION COORDINATES	<u>Core #2</u>		<input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	<input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
				RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Black piece of footing material / expansion joint.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-80M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

NOTES  
Footing material bisected original core boring #.2 location, and was collected once boring was widened.

SAMPLED BY: W. Fillingame  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID FL-R43 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input checked="" type="checkbox"/> OTHER <u>concrete core</u>	EQUIPMENT USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
LOCATION COORDINATES <u>Core #1</u>			RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
6" cores with 6" depth.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/8010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>
<u>* Gamma spec</u>				

NOTES

SAMPLED BY: W. Fillingame  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-25-06  
 LOCATION ID 1103A ACTIVITY TIME START 0830 END 0930 CONTAINER TIME -  
 FIELD SAMPLE ID FL-R44 QC SAMPLES COLLECTED N/A

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input checked="" type="checkbox"/> OTHER <u>concrete core</u>	EQUIPMENT USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
LOCATION COORDINATES <u>Core #2</u>			RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
6" core with 6.5" depth.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

SAMPLED BY: W. Fillingame  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID FL-R45 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input checked="" type="checkbox"/> OTHER <i>concrete core</i>	EQUIPMENT USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
LOCATION COORDINATES <u>CORE #3</u>			RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
*6" core with 4" depth.*

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.D	None	1 plastic bag	<input type="checkbox"/>
<input type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/8010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

SAMPLED BY: W. Fillingame  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID FL-R46 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input checked="" type="checkbox"/> OTHER <u>concrete core</u>	EQUIPMENT USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
LOCATION COORDINATES <u>Core # 4</u>			RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS** (e.g., location, texture, color, odor, etc.)  
6" core with 5" depth.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input type="checkbox"/>
<input type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

SAMPLED BY: W. Fillingame  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID FLR47 QC SAMPLES COLLECTED N/A

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input checked="" type="checkbox"/> OTHER <u>concrete core</u>	EQUIPMENT USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____	DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
LOCATION COORDINATES <u>Core #5</u>			RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
6" core with 5" depth

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6810/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

SAMPLED BY: W. Fillingarne  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6/1/06  
 LOCATION ID 1103A ACTIVITY TIME START 0700 END 0730 CONTAINER TIME -  
 FIELD SAMPLE ID SM-A06 QC SAMPLES COLLECTED n/a

SAMPLE DATA		MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE:	<input type="checkbox"/> DISCRETE <input checked="" type="checkbox"/> COMPOSITE	<input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input checked="" type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	EQUIPMENT USED:	DECON FLUIDS USED:
LOCATION COORDINATES	<u>bathroom sink drain</u>		<input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input checked="" type="checkbox"/> OTHER <u>snake, paper towel</u>	<input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>
				RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	<u>3 <math>\mu</math>rem/hr.</u>	Type: <u>Bicron</u> Serial No.: <u>C853F</u>	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
Paper towel is wet, dark brown/tan color, moldy odor.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input type="checkbox"/>
<input checked="" type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input checked="" type="checkbox"/>
<input type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6/1/06  
 LOCATION ID Bldg 1103A ACTIVITY TIME START 0700 END 0720 CONTAINER TIME -  
 FIELD SAMPLE ID SM - A07 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input type="checkbox"/> DISCRETE	<input type="checkbox"/> WALLBOARD (WL)	EQUIPMENT USED:	DECON FLUIDS USED:
<input checked="" type="checkbox"/> COMPOSITE	<input type="checkbox"/> CEILING TILE (CL)	<input type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
LOCATION COORDINATES <u>shower drain</u>	<input type="checkbox"/> FLOOR TILE (FL)	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
	<input type="checkbox"/> PAINT CHIP (PT)	<input type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
	<input checked="" type="checkbox"/> SMEAR (SM)	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input type="checkbox"/> OTHER	<input type="checkbox"/> GEOPROBE	
		<input checked="" type="checkbox"/> OTHER <u>snake, papertowel</u>	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	<u>3 <math>\mu</math>m/hr.</u>	Type: <u>Bicron</u>	Type: _____
		Serial No.: <u>C853F</u>	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Paper towel is wet, dark orange color, moldy odor.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input type="checkbox"/>
<input checked="" type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input checked="" type="checkbox"/>
<input type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll



**CABRERA SERVICES**  
RADIOLOGICAL • ENVIRONMENTAL • REMEDIATION

**FIELD DATA RECORD**  
**VOLUMETRIC SAMPLING**

PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6/1/06  
 LOCATION ID 1103A ACTIVITY TIME START 0700 END 0720 CONTAINER TIME —  
 FIELD SAMPLE ID SM-A08 QC SAMPLES COLLECTED n/a

SAMPLE DATA	MATERIAL:	EQUIPMENT INFORMATION	
TYPE OF SAMPLE: <input type="checkbox"/> DISCRETE	<input type="checkbox"/> WALLBOARD (WL)	EQUIPMENT USED:	DECON FLUIDS USED:
<input checked="" type="checkbox"/> COMPOSITE	<input type="checkbox"/> CEILING TILE (CL)	<input type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
LOCATION COORDINATES	<input type="checkbox"/> FLOOR TILE (FL)	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
<u>washing machine drain</u>	<input type="checkbox"/> PAINT CHIP (PT)	<input type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
	<input checked="" type="checkbox"/> SMEAR (SM)	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input type="checkbox"/> OTHER	<input type="checkbox"/> GEOPROBE	RINSATE BLANK ID _____
		<input checked="" type="checkbox"/> OTHER <u>snake paper towel</u>	

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	<u>4 pcrem/hr</u>	Type: <u>Bicron</u>	Type: _____
		Serial No.: <u>0853F</u>	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Paper towel is dry with brown smudges, no odor.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input type="checkbox"/>
<input checked="" type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input checked="" type="checkbox"/>
<input type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID SO-A17 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>Core #1</u>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

Medium brown silty clay with medium plasticity, slightly moist.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/> (1)
<input checked="" type="checkbox"/> RCRA Metals (TCLP)	EPA 400.0	COOL 4°C	1 @ 80z glass	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES

Three samples were collected from the core boring, located in the SW corner of the main room, just inside the rollover door to 1103A.

SAMPLED BY: W. Fillingame / M. Driscoll

RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-25-06  
 LOCATION ID 1103A ACTIVITY TIME START 0830 END 0930 CONTAINER TIME -  
 FIELD SAMPLE ID SO-A20 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>Core #2a</u>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input type="checkbox"/> OTHER	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
Medium brown soft clay with some fines, 30% gravel, slightly moist.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/> (1)
<input checked="" type="checkbox"/> RCRA Metals (TELP)	EPA 900.0	Cool 4°C	1 @ 80z glass	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

**NOTES**  
Surface sample from this location, three samples were collected from the core boring, located in the interior rollover doorway in 1103A.

SAMPLED BY: W. Fillingame JM. Driscoll  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID SO-A30 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>Core #3</u>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
Medium brown clayey silt, low plasticity.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/> (1)
<input checked="" type="checkbox"/> RERA METALS (TCCLP)	EPA 400.0	Cool 4°C	1 @ 80Z glass	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

**NOTES**  
Three samples were collected from the core boring, located in the middle of the main room of 1103A.

SAMPLED BY: W. Fillingame / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID SO-A33 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>Core #4</u>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Light brown silty clay, soft consistency, with fine to medium gravels.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/> (1)
<input checked="" type="checkbox"/> RCRA Metals (TCLP)	EPA 900.0	Cool 4°C	1 @ 80z glass	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES  
Three samples were collected from the core boring, located in the NE area of the main room of 1103A.

SAMPLED BY: W. Fillingame / M. Driscoll  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-24-06  
 LOCATION ID 1103A ACTIVITY TIME START 1210 END 1400 CONTAINER TIME -  
 FIELD SAMPLE ID SO-A36 QC SAMPLES COLLECTED n/a

SAMPLE DATA	EQUIPMENT INFORMATION
DEPTH OF SAMPLE <u>0-0.5</u> FT.(BGS) TYPE OF SOIL: TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> ORGANIC <input type="checkbox"/> COMPOSITE <input type="checkbox"/> SAND <input type="checkbox"/> GRAVEL LOCATION COORDINATES <input checked="" type="checkbox"/> CLAY <u>Core # 5</u> <input checked="" type="checkbox"/> OTHER <u>silt</u>	EQUIPMENT USED: DECON FLUIDS USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> POTABLE WATER <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> LIQUINOX SOLUTION <input type="checkbox"/> S.S. SPATULA <input checked="" type="checkbox"/> OTHER <u>DI Water</u> <input type="checkbox"/> GEOPROBE RINSATE BLANK ID _____ <input type="checkbox"/> OTHER _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
Light to medium brown silty clay, medium plasticity.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/> (1)
<input checked="" type="checkbox"/> RCRA Metals (TELP)	EPA 900.0	Cool 4°C	1 @ 8oz glass	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

**NOTES**  
Three samples were collected from the core boring, located in the bathroom of 1103A.

SAMPLED BY: W. Fillingame / M. Driscoll  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6-1-06  
 LOCATION ID Adj. Grounds ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-601 QC SAMPLES COLLECTED n/a

SAMPLE DATA	EQUIPMENT INFORMATION
DEPTH OF SAMPLE <u>0-0.5</u> FT (EGS) TYPE OF SOIL: TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> ORGANIC <input type="checkbox"/> COMPOSITE <input checked="" type="checkbox"/> SAND <input checked="" type="checkbox"/> GRAVEL <input type="checkbox"/> CLAY <input checked="" type="checkbox"/> OTHER: <u>silt</u> LOCATION COORDINATES <u>195090.1 / 591364.2</u> <u>478376.21 / 201295.155</u>	EQUIPMENT USED: DECON FLUIDS USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> POTABLE WATER <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> LIQUINOX SOLUTION <input type="checkbox"/> S.S. SPATULA <input checked="" type="checkbox"/> OTHER: <u>DI Water</u> <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____ RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>15,317</u> cpm	_____ cpm	Type: <u>44-20</u> Serial No.: <u>PR215468</u>	Type: <u>2221</u> Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

Light grey sandy silt with small to medium gravel (40%).  
 Sample was collected at the north end of the site, in the  
 grassy area west of Building 1103A.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>

NOTES

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Buffer Zone Grounds ACTIVITY TIME START 1000 END 1455 CONTAINER TIME --  
 FIELD SAMPLE ID SO-G02 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE: <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
LOCATION COORDINATES	<input type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
<u>-145062.4 / 541243.8</u> <u>478407.826 / 201226.741</u>	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER	RINSATE BLANK ID

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>20,332</u> cpm	_____ cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
 Light grey sandy silt with 40% small to medium gravel.  
 Sample was collected in the SE corner of the site, south of the stand-alone vault.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

**NOTES**

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6-1-06  
 LOCATION ID Buffer Zone Grounds ACTIVITY TIME START 1000 END 1455 CONTAINER TIME --  
 FIELD SAMPLE ID SO-603 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>4911/06</u> <u>145080.5 / 541242.4</u> <u>478340.306 / 201224.741</u>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>22,196</u> cpm	_____ cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Light brown sandy silt, some clay.  
Sample was collected in the SW corner of the site, SW of the stand-alone vault.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

**NOTES**

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6-1-06  
 LOCATION ID Adj. Grounds ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-G04 QC SAMPLES COLLECTED n/a

SAMPLE DATA	EQUIPMENT INFORMATION
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS) TYPE OF SOIL: TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> ORGANIC <input type="checkbox"/> COMPOSITE <input checked="" type="checkbox"/> SAND <input type="checkbox"/> GRAVEL LOCATION COORDINATES <u>do 110602</u> <del>195084.9/541375.5</del> <u>478380.695/201306.802</u> <input type="checkbox"/> CLAY <input checked="" type="checkbox"/> OTHER <u>silt</u>	EQUIPMENT USED: DECON FLUIDS USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> POTABLE WATER <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> LIQUINOX SOLUTION <input type="checkbox"/> S.S. SPATULA <input checked="" type="checkbox"/> OTHER <u>DI Water</u> <input type="checkbox"/> GEOPROBE RINSATE BLANK ID _____ <input type="checkbox"/> OTHER _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>26,043</u> cpm	_____ cpm	Type: <u>44-20</u> Serial No.: <u>PR215468</u>	Type: <u>2221</u> Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Light brown sandy silt, dry  
Sample was collected at the far north end of the site,  
just NW of Building 1103A.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3080.06\_Task 3 DATE 6-1-06  
 LOCATION ID Asphalt Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-607 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE: <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
LOCATION COORDINATES <sup>NO. 11467</sup>	<input type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI water</u>
<u><del>195074.8 / 541338.3</del></u>	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
<u>478343.162 / 201270.274</u>		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>52,577</u> cpm	_____ cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

*Medium grey silty sand with 15% fine to medium gravels. Sample was collected in the middle of the site area, adjacent to the east wall of Building BR12.*

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES Gravelly surface @ sample location.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Asphalt area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-608 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES <u>195011.9 / 541315</u> <sup>40011668</sup>	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>162,052</u> cpm	_____ cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Medium to dark brown silty, sandy clay, medium to coarse gravels, low plasticity.  
Sample was collected in the south half of the site area, adjacent to the north wall of the stand-alone vault.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>

**NOTES**

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task3 DATE 6-1-06  
 LOCATION ID Asphalt Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-609 QC SAMPLES COLLECTED n/a

**SAMPLE DATA**

DEPTH OF SAMPLE 0-0.5 FT (BGS) TYPE OF SOIL:  
 TYPE OF SAMPLE:  DISCRETE  ORGANIC  
 COMPOSITE  SAND  
 GRAVEL  
 CLAY  
 OTHER silt  
 LOCATION COORDINATES 49° 11' 16.09"  
~~-145077.7 / 591317~~  
478391.639 / 201248.873

**EQUIPMENT INFORMATION**

EQUIPMENT USED: DECON FLUIDS USED:  
 HAND CORER / AUGER  DI WATER N2 PURGE  
 S.S. SPOON  POTABLE WATER  
 S.S. SHOVEL / TROWEL  LIQUINOX SOLUTION  
 S.S. SPATULA  OTHER DI Water  
 GEOPROBE  
 OTHER \_\_\_\_\_ RINSATE BLANK ID \_\_\_\_\_

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION AFTER SAMPLE COLLECTION DETECTOR METER  
69,112 cpm \_\_\_\_\_ cpm Type: 44-20 Type: 2221  
 Serial No.: PR215468 Serial No.: 218559

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Medium grey sandy silt, coarse to fine gravel (50%).  
 Sample was collected in the south half of the site area,  
 NW of the stand-alone vault.

**SAMPLE ANALYSES**

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 801.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

**NOTES**

Gravelly surface, yellow soil.  
 Surface sample associated with SS-614.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6-1-06  
 LOCATION ID Asphalt Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-G10 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>do 11668</u> <u>195074.7/541324.2</u>	<input type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
<u>478393.782/201261.257</u>	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	RINSATE BLANK ID _____
		<input type="checkbox"/> OTHER _____	

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>72,103</u> cpm	_____ cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

*Dark grey/green sandy silt with 25% coarse gravels.  
 Sample was collected in the middle of the site area,  
 adjacent to the SE corner of Building BRL12.*

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES Gravelly surface @ sample location.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6-1-06  
 LOCATION ID Asphalt Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-G12 QC SAMPLES COLLECTED n/a

SAMPLE DATA	EQUIPMENT INFORMATION
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS) TYPE OF SOIL: TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> ORGANIC <input type="checkbox"/> COMPOSITE <input checked="" type="checkbox"/> SAND <input checked="" type="checkbox"/> GRAVEL <input type="checkbox"/> CLAY <input checked="" type="checkbox"/> OTHER <u>silt</u> LOCATION COORDINATES <sup>do not use</sup> <del>145067.9/541342.2</del> <u>478399.761/201274.635</u>	EQUIPMENT USED: DECON FLUIDS USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> POTABLE WATER <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> LIQUINOX SOLUTION <input type="checkbox"/> S.S. SPATULA <input checked="" type="checkbox"/> OTHER <u>DI Water</u> <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____ RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>164,039</u> cpm	_____ cpm	Type: <u>44-20</u> Serial No.: <u>PR215468</u>	Type: <u>2221</u> Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Light grey sandy silt with 30% small to large gravel.  
Sample was collected from the eastern edge of the site area, directly east of Building BRL12.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz, plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID 1103A ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-G39 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (EGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>1103A downspout</u>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

light brown silty clay, low plasticity, 1% gravel.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>

**NOTES**

SAMPLED BY: B. Clarke

RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID BRL12 ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-640 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE: <u>0-0.5 FT (BGS)</u>	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
LOCATION COORDINATES	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
<u>BRL12 downspout</u>	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Dark grey clayey, sandy silt with small to medium gravel (10%), low plasticity.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES

SAMPLED BY: B. Clarke  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Vault Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-642 QC SAMPLES COLLECTED n/a

SAMPLE DATA	EQUIPMENT INFORMATION
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS) TYPE OF SOIL: TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> ORGANIC <input type="checkbox"/> COMPOSITE <input checked="" type="checkbox"/> SAND <input type="checkbox"/> GRAVEL LOCATION COORDINATES <u>Grassy area south of vault</u> <input checked="" type="checkbox"/> CLAY <input checked="" type="checkbox"/> OTHER <u>silt</u>	EQUIPMENT USED: DECON FLUIDS USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> POTABLE WATER <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> LIQUINOX SOLUTION <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> OTHER _____ <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____ RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____ Serial No.: _____	Type: _____ Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Medium brown sandy silt, few small gravels, very low plasticity.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>

**NOTES**

Sampling location was added to initial list, no GPS coordinates or surface  $\alpha$ -readings were collected.

SAMPLED BY: D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6-1-06  
 LOCATION ID Asphalt Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-POS QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
LOCATION COORDINATES <sup>to 11/6/07</sup>	<input type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
<u>-145075/591304</u>	<input type="checkbox"/> OTHER	<input type="checkbox"/> GEOPROBE	
<u>478399.143/201236.395</u>		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>28,214</u> cpm	_____ cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR 215468</u>	Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Greenish-grey medium gravel with fines, sandy soil.  
Sample was collected at the south end of the site area,  
adjacent to the SW corner of the stand-alone vault.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES  
Surface soil sample associated with AS-POS (2 samples of asphalt).

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Buffer Zone Grounds ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-PO6 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE: <u>0-0.5'</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>195085.2 / 541337.6</u> <i>dep. 11/16/06</i>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
<u>478382.855 / 201268.958</u>	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>37,493</u> cpm	_____ cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Medium greenish-grey with reddish-orange pieces; clayey, sandy, silt, low plasticity with 5% gravel.  
Sample was collected in the middle of the site area, adjacent to the west wall of Building BRL12.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>

NOTES

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06\_Task 3 DATE 6-1-06  
 LOCATION ID Buffer Zone Asphalt ACTIVITY TIME START 1000 END 1455 CONTAINER TIME --  
 FIELD SAMPLE ID SO-P11 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE: <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES <sup>dro 11/16/07</sup>	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>145067.2 / 541347.4</u>	<input type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
<u>478400.165 / 201279.831</u>	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	RINSATE BLANK ID _____
		<input type="checkbox"/> OTHER _____	

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>61,000</u> cpm	<u>81,515</u> cpm	Type: <u>44-20</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Dark brown sandy silt, slightly moist.  
Sample was collected at the eastern edge of the site area,  
east of Building BRL12 and north of SO-G12.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>
<input type="checkbox"/>					<input type="checkbox"/>

NOTES Surface sample associated with SS-P15.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Buffer zone Asphalt ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SO-P13 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-0.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input checked="" type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>E of BRL12, SE of 1103A</u>	<input type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)

1) Surface sediment on asphalt; medium brown silty sand with organics.  
 2) Soil under asphalt; light brown sandy silt.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES Two samples were collected at this location. No GPS coordinates or surface  $\gamma$ -readings were available.

SAMPLED BY: W. Fillingame  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-25-06  
 LOCATION ID 1103A ACTIVITY TIME START 0830 END 0930 CONTAINER TIME -  
 FIELD SAMPLE ID SS-A24 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0.5-1</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>Core #2b</u>	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input type="checkbox"/> OTHER	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Medium brown soft clay with some fines, 5% gravel, slightly moist.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/> (1)
<input checked="" type="checkbox"/> RCRA Metals (TCLP)	EPA 900.0	Cold 4°C	1 @ 8oz glass	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES  
One of two subsurface depths at this location, three samples were collected from the core boring, located in the interior rollover doorway in 1103A.

SAMPLED BY: W. Fillingame / M. Driscoll  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-25-06  
 LOCATION ID 1103A ACTIVITY TIME START 0830 END 0430 CONTAINER TIME -  
 FIELD SAMPLE ID SS-A27 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0-1.5</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES <u>Core # 2c</u>	<input type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
	<input checked="" type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER _____	RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Medium brown silty clay, medium plasticity.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/> (1)
<input checked="" type="checkbox"/> RCRA Metals (TELP)	EPA 900.0	Cool 4°C	1 @ 8oz glass	<input checked="" type="checkbox"/> (2)
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES  
One of two subsurface depths at this location, three samples were collected from the core boring, located in the interior rollover doorway in 1103A.

SAMPLED BY: W. Fillingame / M. Driscoll  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Asphalt Area ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SS-G14 QC SAMPLES COLLECTED n/a

SAMPLE DATA		EQUIPMENT INFORMATION	
DEPTH OF SAMPLE <u>0.5-1</u> FT (BGS)	TYPE OF SOIL:	EQUIPMENT USED:	DECON FLUIDS USED:
TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE	<input type="checkbox"/> ORGANIC	<input checked="" type="checkbox"/> HAND CORER / AUGER	<input type="checkbox"/> DI WATER N2 PURGE
<input type="checkbox"/> COMPOSITE	<input checked="" type="checkbox"/> SAND	<input type="checkbox"/> S.S. SPOON	<input type="checkbox"/> POTABLE WATER
LOCATION COORDINATES <sup>470116107</sup>	<input checked="" type="checkbox"/> GRAVEL	<input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL	<input type="checkbox"/> LIQUINOX SOLUTION
<u>145077.7 / 591317</u>	<input type="checkbox"/> CLAY	<input type="checkbox"/> S.S. SPATULA	<input checked="" type="checkbox"/> OTHER <u>DI Water</u>
<u>478311.639 / 201248.837</u>	<input checked="" type="checkbox"/> OTHER <u>silt</u>	<input type="checkbox"/> GEOPROBE	
		<input type="checkbox"/> OTHER	RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>69,112</u> cpm	_____ cpm	Type: <u>4420</u>	Type: <u>2221</u>
		Serial No.: <u>PR215468</u>	Serial No.: <u>218559</u>

SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)  
Greenish-grey silty, sandy soil with well-graded gravel.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

NOTES Subsurface sample associated with SO-G09.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06  
 LOCATION ID Buffer zone Asphalt ACTIVITY TIME START 1000 END 1455 CONTAINER TIME -  
 FIELD SAMPLE ID SS-P15 QC SAMPLES COLLECTED n/a

SAMPLE DATA	EQUIPMENT INFORMATION
DEPTH OF SAMPLE <u>0.5-1</u> FT (BGS) TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> ORGANIC <input type="checkbox"/> COMPOSITE <input type="checkbox"/> SAND <input type="checkbox"/> GRAVEL LOCATION COORDINATES <u>478400.165/201279.831</u> <del>195067.2/591347.4</del>	EQUIPMENT USED: <input checked="" type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> POTABLE WATER <input checked="" type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> LIQUINOX SOLUTION <input type="checkbox"/> S.S. SPATULA <input checked="" type="checkbox"/> OTHER <u>DI Water</u> <input type="checkbox"/> GEOPROBE <input type="checkbox"/> OTHER _____ RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
<u>61,000</u> cpm	<u>81,515</u> cpm	Type: <u>44-20</u> Serial No.: <u>PR215468</u>	Type: <u>2221</u> Serial No.: <u>218559</u>

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**

Dark grey silty sand with 15% gravels, slightly moist. See SO-P11 for location description.

SAMPLE ANALYSES	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>
<input type="checkbox"/>				<input type="checkbox"/>

**NOTES** Subsurface sample associated with SO-P11.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5/25/06  
 LOCATION ID 1103A ACTIVITY TIME START 1000 END 1100 CONTAINER TIME -  
 FIELD SAMPLE ID WL-A05 QC SAMPLES COLLECTED n/a

<b>SAMPLE DATA</b>  TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE  LOCATION COORDINATES <u>Smear #171</u>	<b>MATERIAL:</b> <input type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input checked="" type="checkbox"/> OTHER <u>filtermat.</u>	<b>EQUIPMENT INFORMATION</b>  EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input checked="" type="checkbox"/> OTHER <u>razor knife</u>
		DECON FLUIDS USED: <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>  RINSATE BLANK ID _____

**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
white/grey filter netting w/a dark brown/light brown soft, fuzzy material and small pieces of paper-like material.

SAMPLE ANALYSES	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/>	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/>	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input type="checkbox"/>	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/>	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**  
Filter was collected from west wall between main work area and office area.

SAMPLED BY: B. Clarke ID. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6/1/06  
 LOCATION ID 1103A ACTIVITY TIME START 0730 END 0830 CONTAINER TIME -  
 FIELD SAMPLE ID WL-A09 QC SAMPLES COLLECTED n/a

<b>SAMPLE DATA</b>  TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE  LOCATION COORDINATES <u>wall 11a, smear #109</u>		<b>MATERIAL:</b> <input checked="" type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	<b>EQUIPMENT INFORMATION</b>  EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input checked="" type="checkbox"/> OTHER <u>razor knife</u>	<b>DECON FLUIDS USED:</b> <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI Water</u>  RINSATE BLANK ID _____
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**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
~2" x 3" x 0.5" chunk of sheetrock, relatively intact (not much crumbling), dark tan exterior w/ white & grey interior.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**  
Two samples were collected from this location.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll



PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6/1/06  
 LOCATION ID 1103A ACTIVITY TIME START 0730 END 0830 CONTAINER TIME -  
 FIELD SAMPLE ID WL-A11 (2) QC SAMPLES COLLECTED n/a

<b>SAMPLE DATA</b>  TYPE OF SAMPLE: <input checked="" type="checkbox"/> DISCRETE <input type="checkbox"/> COMPOSITE  LOCATION COORDINATES <u>Wall 4, smear #118</u>		<b>MATERIAL:</b> <input checked="" type="checkbox"/> WALLBOARD (WL) <input type="checkbox"/> CEILING TILE (CL) <input type="checkbox"/> FLOOR TILE (FL) <input type="checkbox"/> PAINT CHIP (PT) <input type="checkbox"/> SMEAR (SM) <input type="checkbox"/> OTHER	<b>EQUIPMENT INFORMATION</b>  EQUIPMENT USED: <input type="checkbox"/> HAND CORER / AUGER <input type="checkbox"/> S.S. SPOON <input type="checkbox"/> S.S. SHOVEL / TROWEL <input type="checkbox"/> S.S. SPATULA <input type="checkbox"/> GEOPROBE <input checked="" type="checkbox"/> OTHER <u>razor knife</u>	<b>DECON FLUIDS USED:</b> <input type="checkbox"/> DI WATER N2 PURGE <input type="checkbox"/> POTABLE WATER <input type="checkbox"/> LIQUINOX SOLUTION <input checked="" type="checkbox"/> OTHER <u>DI water</u>  RINSATE BLANK ID: _____
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**RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION**

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	_____ cpm	Type: _____	Type: _____
		Serial No.: _____	Serial No.: _____

**SAMPLE OBSERVATIONS (e.g., location, texture, color, odor, etc.)**  
~2" x 2" x 0.5" chunk of sheetrock, white/grey, dry and crumbly.

PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
<input checked="" type="checkbox"/> ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	<input checked="" type="checkbox"/>
<input type="checkbox"/> GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	<input type="checkbox"/>
<input checked="" type="checkbox"/> RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	<input checked="" type="checkbox"/>
<input type="checkbox"/> PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	<input type="checkbox"/>
<input type="checkbox"/> ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	<input type="checkbox"/>

**NOTES**  
Two samples were collected from this location.

SAMPLED BY: B. Clarke / D. Kateley  
 RECEIVED BY: M. Driscoll

**APPENDIX D-2**

**CHEMICAL ANALYSIS RESULTS**

**Building 1103A Area Characterization  
Metals and PCB Results**

Field ID	Parameter	Result	Units	PRL	Flag	Suite	Analytical		Order Number
							Method	Matrix	
CL-A13	AROCLOR-1016	710	UG/KG	710	U	PEST/PCB	SW8082	SOLID	606029
CL-A13	AROCLOR-1221	1400	UG/KG	1400	U	PEST/PCB	SW8082	SOLID	606029
CL-A13	AROCLOR-1232	710	UG/KG	710	U	PEST/PCB	SW8082	SOLID	606029
CL-A13	AROCLOR-1242	710	UG/KG	710	U	PEST/PCB	SW8082	SOLID	606029
CL-A13	AROCLOR-1248	710	UG/KG	710	U	PEST/PCB	SW8082	SOLID	606029
CL-A13	AROCLOR-1254	710	UG/KG	710	U	PEST/PCB	SW8082	SOLID	606029
CL-A13	AROCLOR-1260	710	UG/KG	710	U	PEST/PCB	SW8082	SOLID	606029
CL-A13	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CL-A13	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
CL-A13	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CL-A13	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CL-A13	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
CL-A13	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
CL-A13	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CL-A13	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CL-A15	AROCLOR-1016	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A15	AROCLOR-1221	2000	UG/KG	2000	U	PEST/PCB	SW8082	SOLID	606029
CL-A15	AROCLOR-1232	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A15	AROCLOR-1242	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A15	AROCLOR-1248	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A15	AROCLOR-1254	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A15	AROCLOR-1260	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A15	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CL-A15	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
CL-A15	CADMIUM	0.17	MG/L	0.05		METALS	SW6010	LEACHATE	606029
CL-A15	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CL-A15	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
CL-A15	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
CL-A15	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CL-A15	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CL-A17	AROCLOR-1016	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A17	AROCLOR-1221	2000	UG/KG	2000	U	PEST/PCB	SW8082	SOLID	606029
CL-A17	AROCLOR-1232	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A17	AROCLOR-1242	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A17	AROCLOR-1248	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A17	AROCLOR-1254	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A17	AROCLOR-1260	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CL-A17	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029

**Building 1103A Area Characterization  
Metals and PCB Results**

Field ID	Parameter	Result	Units	PRL	Flag	Suite	Analytical		Order Number
							Method	Matrix	
CL-A17	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
CL-A17	CADMIUM	0.17	MG/L	0.05		METALS	SW6010	LEACHATE	606029
CL-A17	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CL-A17	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
CL-A17	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
CL-A17	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CL-A17	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-A01	AROCLOR-1016	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A01	AROCLOR-1221	2000	UG/KG	2000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A01	AROCLOR-1232	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A01	AROCLOR-1242	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A01	AROCLOR-1248	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A01	AROCLOR-1254	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A01	AROCLOR-1260	980	UG/KG	980	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A01	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-A01	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
CLPT-A01	CADMIUM	0.072	MG/L	0.05		METALS	SW6010	LEACHATE	606029
CLPT-A01	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-A01	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
CLPT-A01	MERCURY	0.027	MG/L	0.002		METALS	SW7470	LEACHATE	606029
CLPT-A01	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CLPT-A01	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-A02	AROCLOR-1016	950	UG/KG	950	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A02	AROCLOR-1221	1900	UG/KG	1900	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A02	AROCLOR-1232	950	UG/KG	950	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A02	AROCLOR-1242	950	UG/KG	950	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A02	AROCLOR-1248	950	UG/KG	950	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A02	AROCLOR-1254	950	UG/KG	950	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A02	AROCLOR-1260	950	UG/KG	950	U	PEST/PCB	SW8082	SOLID	606029
CLPT-A02	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-A02	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
CLPT-A02	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CLPT-A02	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-A02	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
CLPT-A02	MERCURY	0.032	MG/L	0.002		METALS	SW7470	LEACHATE	606029
CLPT-A02	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CLPT-A02	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-B03	AROCLOR-1016	960	UG/KG	960	U	PEST/PCB	SW8082	SOLID	606029

**Building 1103A Area Characterization  
Metals and PCB Results**

Field ID	Parameter	Result	Units	PRL	Flag	Suite	Analytical Method	Matrix	Order Number
CLPT-B03	AROCLOR-1221	1900	UG/KG	1900	U	PEST/PCB	SW8082	SOLID	606029
CLPT-B03	AROCLOR-1232	960	UG/KG	960	U	PEST/PCB	SW8082	SOLID	606029
CLPT-B03	AROCLOR-1242	960	UG/KG	960	U	PEST/PCB	SW8082	SOLID	606029
CLPT-B03	AROCLOR-1248	960	UG/KG	960	U	PEST/PCB	SW8082	SOLID	606029
CLPT-B03	AROCLOR-1254	960	UG/KG	960	U	PEST/PCB	SW8082	SOLID	606029
CLPT-B03	AROCLOR-1260	960	UG/KG	960	U	PEST/PCB	SW8082	SOLID	606029
CLPT-B03	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-B03	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
CLPT-B03	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CLPT-B03	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-B03	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
CLPT-B03	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
CLPT-B03	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CLPT-B03	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-C04	AROCLOR-1016	1000	UG/KG	1000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-C04	AROCLOR-1221	2000	UG/KG	2000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-C04	AROCLOR-1232	1000	UG/KG	1000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-C04	AROCLOR-1242	1000	UG/KG	1000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-C04	AROCLOR-1248	1000	UG/KG	1000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-C04	AROCLOR-1254	1000	UG/KG	1000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-C04	AROCLOR-1260	1000	UG/KG	1000	U	PEST/PCB	SW8082	SOLID	606029
CLPT-C04	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
CLPT-C04	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
CLPT-C04	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CLPT-C04	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
<b>CLPT-C04</b>	<b>LEAD</b>	<b>21</b>	<b>MG/L</b>	<b>0.03</b>		<b>METALS</b>	<b>SW6010</b>	<b>LEACHATE</b>	<b>606029</b>
CLPT-C04	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
CLPT-C04	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
CLPT-C04	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
FL-A19	AROCLOR-1016	680	UG/KG	680	U	PEST/PCB	SW8082	SOLID	606029
FL-A19	AROCLOR-1221	1400	UG/KG	1400	U	PEST/PCB	SW8082	SOLID	606029
FL-A19	AROCLOR-1232	680	UG/KG	680	U	PEST/PCB	SW8082	SOLID	606029
FL-A19	AROCLOR-1242	680	UG/KG	680	U	PEST/PCB	SW8082	SOLID	606029
FL-A19	AROCLOR-1248	680	UG/KG	680	U	PEST/PCB	SW8082	SOLID	606029
FL-A19	AROCLOR-1254	680	UG/KG	680	U	PEST/PCB	SW8082	SOLID	606029
FL-A19	AROCLOR-1260	680	UG/KG	680	U	PEST/PCB	SW8082	SOLID	606029
FL-A19	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
FL-A19	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029

**Building 1103A Area Characterization  
Metals and PCB Results**

Field ID	Parameter	Result	Units	PRL	Flag	Suite	Analytical		
							Method	Matrix	Order Number
FL-A19	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
FL-A19	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
FL-A19	LEAD	0.094	MG/L	0.03		METALS	SW6010	LEACHATE	606029
FL-A19	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
FL-A19	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
FL-A19	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A17	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A17	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
SO-A17	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A17	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A17	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
SO-A17	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
SO-A17	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A17	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A21	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A21	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
SO-A21	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A21	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A21	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
SO-A21	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
SO-A21	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A21	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A30	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A30	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
SO-A30	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A30	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A30	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
SO-A30	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
SO-A30	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A30	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A33	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A33	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
SO-A33	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A33	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A33	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
SO-A33	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
SO-A33	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A33	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029

**Building 1103A Area Characterization  
Metals and PCB Results**

Field ID	Parameter	Result	Units	PRL	Flag	Suite	Analytical		Order Number
							Method	Matrix	
SO-A36	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A36	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
SO-A36	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A36	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SO-A36	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
SO-A36	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
SO-A36	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SO-A36	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SS-A24	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SS-A24	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
SS-A24	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SS-A24	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SS-A24	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
SS-A24	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
SS-A24	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SS-A24	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SS-A27	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SS-A27	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
SS-A27	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SS-A27	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
SS-A27	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
SS-A27	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
SS-A27	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
SS-A27	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
WL-A09	AROCLOR-1016	760	UG/KG	760	U	PEST/PCB	SW8082	SOLID	606029
WL-A09	AROCLOR-1221	1500	UG/KG	1500	U	PEST/PCB	SW8082	SOLID	606029
WL-A09	AROCLOR-1232	760	UG/KG	760	U	PEST/PCB	SW8082	SOLID	606029
WL-A09	AROCLOR-1242	760	UG/KG	760	U	PEST/PCB	SW8082	SOLID	606029
WL-A09	AROCLOR-1248	760	UG/KG	760	U	PEST/PCB	SW8082	SOLID	606029
WL-A09	AROCLOR-1254	760	UG/KG	760	U	PEST/PCB	SW8082	SOLID	606029
WL-A09	AROCLOR-1260	760	UG/KG	760	U	PEST/PCB	SW8082	SOLID	606029
WL-A09	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
WL-A09	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
WL-A09	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
WL-A09	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
WL-A09	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
WL-A09	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
WL-A09	SELENIUM	0.051	MG/L	0.05		METALS	SW6010	LEACHATE	606029

**Building 1103A Area Characterization  
Metals and PCB Results**

Field ID	Parameter	Result	Units	PRL	Flag	Suite	Analytical Method	Matrix	Order Number
WL-A09	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
WL-A11	AROCLOR-1016	580	UG/KG	580	U	PEST/PCB	SW8082	SOLID	606029
WL-A11	AROCLOR-1221	1200	UG/KG	1200	U	PEST/PCB	SW8082	SOLID	606029
WL-A11	AROCLOR-1232	580	UG/KG	580	U	PEST/PCB	SW8082	SOLID	606029
WL-A11	AROCLOR-1242	580	UG/KG	580	U	PEST/PCB	SW8082	SOLID	606029
WL-A11	AROCLOR-1248	580	UG/KG	580	U	PEST/PCB	SW8082	SOLID	606029
WL-A11	AROCLOR-1254	580	UG/KG	580	U	PEST/PCB	SW8082	SOLID	606029
WL-A11	AROCLOR-1260	580	UG/KG	580	U	PEST/PCB	SW8082	SOLID	606029
WL-A11	ARSENIC	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
WL-A11	BARIUM	1	MG/L	1	U	METALS	SW6010	LEACHATE	606029
WL-A11	CADMIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
WL-A11	CHROMIUM	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
WL-A11	LEAD	0.03	MG/L	0.03	U	METALS	SW6010	LEACHATE	606029
WL-A11	MERCURY	0.002	MG/L	0.002	U	METALS	SW7470	LEACHATE	606029
WL-A11	SELENIUM	0.05	MG/L	0.05	U	METALS	SW6010	LEACHATE	606029
WL-A11	SILVER	0.1	MG/L	0.1	U	METALS	SW6010	LEACHATE	606029
<b>NOTES:</b>									
Bold text and yellow highlighting indicate that the sample exceeded the 40 CFR 261.25 toxicity characteristic for the respective constituent.									
U = The compound was analyzed for but not detected.									

**APPENDIX D-3**

**ISOTOPIC URANIUM RESULTS**

**Building 1103A Area Characterization  
Isotopic Uranium Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical		
							Method	Matrix	Order Number
AS-P05- Bottom	U-234	1.8	+/- 0.35	pCi/g	0.04		714R9	SOLID	606044
AS-P05- Bottom	U-235	0.221	+/- 0.082	pCi/g	0.038		714R9	SOLID	606044
AS-P05- Bottom	U-238	10.3	+/- 1.7	pCi/g	0		714R9	SOLID	606044
AS-P05- Top	U-234	0.39	+/- 0.12	pCi/g	0.04		714R9	SOLID	606044
AS-P05- Top	U-235	0.034	+/- 0.033	pCi/g	0.038	U	714R9	SOLID	606044
AS-P05- Top	U-238	2.07	+/- 0.41	pCi/g	0.04		714R9	SOLID	606044
CL-A13	U-234	0.42	+/- 0.12	pCi/g	0.04		714R9	SOLID	606044
CL-A13	U-235	0.033	+/- 0.032	pCi/g	0.037	U	714R9	SOLID	606044
CL-A13	U-238	2.37	+/- 0.45	pCi/g	0.02		714R9	SOLID	606044
CL-A15	U-234	0.67	+/- 0.17	pCi/g	0.04		714R9	SOLID	606044
CL-A15	U-235	0.1	+/- 0.058	pCi/g	0.021		714R9	SOLID	606044
CL-A15	U-238	4.33	+/- 0.79	pCi/g	0.04		714R9	SOLID	606044
CL-A17	U-234	2.19	+/- 0.42	pCi/g	0.03		714R9	SOLID	606044
CL-A17	U-235	0.246	+/- 0.089	pCi/g	0.018		714R9	SOLID	606044
CL-A17	U-238	16.9	+/- 2.8	pCi/g	0		714R9	SOLID	606044
CLPT-A01	U-234	0.94	+/- 0.21	pCi/g	0.06		714R9	SOLID	606029
CLPT-A01	U-235	0.15	+/- 0.07	pCi/g	0.062		714R9	SOLID	606029
CLPT-A01	U-238	4.72	+/- 0.83	pCi/g	0.05		714R9	SOLID	606029
CLPT-A02	U-234	1.77	+/- 0.35	pCi/g	0.04		714R9	SOLID	606029
CLPT-A02	U-235	0.16	+/- 0.069	pCi/g	0.04		714R9	SOLID	606029
CLPT-A02	U-238	10.3	+/- 1.7	pCi/g	0		714R9	SOLID	606029
CLPT-B03	U-234	0.73	+/- 0.18	pCi/g	0.04		714R9	SOLID	606029
CLPT-B03	U-235	0.216	+/- 0.085	pCi/g	0.019		714R9	SOLID	606029
CLPT-B03	U-238	4.24	+/- 0.76	pCi/g	0.04		714R9	SOLID	606029
CLPT-C04	U-234	0.104	+/- 0.055	pCi/g	0.059		714R9	SOLID	606029
CLPT-C04	U-235	0.005	+/- 0.024	pCi/g	0.052	U	714R9	SOLID	606029
CLPT-C04	U-238	0.12	+/- 0.058	pCi/g	0.051		714R9	SOLID	606029
FL-A19	U-234	1.41	+/- 0.27	pCi/g	0.03		714R9	SOLID	606029
FL-A19	U-235	0.144	+/- 0.053	pCi/g	0.02		714R9	SOLID	606029
FL-A19	U-238	5.52	+/- 0.94	pCi/g	0.04		714R9	SOLID	606029
<b>FL-A21</b>	<b>U-234</b>	<b>11.1</b>	<b>+/- 2</b>	<b>pCi/g</b>	<b>0.1</b>	<b>Y2</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
<b>FL-A21</b>	<b>U-235</b>	<b>1.24</b>	<b>+/- 0.32</b>	<b>pCi/g</b>	<b>0.08</b>	<b>Y2</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
<b>FL-A21</b>	<b>U-238</b>	<b>85</b>	<b>+/- 15</b>	<b>pCi/g</b>	<b>0</b>	<b>Y2</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
FL-R43- Bottom	U-234	0.069	+/- 0.053	pCi/g	0.081	U	714R9	SOLID	606044
FL-R43- Bottom	U-235	0.011	+/- 0.031	pCi/g	0.069	U	714R9	SOLID	606044
FL-R43- Bottom	U-238	0.089	+/- 0.054	pCi/g	0.064	LT	714R9	SOLID	606044
FL-R43- Top	U-234	2.21	+/- 0.43	pCi/g	0.04		714R9	SOLID	606044

**Building 1103A Area Characterization  
Isotopic Uranium Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical			
							Method	Matrix	Order Number	
FL-R43- Top	U-235	0.35	+/-	0.12	pCi/g	0.02		714R9	SOLID	606044
FL-R43- Top	U-238	15.5	+/-	2.6	pCi/g	0		714R9	SOLID	606044
FL-R44- Bottom	U-234	0.303	+/-	0.099	pCi/g	0.032		714R9	SOLID	606044
FL-R44- Bottom	U-235	0.07	+/-	0.047	pCi/g	0.038	LT	714R9	SOLID	606044
FL-R44- Bottom	U-238	1.65	+/-	0.34	pCi/g	0.04		714R9	SOLID	606044
FL-R44- Top	U-234	1.07	+/-	0.23	pCi/g	0.03		714R9	SOLID	606044
FL-R44- Top	U-235	0.096	+/-	0.053	pCi/g	0.034	LT	714R9	SOLID	606044
FL-R44- Top	U-238	7.5	+/-	1.3	pCi/g	0		714R9	SOLID	606044
FL-R45- Bottom	U-234	0.114	+/-	0.055	pCi/g	0.04		714R9	SOLID	606044
FL-R45- Bottom	U-235	-0.004	+/-	0.024	pCi/g	0.042	U	714R9	SOLID	606044
FL-R45- Bottom	U-238	0.208	+/-	0.078	pCi/g	0.044		714R9	SOLID	606044
FL-R45- Top	U-234	6.4	+/-	1.1	pCi/g	0.1		714R9	SOLID	606044
FL-R45- Top	U-235	1.17	+/-	0.26	pCi/g	0.06		714R9	SOLID	606044
FL-R45- Top	U-238	47.7	+/-	7.8	pCi/g	0		714R9	SOLID	606044
FL-R46- Bottom	U-234	0.122	+/-	0.054	pCi/g	0.045	Y1	714R9	SOLID	606044
FL-R46- Bottom	U-235	0.009	+/-	0.02	pCi/g	0.029	Y1,U	714R9	SOLID	606044
FL-R46- Bottom	U-238	0.121	+/-	0.054	pCi/g	0.047	Y1	714R9	SOLID	606044
<b>FL-R46- Top</b>	<b>U-234</b>	<b>17</b>	<b>+/-</b>	<b>3</b>	<b>pCi/g</b>	<b>0.2</b>	<b>Y2,M3</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
<b>FL-R46- Top</b>	<b>U-235</b>	<b>1.71</b>	<b>+/-</b>	<b>0.4</b>	<b>pCi/g</b>	<b>0.13</b>	<b>Y2,M3</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
<b>FL-R46- Top</b>	<b>U-238</b>	<b>132</b>	<b>+/-</b>	<b>23</b>	<b>pCi/g</b>	<b>0</b>	<b>Y2,M3</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
FL-R47- Bottom	U-234	0.109	+/-	0.056	pCi/g	0.054		714R9	SOLID	606044
FL-R47- Bottom	U-235	0.001	+/-	0.024	pCi/g	0.048	U	714R9	SOLID	606044
FL-R47- Bottom	U-238	0.143	+/-	0.063	pCi/g	0.045		714R9	SOLID	606044
FL-R47- Top	U-234	0.128	+/-	0.058	pCi/g	0.03		714R9	SOLID	606044
FL-R47- Top	U-235	0.018	+/-	0.024	pCi/g	0.035	U	714R9	SOLID	606044
FL-R47- Top	U-238	0.243	+/-	0.085	pCi/g	0.04		714R9	SOLID	606044
SM-A06	U-234	1.08	+/-	0.26	pCi/g	0.06		714R9	SOLID	606044
SM-A06	U-235	0.065	+/-	0.052	pCi/g	0.056	LT	714R9	SOLID	606044
SM-A06	U-238	8.3	+/-	1.5	pCi/g	0.1		714R9	SOLID	606044
SM-A07	U-234	0.57	+/-	0.15	pCi/g	0.07		714R9	SOLID	606044
SM-A07	U-235	0.125	+/-	0.062	pCi/g	0.049		714R9	SOLID	606044
SM-A07	U-238	3.96	+/-	0.71	pCi/g	0.05		714R9	SOLID	606044
SM-A08	U-234	1.17	+/-	0.25	pCi/g	0.07		714R9	SOLID	606044
SM-A08	U-235	0.237	+/-	0.091	pCi/g	0.053		714R9	SOLID	606044
SM-A08	U-238	9.2	+/-	1.6	pCi/g	0		714R9	SOLID	606044
<b>WL-A05</b>	<b>U-234</b>	<b>13.7</b>	<b>+/-</b>	<b>2.6</b>	<b>pCi/g</b>	<b>0.1</b>	<b>Y2,M3</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
<b>WL-A05</b>	<b>U-235</b>	<b>1.78</b>	<b>+/-</b>	<b>0.44</b>	<b>pCi/g</b>	<b>0.12</b>	<b>Y2,M3</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>

**Building 1103A Area Characterization  
Isotopic Uranium Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical Method	Matrix	Order Number	
<b>WL-A05</b>	<b>U-238</b>	<b>99</b>	<b>+/-</b>	<b>18</b>	<b>pCi/g</b>	<b>0</b>	<b>Y2</b>	<b>714R9</b>	<b>SOLID</b>	<b>606044</b>
WL-A09	U-234	0.215	+/-	0.08	pCi/g	0.041		714R9	SOLID	606044
WL-A09	U-235	0.034	+/-	0.031	pCi/g	0.018	LT	714R9	SOLID	606044
WL-A09	U-238	0.207		0.078	pCi/g	0.045		714R9	SOLID	606044
WL-A11	U-234	0.57	+/-	0.16	pCi/g	0.09		714R9	SOLID	606044
WL-A11	U-235	0.084	+/-	0.057	pCi/g	0.067	LT	714R9	SOLID	606044
WL-A11	U-238	2.49		0.48	pCi/g	0.05		714R9	SOLID	606044
<b>NOTES:</b>										
Sample entries in bold text and yellow highlighting indicate that DU concentrations are higher than or close to the soil sample screening limit of 102 pCi/g.										
MDC = Minimum Detectable Concentration										
TPU = Total Propagated Uncertainty										
U = Result is less than the sample-specific MDC.										
LT = Result is less than the requested MDC but greater than the sample-specific MDC.										
Y1 = Chemical yield is in control at 100-110%. Quantitative yield is assumed.										
Y2 = Chemical yield is outside default limits.										
M3 = The requested MDC was not met, but the reported activity is greater than the reported MDC.										

## **APPENDIX D-4**

# **GAMMA SPECTROSCOPY RESULTS**

**Building 1103A Area Characterization  
Gamma Spectroscopy Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical			
							Method	Matrix	Order Number	
SO-A17	Ac-228	1	+/-	0.27	pCi/g	0.35	G	713R9	SOIL	606043
SO-A17	Bi-212	1.3	+/-	1	pCi/g	1.6	U,G	713R9	SOIL	606043
SO-A17	Bi-214	0.92	+/-	0.25	pCi/g	0.25	G,J	713R9	SOIL	606043
SO-A17	Cs-137	0.091	+/-	0.075	pCi/g	0.113	U,G	713R9	SOIL	606043
SO-A17	K-40	8.8	+/-	2	pCi/g	1.4	G	713R9	SOIL	606043
SO-A17	Pa-234m	-2.2	+/-	7.8	pCi/g	15.1	U,G	713R9	SOIL	606043
SO-A17	Pb-212	1.16	+/-	0.22	pCi/g	0.17	G	713R9	SOIL	606043
SO-A17	Pb-214	1.2	+/-	0.23	pCi/g	0.22	G,J	713R9	SOIL	606043
SO-A17	Th-234	0.1	+/-	3.1	pCi/g	5.6	U,G	713R9	SOIL	606043
SO-A17	U-235	-0.01	+/-	0.35	pCi/g	0.62	U,G	713R9	SOIL	606043
SO-A20	Ac-228	1.08	+/-	0.33	pCi/g	0.49	G	713R9	SOIL	606043
SO-A20	Bi-212	1.1	+/-	1.1	pCi/g	1.7	U,G	713R9	SOIL	606043
SO-A20	Bi-214	0.84	+/-	0.24	pCi/g	0.26	G,J	713R9	SOIL	606043
SO-A20	Cs-137	0.064	+/-	0.086	pCi/g	0.141	U,G	713R9	SOIL	606043
SO-A20	K-40	9.7	+/-	2.4	pCi/g	2.3	G	713R9	SOIL	606043
SO-A20	Pa-234m	1.6	+/-	8.1	pCi/g	14.8	U,G	713R9	SOIL	606043
SO-A20	Pb-212	1.25	+/-	0.26	pCi/g	0.27	G	713R9	SOIL	606043
SO-A20	Pb-214	1.16	+/-	0.23	pCi/g	0.23	G,J	713R9	SOIL	606043
SO-A20	Th-234	2.7	+/-	2.6	pCi/g	4.2	U,G	713R9	SOIL	606043
SO-A20	U-235	0.19	+/-	0.35	pCi/g	0.59	U,G	713R9	SOIL	606043
SO-A30	Ac-228	1.26	+/-	0.31	pCi/g	0.54	G	713R9	SOIL	606043
SO-A30	Bi-212	2.2	+/-	1.3	pCi/g	1.9	G	713R9	SOIL	606043
SO-A30	Bi-214	1.14	+/-	0.24	pCi/g	0.25	G,J	713R9	SOIL	606043
SO-A30	Cs-137	-0.008	+/-	0.073	pCi/g	0.132	U,G	713R9	SOIL	606043
SO-A30	K-40	11.2	+/-	2.2	pCi/g	1.6	G	713R9	SOIL	606043
SO-A30	Pa-234m	-1.6	+/-	7.8	pCi/g	14.7	U,G	713R9	SOIL	606043
SO-A30	Pb-212	1.59	+/-	0.26	pCi/g	0.17	G	713R9	SOIL	606043
SO-A30	Pb-214	1.35	+/-	0.24	pCi/g	0.25	G,J	713R9	SOIL	606043
SO-A30	Th-234	-2.8	+/-	4.3	pCi/g	7.6	U,G	713R9	SOIL	606043
SO-A30	U-235	-0.16	+/-	0.47	pCi/g	0.81	U,G	713R9	SOIL	606043
SO-A33	Ac-228	1.21	+/-	0.39	pCi/g	0.5	G	713R9	SOIL	606043
SO-A33	Bi-212	2.5	+/-	1.5	pCi/g	2.1	G	713R9	SOIL	606043
SO-A33	Bi-214	0.94	+/-	0.3	pCi/g	0.34	G,J	713R9	SOIL	606043
SO-A33	Cs-137	0.057	+/-	0.094	pCi/g	0.157	U,G	713R9	SOIL	606043
SO-A33	K-40	11.2	+/-	2.6	pCi/g	1.4	G	713R9	SOIL	606043
SO-A33	Pa-234m	7	+/-	11	pCi/g	18	U,G	713R9	SOIL	606043
SO-A33	Pb-212	1.24	+/-	0.27	pCi/g	0.27	G	713R9	SOIL	606043
SO-A33	Pb-214	1.21	+/-	0.25	pCi/g	0.25	G,J	713R9	SOIL	606043
SO-A33	Th-234	3.5	+/-	4	pCi/g	6.5	U,G	713R9	SOIL	606043
SO-A33	U-235	0.18	+/-	0.43	pCi/g	0.73	U,G	713R9	SOIL	606043

**Building 1103A Area Characterization  
Gamma Spectroscopy Results**

Field ID	Parameter	Result		TPU	Units	MDC	Flag	Analytical		
								Method	Matrix	Order Number
SO-A36	Ac-228	1.28	+/-	0.32	pCi/g	0.55	G	713R9	SOIL	606043
SO-A36	Bi-212	1.1	+/-	1.1	pCi/g	1.7	U,G	713R9	SOIL	606043
SO-A36	Bi-214	0.91	+/-	0.23	pCi/g	0.24	G,J	713R9	SOIL	606043
SO-A36	Cs-137	0.005	+/-	0.074	pCi/g	0.133	U,G	713R9	SOIL	606043
SO-A36	K-40	8.7	+/-	2	pCi/g	1.2	G	713R9	SOIL	606043
SO-A36	Pa-234m	8	+/-	8.1	pCi/g	12.7	U,G	713R9	SOIL	606043
SO-A36	Pb-212	1.53	+/-	0.27	pCi/g	0.18	G	713R9	SOIL	606043
SO-A36	Pb-214	1.14	+/-	0.22	pCi/g	0.2	G,J	713R9	SOIL	606043
SO-A36	Th-234	3.1	+/-	3	pCi/g	4.8	U,G	713R9	SOIL	606043
SO-A36	U-235	0.15	+/-	0.39	pCi/g	0.66	U,G	713R9	SOIL	606043
SO-G01	Ac-228	0.73	+/-	0.26	pCi/g	0.35		713R9	SOIL	606043
SO-G01	Bi-212	0.82	+/-	0.88	pCi/g	1.4	U	713R9	SOIL	606043
SO-G01	Bi-214	0.42	+/-	0.17	pCi/g	0.2	J	713R9	SOIL	606043
SO-G01	Cs-137	-0.043	+/-	0.066	pCi/g	0.132	U	713R9	SOIL	606043
SO-G01	K-40	4.5	+/-	1.3	pCi/g	1.1		713R9	SOIL	606043
SO-G01	Pa-234m	-1.3	+/-	6.7	pCi/g	13.2	U	713R9	SOIL	606043
SO-G01	Pb-212	0.62	+/-	0.15	pCi/g	0.15		713R9	SOIL	606043
SO-G01	Pb-214	0.48	+/-	0.14	pCi/g	0.19	J	713R9	SOIL	606043
SO-G01	Th-234	0.1	+/-	3.2	pCi/g	5.6	U	713R9	SOIL	606043
SO-G01	U-235	0.09	+/-	0.36	pCi/g	0.63	U	713R9	SOIL	606043
SO-G02	Ac-228	0.53	+/-	0.32	pCi/g	0.36	G,TI	713R9	SOIL	606043
SO-G02	Bi-212	-0.3	+/-	1.1	pCi/g	2.1	U,G	713R9	SOIL	606043
SO-G02	Bi-214	0.03	+/-	0.16	pCi/g	0.29	U,G,J	713R9	SOIL	606043
SO-G02	Cs-137	-0.042	+/-	0.074	pCi/g	0.152	U,G	713R9	SOIL	606043
SO-G02	K-40	1.8	+/-	1.3	pCi/g	1.9	U,G	713R9	SOIL	606043
SO-G02	Pa-234m	26	+/-	12	pCi/g	12	G	713R9	SOIL	606043
SO-G02	Pb-212	0.26	+/-	0.13	pCi/g	0.17	G	713R9	SOIL	606043
SO-G02	Pb-214	0.3	+/-	0.16	pCi/g	0.22	G,J	713R9	SOIL	606043
SO-G02	Th-234	19.3	+/-	8.8	pCi/g	12.2	M3,G	713R9	SOIL	606043
SO-G02	U-235	-0.12	+/-	0.36	pCi/g	0.67	U,G	713R9	SOIL	606043
SO-G03	Ac-228	1.59	+/-	0.37	pCi/g	0.61	G	713R9	SOIL	606043
SO-G03	Bi-212	1.16	+/-	0.92	pCi/g	1.38	U,G	713R9	SOIL	606043
SO-G03	Bi-214	1.27	+/-	0.26	pCi/g	0.27	G,J	713R9	SOIL	606043
SO-G03	Cs-137	0.021	+/-	0.084	pCi/g	0.147	U,G	713R9	SOIL	606043
SO-G03	K-40	11.2	+/-	2.3	pCi/g	1.7	G	713R9	SOIL	606043
SO-G03	Pa-234m	4.5	+/-	8.9	pCi/g	15.2	U,G	713R9	SOIL	606043
SO-G03	Pb-212	1.61	+/-	0.27	pCi/g	0.19	G	713R9	SOIL	606043
SO-G03	Pb-214	1.29	+/-	0.23	pCi/g	0.24	G,J	713R9	SOIL	606043
SO-G03	Th-234	1.5	+/-	3.3	pCi/g	5.5	U,G	713R9	SOIL	606043
SO-G03	U-235	-0.25	+/-	0.47	pCi/g	0.82	U,G	713R9	SOIL	606043

**Building 1103A Area Characterization  
Gamma Spectroscopy Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical			
							Method	Matrix	Order Number	
SO-G04	Ac-228	1.41	+/-	0.4	pCi/g	0.64	G	713R9	SOIL	606043
SO-G04	Bi-212	1.8	+/-	1.1	pCi/g	1.5	G	713R9	SOIL	606043
SO-G04	Bi-214	1.06	+/-	0.29	pCi/g	0.3	G,J	713R9	SOIL	606043
SO-G04	Cs-137	0.064	+/-	0.098	pCi/g	0.164	U,G	713R9	SOIL	606043
SO-G04	K-40	9.2	+/-	2.4	pCi/g	1.5	G	713R9	SOIL	606043
SO-G04	Pa-234m	3	+/-	10	pCi/g	18.7	U,G	713R9	SOIL	606043
SO-G04	Pb-212	1.32	+/-	0.28	pCi/g	0.26	G	713R9	SOIL	606043
SO-G04	Pb-214	0.95	+/-	0.23	pCi/g	0.29	G,J	713R9	SOIL	606043
SO-G04	Th-234	3.2	+/-	1.5	pCi/g	2.1	LT,G	713R9	SOIL	606043
SO-G04	U-235	0.26	+/-	0.41	pCi/g	0.69	U,G	713R9	SOIL	606043
SO-G07	Ac-228	0.46	+/-	0.35	pCi/g	0.51	U,G	713R9	SOIL	606043
SO-G07	Bi-212	-0.9	+/-	1.1	pCi/g	2.2	U,G	713R9	SOIL	606043
SO-G07	Bi-214	0.12	+/-	0.17	pCi/g	0.28	U,G,J	713R9	SOIL	606043
SO-G07	Cs-137	0.001	+/-	0.086	pCi/g	0.156	U,G	713R9	SOIL	606043
SO-G07	K-40	1.3	+/-	1.2	pCi/g	1.9	U,G	713R9	SOIL	606043
SO-G07	Pa-234m	230	+/-	39	pCi/g	16	G	713R9	SOIL	606043
SO-G07	Pb-212	0.23	+/-	0.19	pCi/g	0.3	U,G	713R9	SOIL	606043
SO-G07	Pb-214	0.22	+/-	0.16	pCi/g	0.25	U,G,J	713R9	SOIL	606043
<b>SO-G07</b>	<b>Th-234</b>	<b>156</b>	<b>+/-</b>	<b>22</b>	<b>pCi/g</b>	<b>14</b>	<b>M3,G</b>	<b>713R9</b>	<b>SOIL</b>	<b>606043</b>
SO-G07	U-235	2.47	+/-	0.65	pCi/g	1.07	LT,G	713R9	SOIL	606043
SO-G08	Ac-228	0.26	+/-	0.49	pCi/g	0.84	U,G	713R9	SOIL	606043
SO-G08	Bi-212	0.5	+/-	1.9	pCi/g	3.4	U,G	713R9	SOIL	606043
SO-G08	Bi-214	0.39	+/-	0.29	pCi/g	0.45	U,G,J	713R9	SOIL	606043
SO-G08	Cs-137	-0.08	+/-	0.12	pCi/g	0.24	U,G	713R9	SOIL	606043
SO-G08	K-40	3.1	+/-	1.5	pCi/g	1.8	G	713R9	SOIL	606043
SO-G08	Pa-234m	597	+/-	86	pCi/g	20	G	713R9	SOIL	606043
SO-G08	Pb-212	0.51	+/-	0.25	pCi/g	0.37	G	713R9	SOIL	606043
SO-G08	Pb-214	0.26	+/-	0.23	pCi/g	0.36	U,G,J	713R9	SOIL	606043
<b>SO-G08</b>	<b>Th-234</b>	<b>405</b>	<b>+/-</b>	<b>48</b>	<b>pCi/g</b>	<b>7</b>	<b>G</b>	<b>713R9</b>	<b>SOIL</b>	<b>606043</b>
SO-G08	U-235	6.5	+/-	1.2	pCi/g	1.4	LT,G	713R9	SOIL	606043
SO-G09	Ac-228	0.12	+/-	0.34	pCi/g	0.59	U,G	713R9	SOIL	606043
SO-G09	Bi-212	0.5	+/-	1.4	pCi/g	2.4	U,G	713R9	SOIL	606043
SO-G09	Bi-214	0.06	+/-	0.21	pCi/g	0.36	U,G,J	713R9	SOIL	606043
SO-G09	Cs-137	0.03	+/-	0.1	pCi/g	0.17	U,G	713R9	SOIL	606043
SO-G09	K-40	0.73	+/-	0.84	pCi/g	1.37	U,G	713R9	SOIL	606043
SO-G09	Pa-234m	313	+/-	48	pCi/g	16	G	713R9	SOIL	606043
SO-G09	Pb-212	0.24	+/-	0.22	pCi/g	0.36	U,G	713R9	SOIL	606043
SO-G09	Pb-214	0	+/-	0.2	pCi/g	0.35	U,G,J	713R9	SOIL	606043
<b>SO-G09</b>	<b>Th-234</b>	<b>226</b>	<b>+/-</b>	<b>30</b>	<b>pCi/g</b>	<b>16</b>	<b>M3,G</b>	<b>713R9</b>	<b>SOIL</b>	<b>606043</b>
SO-G09	U-235	3.7	+/-	0.79	pCi/g	1.13	LT,G	713R9	SOIL	606043

**Building 1103A Area Characterization  
Gamma Spectroscopy Results**

Field ID	Parameter	Result		TPU	Units	MDC	Flag	Analytical		
								Method	Matrix	Order Number
SO-G10	Ac-228	0.36	+/-	0.24	pCi/g	0.29	G, TI	713R9	SOIL	606043
SO-G10	Bi-212	-0.17	+/-	0.71	pCi/g	1.4	U, G	713R9	SOIL	606043
SO-G10	Bi-214	0.12	+/-	0.13	pCi/g	0.21	U, G, J	713R9	SOIL	606043
SO-G10	Cs-137	-0.038	+/-	0.056	pCi/g	0.116	U, G	713R9	SOIL	606043
SO-G10	K-40	1.33	+/-	0.75	pCi/g	0.85	G	713R9	SOIL	606043
SO-G10	Pa-234m	36	+/-	12	pCi/g	12	G	713R9	SOIL	606043
SO-G10	Pb-212	0.098	+/-	0.097	pCi/g	0.156	U, G	713R9	SOIL	606043
SO-G10	Pb-214	0.08	+/-	0.1	pCi/g	0.17	U, G, J	713R9	SOIL	606043
SO-G10	Th-234	26.3	+/-	5.7	pCi/g	6	G	713R9	SOIL	606043
SO-G10	U-235	0.32	+/-	0.32	pCi/g	0.52	U, G	713R9	SOIL	606043
SO-G12	Ac-228	0.1	+/-	0.43	pCi/g	0.75	U	713R9	SOIL	606043
SO-G12	Bi-212	1.3	+/-	2.4	pCi/g	4	U	713R9	SOIL	606043
SO-G12	Bi-214	0.16	+/-	0.3	pCi/g	0.51	U, J	713R9	SOIL	606043
SO-G12	Cs-137	-0.11	+/-	0.17	pCi/g	0.3	U	713R9	SOIL	606043
SO-G12	K-40	1.5	+/-	1.1	pCi/g	1.6	U	713R9	SOIL	606043
SO-G12	Pa-234m	1780	+/-	220	pCi/g	20		713R9	SOIL	606043
SO-G12	Pb-212	0.02	+/-	0.3	pCi/g	0.51	U	713R9	SOIL	606043
SO-G12	Pb-214	0.25	+/-	0.27	pCi/g	0.59	U, J	713R9	SOIL	606043
<b>SO-G12</b>	<b>Th-234</b>	<b>654</b>	<b>+/-</b>	<b>77</b>	<b>pCi/g</b>	<b>8</b>		<b>713R9</b>	<b>SOIL</b>	<b>606043</b>
SO-G12	U-235	17.4	+/-	2.4	pCi/g	2.3		713R9	SOIL	606043
SO-G39	Ac-228	1.51	+/-	0.36	pCi/g	0.46	G	713R9	SOIL	606043
SO-G39	Bi-212	1.4	+/-	1.1	pCi/g	1.7	U, G	713R9	SOIL	606043
SO-G39	Bi-214	1.11	+/-	0.25	pCi/g	0.25	G, J	713R9	SOIL	606043
SO-G39	Cs-137	0.157	+/-	0.074	pCi/g	0.098	G	713R9	SOIL	606043
SO-G39	K-40	12.5	+/-	2.4	pCi/g	1.6	G	713R9	SOIL	606043
SO-G39	Pa-234m	6.7	+/-	8.5	pCi/g	13.8	U, G	713R9	SOIL	606043
SO-G39	Pb-212	1.75	+/-	0.28	pCi/g	0.19	G	713R9	SOIL	606043
SO-G39	Pb-214	1.22	+/-	0.21	pCi/g	0.22	G, J	713R9	SOIL	606043
SO-G39	Th-234	6.4	+/-	3.8	pCi/g	5.9	LT, G	713R9	SOIL	606043
SO-G39	U-235	0.23	+/-	0.25	pCi/g	0.4	U, G	713R9	SOIL	606043
SO-G40	Ac-228	0.12	+/-	0.23	pCi/g	0.39	U, G	713R9	SOIL	606043
SO-G40	Bi-212	0.56	+/-	0.85	pCi/g	1.41	U, G	713R9	SOIL	606043
SO-G40	Bi-214	0.16	+/-	0.14	pCi/g	0.21	U, G, J	713R9	SOIL	606043
SO-G40	Cs-137	0.003	+/-	0.06	pCi/g	0.106	U, G	713R9	SOIL	606043
SO-G40	K-40	1.7	+/-	0.98	pCi/g	1.4	G	713R9	SOIL	606043
SO-G40	Pa-234m	106	+/-	19	pCi/g	10	G	713R9	SOIL	606043
SO-G40	Pb-212	0.23	+/-	0.12	pCi/g	0.18	G	713R9	SOIL	606043
SO-G40	Pb-214	0.16	+/-	0.12	pCi/g	0.21	U, G, J	713R9	SOIL	606043
<b>SO-G40</b>	<b>Th-234</b>	<b>84</b>	<b>+/-</b>	<b>12</b>	<b>pCi/g</b>	<b>9</b>	<b>M3, G</b>	<b>713R9</b>	<b>SOIL</b>	<b>606043</b>
SO-G40	U-235	1.36	+/-	0.4	pCi/g	0.69	LT, G	713R9	SOIL	606043

**Building 1103A Area Characterization  
Gamma Spectroscopy Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical			
							Method	Matrix	Order Number	
SO-G42	Ac-228	0.92	+/-	0.46	pCi/g	0.67	G	713R9	SOIL	606043
SO-G42	Bi-212	1.8	+/-	1.6	pCi/g	2.3	U,G	713R9	SOIL	606043
SO-G42	Bi-214	0.72	+/-	0.3	pCi/g	0.35	G,J	713R9	SOIL	606043
SO-G42	Cs-137	0.12	+/-	0.11	pCi/g	0.16	U,G	713R9	SOIL	606043
SO-G42	K-40	8.1	+/-	2.5	pCi/g	2	G	713R9	SOIL	606043
SO-G42	Pa-234m	29	+/-	16	pCi/g	20	G	713R9	SOIL	606043
SO-G42	Pb-212	0.97	+/-	0.27	pCi/g	0.29	G	713R9	SOIL	606043
SO-G42	Pb-214	0.64	+/-	0.24	pCi/g	0.41	G,J	713R9	SOIL	606043
SO-G42	Th-234	20.6	+/-	3.7	pCi/g	2.9	G	713R9	SOIL	606043
SO-G42	U-235	-0.05	+/-	0.51	pCi/g	0.92	U,G	713R9	SOIL	606043
SO-P05	Ac-228	0.1	+/-	0.29	pCi/g	0.51	U,G	713R9	SOIL	606043
SO-P05	Bi-212	0.34	+/-	0.63	pCi/g	1.09	U,G	713R9	SOIL	606043
SO-P05	Bi-214	0.04	+/-	0.13	pCi/g	0.22	U,G,J	713R9	SOIL	606043
SO-P05	Cs-137	-0.013	+/-	0.06	pCi/g	0.117	U,G	713R9	SOIL	606043
SO-P05	K-40	1.25	+/-	0.91	pCi/g	1.26	U,G	713R9	SOIL	606043
SO-P05	Pa-234m	-4.1	+/-	6.3	pCi/g	13.9	U,G	713R9	SOIL	606043
SO-P05	Pb-212	0.17	+/-	0.1	pCi/g	0.15	G	713R9	SOIL	606043
SO-P05	Pb-214	-0.01	+/-	0.11	pCi/g	0.2	U,G,J	713R9	SOIL	606043
SO-P05	Th-234	0.6	+/-	2.1	pCi/g	3.6	U,G	713R9	SOIL	606043
SO-P05	U-235	0.04	+/-	0.21	pCi/g	0.37	U,G	713R9	SOIL	606043
SO-P06	Ac-228	0.39	+/-	0.23	pCi/g	0.32	G,TI	713R9	SOIL	606043
SO-P06	Bi-212	0.65	+/-	0.61	pCi/g	0.95	U,G	713R9	SOIL	606043
SO-P06	Bi-214	0.17	+/-	0.12	pCi/g	0.17	U,G,J	713R9	SOIL	606043
SO-P06	Cs-137	0.027	+/-	0.037	pCi/g	0.06	U,G	713R9	SOIL	606043
SO-P06	K-40	2.23	+/-	0.93	pCi/g	1.12	G	713R9	SOIL	606043
SO-P06	Pa-234m	12	+/-	6.1	pCi/g	7.2	G	713R9	SOIL	606043
SO-P06	Pb-212	0.16	+/-	0.075	pCi/g	0.104	G	713R9	SOIL	606043
SO-P06	Pb-214	0.142	+/-	0.085	pCi/g	0.164	U,G,J	713R9	SOIL	606043
SO-P06	Th-234	10.8	+/-	4.8	pCi/g	6.7	G	713R9	SOIL	606043
SO-P06	U-235	0.27	+/-	0.23	pCi/g	0.36	U,G	713R9	SOIL	606043
SO-P11	Ac-228	0.27	+/-	0.87	pCi/g	1.52	U,G	713R9	SOIL	606043
SO-P11	Bi-212	-0.6	+/-	4.1	pCi/g	7.2	U,G	713R9	SOIL	606043
SO-P11	Bi-214	-0.01	+/-	0.57	pCi/g	0.98	U,G,J	713R9	SOIL	606043
SO-P11	Cs-137	0.32	+/-	0.28	pCi/g	0.44	U,G	713R9	SOIL	606043
SO-P11	K-40	4	+/-	2.2	pCi/g	2.9	G	713R9	SOIL	606043
SO-P11	Pa-234m	2440	+/-	310	pCi/g	40	G	713R9	SOIL	606043
SO-P11	Pb-212	0.37	+/-	0.45	pCi/g	0.73	U,G	713R9	SOIL	606043
SO-P11	Pb-214	0.6	+/-	0.41	pCi/g	0.77	U,G,J	713R9	SOIL	606043
<b>SO-P11</b>	<b>Th-234</b>	<b>1740</b>	<b>+/-</b>	<b>220</b>	<b>pCi/g</b>	<b>80</b>	<b>M3,G</b>	<b>713R9</b>	<b>SOIL</b>	<b>606043</b>
SO-P11	U-235	28.3	+/-	4	pCi/g	3.8	G	713R9	SOIL	606043

**Building 1103A Area Characterization  
Gamma Spectroscopy Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical			
							Method	Matrix	Order Number	
SO-P13	Ac-228	1.21	+/-	0.34	pCi/g	0.48	G	713R9	SOIL	606043
SO-P13	Bi-212	1.24	+/-	0.99	pCi/g	1.53	U,G	713R9	SOIL	606043
SO-P13	Bi-214	0.7	+/-	0.19	pCi/g	0.24	G,J	713R9	SOIL	606043
SO-P13	Cs-137	0.136	+/-	0.077	pCi/g	0.11	G	713R9	SOIL	606043
SO-P13	K-40	8.6	+/-	1.9	pCi/g	1.5	G	713R9	SOIL	606043
SO-P13	Pa-234m	11.9	+/-	7.9	pCi/g	11.3	G,Tl	713R9	SOIL	606043
SO-P13	Pb-212	0.96	+/-	0.19	pCi/g	0.17	G	713R9	SOIL	606043
SO-P13	Pb-214	0.86	+/-	0.18	pCi/g	0.21	G,J	713R9	SOIL	606043
SO-P13	Th-234	4.9	+/-	3.7	pCi/g	5.8	U,G	713R9	SOIL	606043
SO-P13	U-235	0.29	+/-	0.45	pCi/g	0.75	U,G	713R9	SOIL	606043
SS-A24	Ac-228	1.38	+/-	0.26	pCi/g	0.27	G	713R9	SOIL	606043
SS-A24	Bi-212	1.67	+/-	0.85	pCi/g	1.16	G	713R9	SOIL	606043
SS-A24	Bi-214	1.11	+/-	0.21	pCi/g	0.18	G,J	713R9	SOIL	606043
SS-A24	Cs-137	0.054	+/-	0.043	pCi/g	0.065	U,G	713R9	SOIL	606043
SS-A24	K-40	9.1	+/-	1.8	pCi/g	1.1	G	713R9	SOIL	606043
SS-A24	Pa-234m	2.5	+/-	6.7	pCi/g	11.6	U,G	713R9	SOIL	606043
SS-A24	Pb-212	1.28	+/-	0.2	pCi/g	0.13	G	713R9	SOIL	606043
SS-A24	Pb-214	1.31	+/-	0.21	pCi/g	0.2	G,J	713R9	SOIL	606043
SS-A24	Th-234	0.2	+/-	4.6	pCi/g	7.9	U,G	713R9	SOIL	606043
SS-A24	U-235	0.12	+/-	0.28	pCi/g	0.47	U,G	713R9	SOIL	606043
SS-A27	Ac-228	1.09	+/-	0.29	pCi/g	0.4	G	713R9	SOLID	606043
SS-A27	Bi-212	1.51	+/-	0.98	pCi/g	1.36	G	713R9	SOLID	606043
SS-A27	Bi-214	0.86	+/-	0.24	pCi/g	0.23	G,J	713R9	SOLID	606043
SS-A27	Cs-137	0.021	+/-	0.067	pCi/g	0.118	U,G	713R9	SOLID	606043
SS-A27	K-40	9.2	+/-	2.2	pCi/g	1.4	G	713R9	SOLID	606043
SS-A27	Pa-234m	8.2	+/-	8.1	pCi/g	12.5	U,G	713R9	SOLID	606043
SS-A27	Pb-212	1.3	+/-	0.24	pCi/g	0.19	G	713R9	SOLID	606043
SS-A27	Pb-214	1.15	+/-	0.22	pCi/g	0.22	G,J	713R9	SOLID	606043
SS-A27	Th-234	1.3	+/-	1.1	pCi/g	1.8	U,G	713R9	SOLID	606043
SS-A27	U-235	-0.18	+/-	0.34	pCi/g	0.62	U,G	713R9	SOLID	606043
SS-G14	Ac-228	0.36	+/-	0.3	pCi/g	0.45	U,G	713R9	SOIL	606043
SS-G14	Bi-212	0	+/-	1.6	pCi/g	2.8	U,G	713R9	SOIL	606043
SS-G14	Bi-214	0.15	+/-	0.21	pCi/g	0.35	U,G,J	713R9	SOIL	606043
SS-G14	Cs-137	-0.07	+/-	0.11	pCi/g	0.21	U,G	713R9	SOIL	606043
SS-G14	K-40	1.7	+/-	1.1	pCi/g	1.4	G	713R9	SOIL	606043
SS-G14	Pa-234m	628	+/-	86	pCi/g	15	G	713R9	SOIL	606043
SS-G14	Pb-212	0.18	+/-	0.22	pCi/g	0.35	U,G	713R9	SOIL	606043
SS-G14	Pb-214	0.15	+/-	0.22	pCi/g	0.36	U,G,J	713R9	SOIL	606043
<b>SS-G14</b>	<b>Th-234</b>	<b>427</b>	<b>+/-</b>	<b>57</b>	<b>pCi/g</b>	<b>30</b>	<b>M3,G</b>	<b>713R9</b>	<b>SOIL</b>	<b>606043</b>
SS-G14	U-235	7.3	+/-	1.3	pCi/g	1.6	LT,G	713R9	SOIL	606043

**Building 1103A Area Characterization  
Gamma Spectroscopy Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical Method	Matrix	Order Number	
SS-P15	Ac-228	0.17	+/-	0.21	pCi/g	0.33	U	713R9	SOIL	606043
SS-P15	Bi-212	0.41	+/-	0.79	pCi/g	1.36	U	713R9	SOIL	606043
SS-P15	Bi-214	0.1	+/-	0.1	pCi/g	0.16	U,J	713R9	SOIL	606043
SS-P15	Cs-137	0.062	+/-	0.063	pCi/g	0.099	U	713R9	SOIL	606043
SS-P15	K-40	0.23	+/-	0.71	pCi/g	1.27	U	713R9	SOIL	606043
SS-P15	Pa-234m	34	+/-	11	pCi/g	8		713R9	SOIL	606043
SS-P15	Pb-212	-0.024	+/-	0.069	pCi/g	0.129	U	713R9	SOIL	606043
SS-P15	Pb-214	0.04	+/-	0.1	pCi/g	0.17	U,J	713R9	SOIL	606043
SS-P15	Th-234	29.6	+/-	4.1	pCi/g	2		713R9	SOIL	606043
SS-P15	U-235	0.51	+/-	0.32	pCi/g	0.48	LT, TI	713R9	SOIL	606043
NOTES:										
Sample entries in bold text and yellow highlighting indicate that DU concentrations are higher than or close to the soil sample screening limit of 102 pCi/g. 1 pCi/g Th-234 is equivalent to 1.1 pCi/g DU. Thus, Th-234 results greater than 92 pCi/g indicate an exceedance of the soil sample screening limit.										
* = The laboratory assigned incorrect ID numbers to several incoming samples. The following substitutions have been made in this spreadsheet: SS-A30 has been corrected to SO-A30, SS-A33 has been corrected to SO-A33, and SS-A36 has been corrected to SO-A36.										
G = Sample density differs by more than 15% of LCS density.										
J = Result is an estimated value detected at less than the sample-specific MDC.										
LT = Result is less than requested MDC, but greater than sample-specific MDC.										
M3 = The requested MDC was not met, but the reported activity is greater than the reported MDC.										
MDC = Minimum Detectable Concentration										
TI = Nuclide identification is tentative.										
TPU = Total Propagated Uncertainty										
U = Result is less than the sample-specific MDC or less than the associated TPU.										

**APPENDIX D-5**  
**SMEAR SAMPLE RESULTS**

**Building 1103A Area Characterization  
Smear Sample Results**

Field ID	Parameter	Result		TPU	Units	MDC	Flag	Analytical Method	Matrix	Order Number
<b>SM-A05</b>	<b>Gross Alpha</b>	<b>31.4</b>	<b>+/-</b>	<b>5.7</b>	<b>pCi/sample</b>	<b>0.7</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A05	Gross Beta	92	+/-	15	pCi/sample	2		724R8	WIPE	606045
SM-A105	Gross Alpha	1.2	+/-	0.58	pCi/sample	0.54	LT	724R8	WIPE	606045
SM-A105	Gross Beta	4	+/-	1.2	pCi/sample	1.4		724R8	WIPE	606045
SM-A115	Gross Alpha	1.67	+/-	0.7	pCi/sample	0.58	LT	724R8	WIPE	606045
SM-A115	Gross Beta	6.4	+/-	1.6	pCi/sample	1.5		724R8	WIPE	606045
<b>SM-A125</b>	<b>Gross Alpha</b>	<b>6.8</b>	<b>+/-</b>	<b>1.7</b>	<b>pCi/sample</b>	<b>0.8</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A125	Gross Beta	32.6	+/-	5.7	pCi/sample	1.6		724R8	WIPE	606045
<b>SM-A135</b>	<b>Gross Alpha</b>	<b>4.5</b>	<b>+/-</b>	<b>1.3</b>	<b>pCi/sample</b>	<b>0.6</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A135	Gross Beta	12.2	+/-	2.5	pCi/sample	1.5		724R8	WIPE	606045
SM-A145	Gross Alpha	0.18	+/-	0.25	pCi/sample	0.48	U	724R8	WIPE	606045
SM-A145	Gross Beta	0.31	+/-	0.57	pCi/sample	1.29	U	724R8	WIPE	606045
SM-A15	Gross Alpha	2.55	+/-	0.88	pCi/sample	0.61	LT	724R8	WIPE	606045
SM-A15	Gross Beta	5.4	+/-	1.4	pCi/sample	1.5		724R8	WIPE	606045
<b>SM-A155</b>	<b>Gross Alpha</b>	<b>89</b>	<b>+/-</b>	<b>15</b>	<b>pCi/sample</b>	<b>1</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A155	Gross Beta	327	+/-	53	pCi/sample	4		724R8	WIPE	606045
<b>SM-A165</b>	<b>Gross Alpha</b>	<b>12.1</b>	<b>+/-</b>	<b>2.5</b>	<b>pCi/sample</b>	<b>0.6</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A165	Gross Beta	29.1	+/-	5.2	pCi/sample	1.8		724R8	WIPE	606045
<b>SM-A25</b>	<b>Gross Alpha</b>	<b>5.8</b>	<b>+/-</b>	<b>1.5</b>	<b>pCi/sample</b>	<b>0.7</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A25	Gross Beta	12.9	+/-	2.6	pCi/sample	1.6		724R8	WIPE	606045
SM-A265	Gross Alpha	0.11	+/-	0.22	pCi/sample	0.5	U	724R8	WIPE	606045
SM-A265	Gross Beta	0.29	+/-	0.59	pCi/sample	1.34	U	724R8	WIPE	606045
SM-A275	Gross Alpha	0.07	+/-	0.23	pCi/sample	0.57	U	724R8	WIPE	606045
SM-A275	Gross Beta	0.49	+/-	0.6	pCi/sample	1.3	U	724R8	WIPE	606045
SM-A285	Gross Alpha	0.18	+/-	0.27	pCi/sample	0.55	U	724R8	WIPE	606045
SM-A285	Gross Beta	0.99	+/-	0.71	pCi/sample	1.41	U	724R8	WIPE	606045
<b>SM-A35</b>	<b>Gross Alpha</b>	<b>44.5</b>	<b>+/-</b>	<b>7.7</b>	<b>pCi/sample</b>	<b>0.8</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A35	Gross Beta	141	+/-	23	pCi/sample	2		724R8	WIPE	606045
SM-A45	Gross Alpha	0.65	+/-	0.42	pCi/sample	0.51	LT	724R8	WIPE	606045
SM-A45	Gross Beta	1.97	+/-	0.84	pCi/sample	1.37	LT	724R8	WIPE	606045
SM-A55	Gross Alpha	0.68	+/-	0.44	pCi/sample	0.57	LT	724R8	WIPE	606045
SM-A55	Gross Beta	1.58	+/-	0.77	pCi/sample	1.33	LT	724R8	WIPE	606045

**Building 1103A Area Characterization  
Smear Sample Results**

Field ID	Parameter	Result	TPU	Units	MDC	Flag	Analytical Method	Matrix	Order Number	
SM-A65	Gross Alpha	2.77	+/-	0.91	pCi/sample	0.56	LT	724R8	WIPE	606045
SM-A65	Gross Beta	6.2	+/-	1.5	pCi/sample	1.5		724R8	WIPE	606045
<b>SM-A95</b>	<b>Gross Alpha</b>	<b>6</b>	<b>+/-</b>	<b>1.5</b>	<b>pCi/sample</b>	<b>0.6</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-A95	Gross Beta	20.4	+/-	3.8	pCi/sample	1.6		724R8	WIPE	606045
<b>SM-B175</b>	<b>Gross Alpha</b>	<b>12</b>	<b>+/-</b>	<b>2.5</b>	<b>pCi/sample</b>	<b>0.7</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-B175	Gross Beta	115	+/-	19	pCi/sample	2		724R8	WIPE	606045
SM-B185	Gross Alpha	0.16	+/-	0.25	pCi/sample	0.5	U	724R8	WIPE	606045
SM-B185	Gross Beta	0.86	+/-	0.67	pCi/sample	1.34	U	724R8	WIPE	606045
SM-B225	Gross Alpha	-0.09	+/-	0.19	pCi/sample	0.48	U	724R8	WIPE	606045
SM-B225	Gross Beta	0.64	+/-	0.61	pCi/sample	1.28	U	724R8	WIPE	606045
SM-B235	Gross Alpha	0.21	+/-	0.28	pCi/sample	0.52	U	724R8	WIPE	606045
SM-B235	Gross Beta	0.39	+/-	0.61	pCi/sample	1.37	U	724R8	WIPE	606045
SM-B325	Gross Alpha	-0.11	+/-	0.19	pCi/sample	0.59	U	724R8	WIPE	606045
SM-B325	Gross Beta	0.11	+/-	0.58	pCi/sample	1.39	U	724R8	WIPE	606045
SM-B75	Gross Alpha	1.8	+/-	0.71	pCi/sample	0.51	LT	724R8	WIPE	606045
SM-B75	Gross Beta	7.9	+/-	1.8	pCi/sample	1.4		724R8	WIPE	606045
SM-B85	Gross Alpha	0.38	+/-	0.34	pCi/sample	0.53	U	724R8	WIPE	606045
SM-B85	Gross Beta	1.45	+/-	0.77	pCi/sample	1.38	LT	724R8	WIPE	606045
SM-C195	Gross Alpha	0.13	+/-	0.25	pCi/sample	0.57	U	724R8	WIPE	606045
SM-C195	Gross Beta	0.3	+/-	0.57	pCi/sample	1.3	U	724R8	WIPE	606045
<b>SM-C205</b>	<b>Gross Alpha</b>	<b>8.3</b>	<b>+/-</b>	<b>1.9</b>	<b>pCi/sample</b>	<b>0.7</b>		<b>724R8</b>	<b>WIPE</b>	<b>606045</b>
SM-C205	Gross Beta	21.1	+/-	3.9	pCi/sample	1.7		724R8	WIPE	606045
SM-C295	Gross Alpha	-0.01	+/-	0.19	pCi/sample	0.52	U	724R8	WIPE	606045
SM-C295	Gross Beta	0.1	+/-	0.57	pCi/sample	1.38	U	724R8	WIPE	606045
SM-C305	Gross Alpha	-0.01	+/-	0.19	pCi/sample	0.53	U	724R8	WIPE	606045
SM-C305	Gross Beta	0.09	+/-	0.6	pCi/sample	1.44	U	724R8	WIPE	606045
SM-C315	Gross Alpha	0.02	+/-	0.2	pCi/sample	0.55	U	724R8	WIPE	606045
SM-C315	Gross Beta	0.16	+/-	0.6	pCi/sample	1.42	U	724R8	WIPE	606045
SM-D245	Gross Alpha	0.43	+/-	0.35	pCi/sample	0.52	U	724R8	WIPE	606045
SM-D245	Gross Beta	0.19	+/-	0.59	pCi/sample	1.37	U	724R8	WIPE	606045
SM-D255	Gross Alpha	0.17	+/-	0.24	pCi/sample	0.48	U	724R8	WIPE	606045
SM-D255	Gross Beta	-0.23	+/-	0.51	pCi/sample	1.33	U	724R8	WIPE	606045
<b>NOTES:</b>										
Sample entries in bold text and yellow highlighting indicate that gross activity is higher than or close to the screening limit of 10 dpm / 100 cm <sup>2</sup> .										
1 pCi/sample is equivalent to 2.2 dpm/100 cm <sup>2</sup> . Thus, alpha results greater than 4.5 pCi indicate an exceedance of the DU screening limit.										
U = Result is less than the sample-specific MDC.										
LT = Result is less than requested MDC, greater than sample-specific MEC.										

**APPENDIX D-6**

**ANALYTICAL LABORATORY  
DATA PACKAGES (ON CD)**

**APPENDIX E**

**ASBESTOS INSPECTION REPORT**



EA Engineering, Science  
and Technology, Inc.

1319 Woodbridge Station Way, Suite 200.  
Edgewood, Maryland 21040  
Telephone: 410-538-8202  
Fax: 410-538-8207  
www.eaest.com

5 June 2006

Ms. Barbara Duletsky  
Cabrera Services, Inc.  
5091 Mt. Ellen Court  
St. Charles, MO 63304

RE: Report of Asbestos Containing Material Survey  
Buildings 1103A, BRL 12 and Associated Vault – Aberdeen Proving Ground, Maryland

Dear Ms. Duletsky:

EA Engineering, Science, and Technology, Inc. has completed an Asbestos Containing Materials (ACM) Survey at Buildings 1103A, BRL 12 and an associated vault located on Spesutie Island, in the Aberdeen Area of Aberdeen Proving Ground, Maryland. Sampling activities included the collection of 12 bulk samples of suspect ACM from the three buildings.

Current Federal and State environmental statutes require that certain potentially hazardous materials that may be affected by building renovation activities be identified and removed prior to conducting these activities. In the case of asbestos, Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and State of Maryland regulatory requirements contained in 40 CFR 61, 29 CFR 1926.1101, and COMAR 26.11.22, respectively, require that asbestos-containing materials (ACM) be identified, and that friable ACM be removed prior to conducting renovation activities that may disturb these materials. This requirement also applies to non-friable ACM that may become friable as a result of renovation activities.

#### SAMPLING PROCEDURES

On 24 May 2006, an EA inspector conducted a walk-through visual inspection and sampling of suspect ACM within the interior areas of Buildings 1103A, BRL 12 and an associated vault, located on Spesutie Island, on APG. The ACM inspection procedures were conducted in accordance with Asbestos Hazard Emergency Response Act (AHERA) guidelines and included identifying homogeneous areas of suspect ACM, determining suspect ACM friability, and assessing the homogeneous areas of suspect ACM to determine overall condition. Suspect ACM was sampled in accordance with AHERA guidelines. The inspection was conducted by U.S. Environmental Protection Agency (EPA) Asbestos Hazard Emergency Response Act (AHERA) accredited and Maryland licensed asbestos building inspector. Non-destructive asbestos sampling procedures were employed for the asbestos inspection and were limited to readily accessible areas of the site buildings.

According to the client, Building 1103A was constructed in the early 1950's and Building BRL 12 and the associated vault were constructed around 1990. Suspect materials were grouped into homogeneous areas (uniform in color and texture and appearing identical in every other respect)



and were sampled in a manner consistent with the U.S. Environmental Protection Agency (EPA) Asbestos Hazard Emergency Response Act (AHERA) regulations.

Samples were submitted to AMA Analytical Services in Lanham, Maryland. AMA is an independent laboratory accredited by the National Institute of Science and Technology's (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) and the American Industrial Hygiene Association. Analyses were performed by polarized light microscopy (PLM) in accordance with EPA Method EPA/600/R-93/116.

Asbestos inspection forms are provided in Attachment I. Asbestos sampling location diagrams are provided in Attachment II. Asbestos laboratory analytical results as well as chain-of-custody forms are included in Attachment III, and Inspector certifications are included in Attachment IV.

## FINDINGS

Table 1 details the description and estimated quantities of laboratory confirmed ACM. ACM are defined by EPA standards as materials determined to contain greater than one-percent asbestos. Based on the analytical results, the following is a summary of ACM in each of the three surveyed buildings:

### *Building 1103A:*

- All 12"x 12" floor tile and associated mastic observed within the entry area, shower room and support room.

It should also be noted that ACM are commonly observed within fire doors in buildings constructed prior to 1980. Two fire doors were observed within Building 1103A. Because the survey did not include destructive sampling, the interior portions of the fire doors were not sampled; therefore, it is recommended that all fire doors should be assumed and handled as ACM.

### *Building BRL 12:*

- All 12"x 12" floor tile observed in the office area.

### *Associated Vault:*

The associated vault building was of steel plate construction, concrete floors and a metal roof. According to visual observations, no suspect ACM was noted in the building; therefore, no samples were collected from this location.

**TABLE 1: LABORATORY CONFIRMED ACM**

Location	Sample Number	Material	Description	% Asbestos	Estimated Quantity (ft <sup>2</sup> )	Friable (yes/no)
Building 1103A	S-2	12"x 12" F.T.	Cream with streak pattern	2% Chrysotile	~ 300	No
	S-3	Mastic	Black	2% Chrysotile	~ 300	No
Building BRL 12	S-10	12"x 12" F.T.	Cream with streak pattern	2% Chrysotile	~ 225	No

F.T. = Floor Tile



## DISCUSSION AND RECOMMENDATIONS

The identified ACBM (presented on Table 1) were observed to be in fair condition. Based on the renovation scope of work, the following remedial actions are recommended for ACM identified in the affected areas of Buildings 1103A and BRL 12:

- Remove any friable and/or non-friable ACM that may be rendered friable, during demolition or renovation activities; and
- Removal of friable ACM and/or non-friable ACM that may be rendered friable during demolition or renovation activities must be conducted by accredited asbestos abatement workers employed by an appropriately Maryland licensed contractor.

## DISCLAIMER

EA does not warrant that there is no asbestos or hazardous materials in areas of the facility not inspected as part of this scope of work, nor does EA accept any liability if such is found at some future time, or could have been found if additional analyses or studies were conducted. EA does not assume responsibility for other environmental issues that may be associated with the subject facility.

In view of the rapidly changing status of environmental laws, regulations, and guidelines, EA cannot be responsible for changes in laws, regulations, or guidelines that occur after the study has been completed and which may affect the facility. This report was prepared for the Cabrera Services, Inc., by EA Engineering, Science, and Technology, Inc. Any transfer of information contained in this report can be conducted only if written consent is provided by Cabrera Services, Inc.

## CLOSING

Thank you for the opportunity to provide environmental services to Cabrera Services, Inc. Should you have any questions or comments regarding this report; please do not hesitate to call me directly at (410) 538-8202 extension 112.

Respectfully yours,  
EA ENGINEERING, SCIENCE AND TECHNOLOGY

Gordy Porter  
Project Manager

**ATTACHMENT I:**  
**ASBESTOS INSPECTION FORMS**

Location: Building 1103A/Building BRL 12/Vault - Spesutie Island, Aberdeen Area, APG  
 Date: 24 May 2006  
 Inspector: Anna-Lisa Marcum

\* (L.F. = Linear Feet)

ASBESTOS INSPECTION SAMPLING FORM

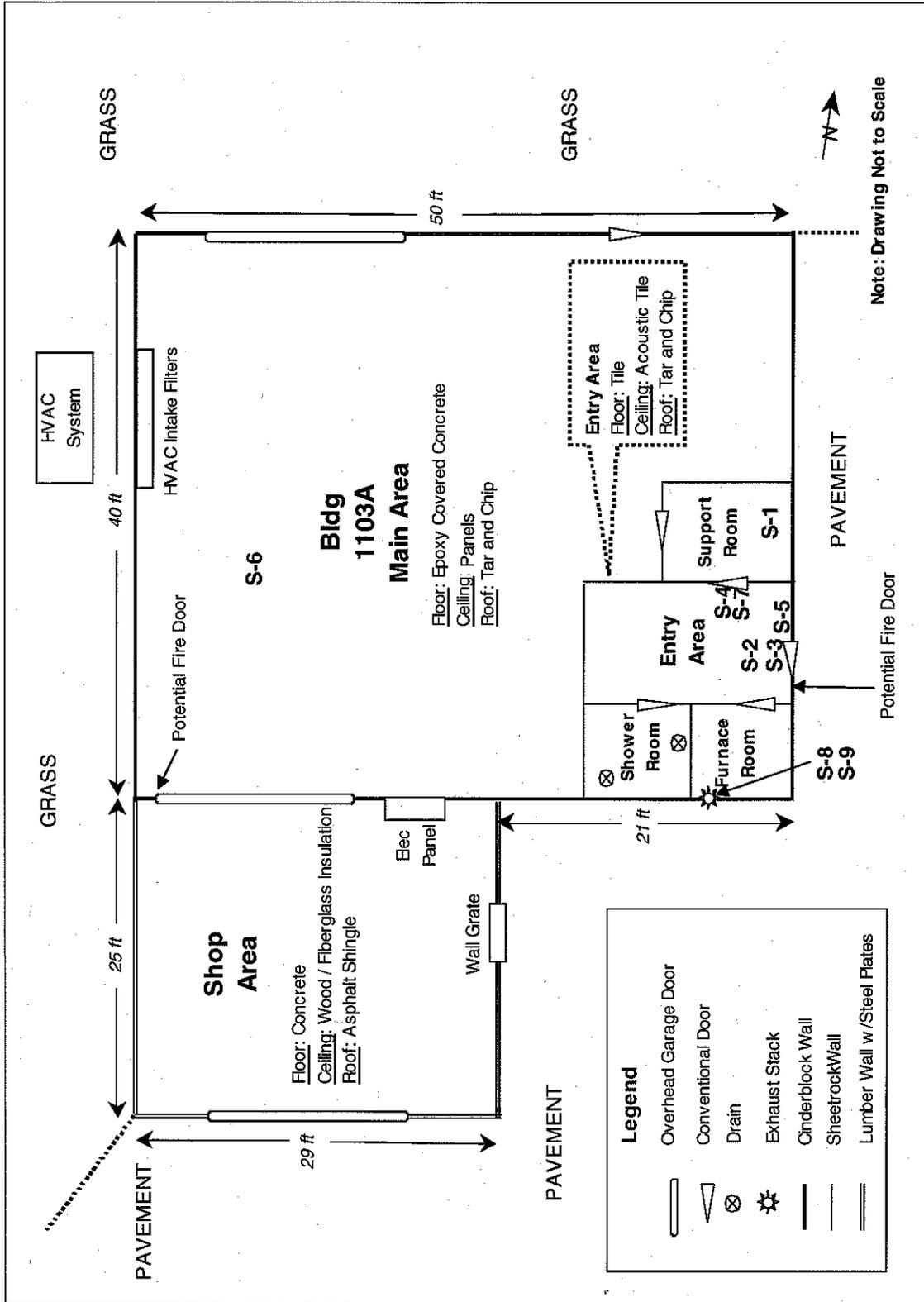
Sample Number	Location	Type of Material	Description (Color/Size)	Friable (Yes/No)
S-1	Support Room	Mastic <sup>beneath black baseboard</sup>	Black (~60 L.F.)	No
S-2	Entry Area	Floor Tile	12"x12" - Cream w/ speck pattern	No
S-3	↓	Mastic - <sup>beneath</sup> S-2	Black	No
S-4		Sheet Rock	Gray (painted white)	No
S-5	Entry Area	Mastic - <sup>beneath brown baseboard</sup>	Brown (~10 L.F.)	No
S-6	Main Area	Ceiling Panels	Cream (~2000 sq ft)	No
S-7	Entry Area	Insulation (wall)	Behind sheetrock Yellow in color	No
S-8	Furnace Room	Duct	12"x12" Flap on duct unit	No
S-9	↓	Duct gasket	Painted silver	No
S-10	Small office Area	Floor Tile	12"x12" - Cream w/ speck pattern	No

\* Note: No samples collected in separate vault bldg, constructed of concrete and steel. Also no samples collected from vaults attached to Bldg BRL 12, also constructed out of concrete and steel.

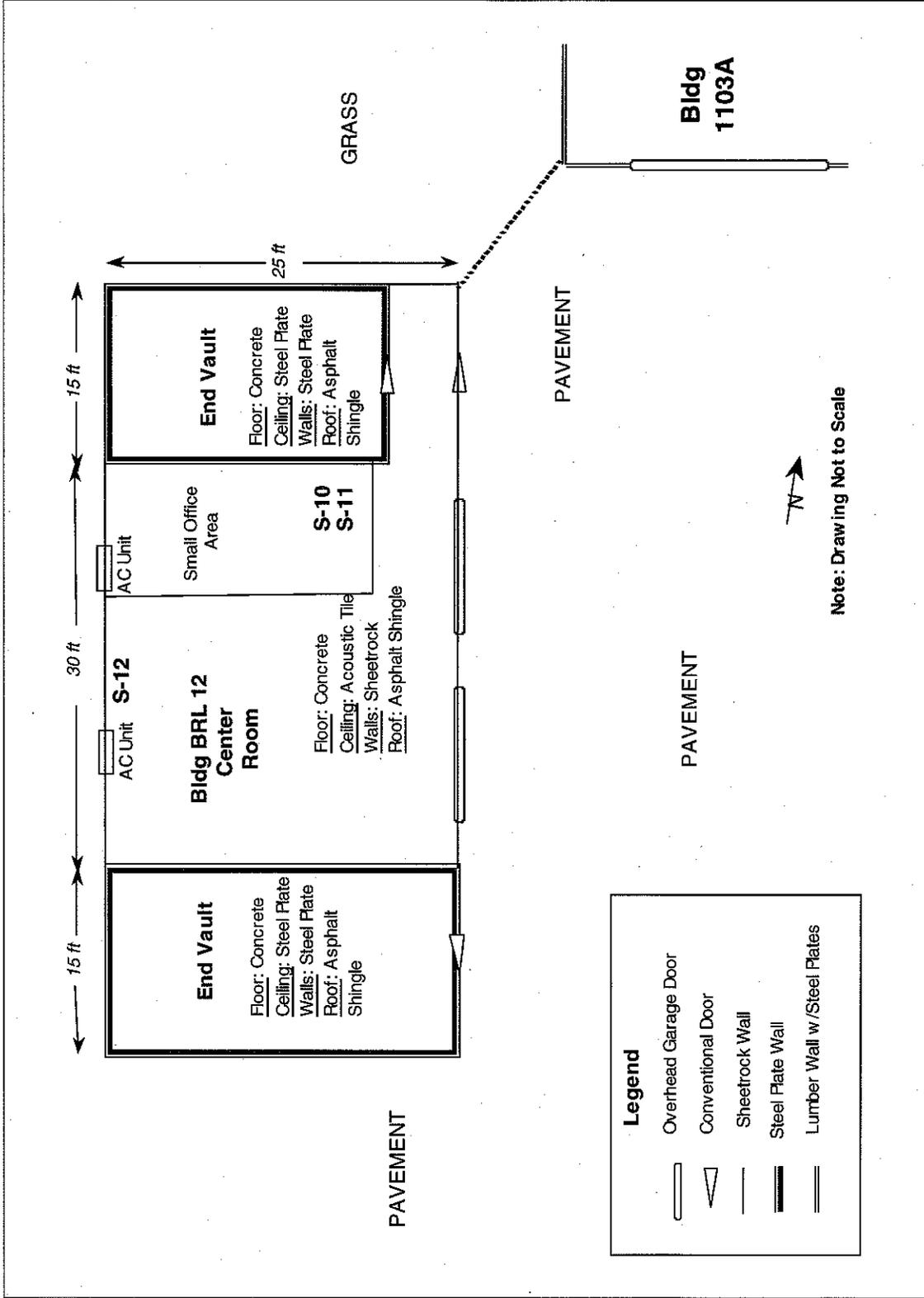
158 →  
L12



**ATTACHEMNT II:  
SAMPLING LOCATION DIAGRAMS**



**Sample Locations - Building 1103A  
 Spesutie Island, AFG, Maryland**



# Sample Locations - Building BRL 12 Spesutie Island, APG, Maryland

**ATTACHMENT III:**

**LABORATORY ANALYTICAL RESULTS**

**CERTIFICATE OF ANALYSIS**

Client: EA Engineering Science & Technology  
Address: 15 Loveton Circle  
Sparks, Maryland 21152  
Job Name: Spesutre Island-Bldg 1103A-APG  
Job Location: Aberdeen, MD  
Job Number: Not Provided  
P.O. Number: Not Provided  
Chain Of Custody: 153140  
Date Analyzed: 5/31/2006  
Person Submitting: Anna-Lisa Marcum

Attention: Anna-Lisa Marcum

**Summary of Polarized Light Microscopy**

AMA Sample Number	Client Sample #	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Color	Homogeneity	Analyst ID	Comments
0651573	S-1	NAD	--	--	--	--	--	--	--	--	--	100	Black	Homogeneous	LB	
0651574	S-2	2	2	--	--	--	--	--	--	--	--	98	Beige	Homogeneous	LB	
0651575	S-3	2	2	--	--	--	--	--	--	--	TR	98	Black	Homogeneous	LB	
0651576	S-4	NAD	--	--	--	--	--	10	--	--	--	90	Multi Layered	Layered	LB	
0651577	S-5	NAD	--	--	--	--	--	--	--	--	2	98	Black	Homogeneous	LB	
0651578	S-6	NAD	--	--	--	--	--	15	--	--	--	85	Multi Layered	Layered	LB	
0651579	S-7	NAD	--	--	--	--	95	--	--	--	--	5	Yellow	Homogeneous	LB	
0651580	S-8	NAD	--	--	--	--	--	95	--	--	--	5	White	Homogeneous	LB	
0651581	S-9	NAD	--	--	--	--	--	10	--	--	--	90	Multi Layered	Layered	LB	
0651582	S-10	2	2	--	--	--	--	--	--	--	--	98	Beige	Homogeneous	LB	
0651583	S-11	NAD	--	--	--	--	--	--	--	--	--	100	Black	Homogeneous	LB	
0651584	S-12	NAD	--	--	--	--	--	--	--	--	--	100	Off-White	Homogeneous	LB	

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from us. Sample types, locations and collection protocols are based upon the information provided by the persons submitting them and, unless collected by personnel of these Laboratories, we expressly disclaim any knowledge and liability for the accuracy and completeness of this information. Residual sample material will be discarded in accordance with the appropriate regulatory guidelines, unless otherwise requested by the client. NVLAP Accreditation applies only to polarized light microscopy of bulk samples and transmission electron microscopy of AHERA air samples. This report must not be used to claim, and does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

**CERTIFICATE OF ANALYSIS**

Client: EA Engineering Science & Technology  
Address: 15 Loveton Circle  
Sparks, Maryland 21152

Job Name: Spesutre Island-Bldg 1103A-APG  
Job Location: Aberdeen, MD  
Job Number: Not Provided  
P.O. Number: Not Provided

Chain Of Custody: 153140  
Date Analyzed: 5/31/2006  
Person Submitting: Anna-Lisa Marcum

Attention: Anna-Lisa Marcum

Page 2 of 2

**Summary of Polarized Light Microscopy**

AMA Sample Number	Client Sample #	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Fiber Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Color	Homogeneity	Analyst ID	Comments	
1																	
2																	

The following footnotes only apply to those samples which the total asbestos result is flagged with a note number.

- 1 TEM RECOMMENDATION - Please note, due to resolution limitations with optical microscopy and/or interference from matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos. It is recommended that the additional analytical technique of TEM be used to check for asbestos fibers below the resolution limits of optical microscopy.
- 2 MATRIX REDUCTION RECOMMENDATION - Please note, due to interference from the matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos which is obscured from view. It is recommended that the additional preparation technique of gravimetric reduction be performed on this sample to minimize the obscuring effects of matrix components, followed by reanalysis by PLM and/or TEM.

Analysis Method - EPA/600/R-93/116 dated July 1993

NAD = "No Asbestos Detected"

TR = "Trace equals less than 1% of this component"

  
Luis Bustillos

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from us. Sample types, locations and collection protocols are based upon the information provided by the persons submitting them and, unless collected by personnel of these Laboratories, we expressly disclaim any knowledge and liability for the accuracy and completeness of this information. Residual sample material will be discarded in accordance with the appropriate regulatory guidelines, unless otherwise requested by the client. NVLAP Accreditation applies only to polarized light microscopy of bulk samples and transmission electron microscopy of AHERA air samples. This report must not be used to claim, and does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



**AMI Analytical Services, Inc.**  
 AIEA (#100470) NVLAP (#101143-0) NY ELAP (10920)  
 4475 Forbes Blvd. • Lanham, MD 20706  
 (301) 459-2640 • (800) 346-0961 • Fax (301) 459-2643  
 www.amilab.com

**Mailing/Billing Information:**

- Client Name: EA Engineering
- Address 1: 1319 Woodbridge Station Way, Suite 200
- Address 2: Edgewood, MD 21040
- Address 3: \_\_\_\_\_
- Phone #: 410-538-8202 Fax #: 410-538-8207

Copies include OOC/final data sheets with results. Reporting information (press) will be provided as soon as technically feasible.  
 Date & Time Results Required: 5/21/06 @ 12 PM  24hr  48hr  72hr  5 Day  10 Day  14 Day  21 Day  28 Day  35 Day  42 Day  49 Day  56 Day  63 Day  70 Day  77 Day  84 Day  91 Day  98 Day  105 Day  112 Day  119 Day  126 Day  133 Day  140 Day  147 Day  154 Day  161 Day  168 Day  175 Day  182 Day  189 Day  196 Day  203 Day  210 Day  217 Day  224 Day  231 Day  238 Day  245 Day  252 Day  259 Day  266 Day  273 Day  280 Day  287 Day  294 Day  301 Day  308 Day  315 Day  322 Day  329 Day  336 Day  343 Day  350 Day  357 Day  364 Day  371 Day  378 Day  385 Day  392 Day  399 Day  406 Day  413 Day  420 Day  427 Day  434 Day  441 Day  448 Day  455 Day  462 Day  469 Day  476 Day  483 Day  490 Day  497 Day  504 Day  511 Day  518 Day  525 Day  532 Day  539 Day  546 Day  553 Day  560 Day  567 Day  574 Day  581 Day  588 Day  595 Day  602 Day  609 Day  616 Day  623 Day  630 Day  637 Day  644 Day  651 Day  658 Day  665 Day  672 Day  679 Day  686 Day  693 Day  700 Day  707 Day  714 Day  721 Day  728 Day  735 Day  742 Day  749 Day  756 Day  763 Day  770 Day  777 Day  784 Day  791 Day  798 Day  805 Day  812 Day  819 Day  826 Day  833 Day  840 Day  847 Day  854 Day  861 Day  868 Day  875 Day  882 Day  889 Day  896 Day  903 Day  910 Day  917 Day  924 Day  931 Day  938 Day  945 Day  952 Day  959 Day  966 Day  973 Day  980 Day  987 Day  994 Day  1001 Day  1008 Day  1015 Day  1022 Day  1029 Day  1036 Day  1043 Day  1050 Day  1057 Day  1064 Day  1071 Day  1078 Day  1085 Day  1092 Day  1099 Day  1106 Day  1113 Day  1120 Day  1127 Day  1134 Day  1141 Day  1148 Day  1155 Day  1162 Day  1169 Day  1176 Day  1183 Day  1190 Day  1197 Day  1204 Day  1211 Day  1218 Day  1225 Day  1232 Day  1239 Day  1246 Day  1253 Day  1260 Day  1267 Day  1274 Day  1281 Day  1288 Day  1295 Day  1302 Day  1309 Day  1316 Day  1323 Day  1330 Day  1337 Day  1344 Day  1351 Day  1358 Day  1365 Day  1372 Day  1379 Day  1386 Day  1393 Day  1400 Day  1407 Day  1414 Day  1421 Day  1428 Day  1435 Day  1442 Day  1449 Day  1456 Day  1463 Day  1470 Day  1477 Day  1484 Day  1491 Day  1498 Day  1505 Day  1512 Day  1519 Day  1526 Day  1533 Day  1540 Day  1547 Day  1554 Day  1561 Day  1568 Day  1575 Day  1582 Day  1589 Day  1596 Day  1603 Day  1610 Day  1617 Day  1624 Day  1631 Day  1638 Day  1645 Day  1652 Day  1659 Day  1666 Day  1673 Day  1680 Day  1687 Day  1694 Day  1701 Day  1708 Day  1715 Day  1722 Day  1729 Day  1736 Day  1743 Day  1750 Day  1757 Day  1764 Day  1771 Day  1778 Day  1785 Day  1792 Day  1799 Day  1806 Day  1813 Day  1820 Day  1827 Day  1834 Day  1841 Day  1848 Day  1855 Day  1862 Day  1869 Day  1876 Day  1883 Day  1890 Day  1897 Day  1904 Day  1911 Day  1918 Day  1925 Day  1932 Day  1939 Day  1946 Day  1953 Day  1960 Day  1967 Day  1974 Day  1981 Day  1988 Day  1995 Day  2002 Day  2009 Day  2016 Day  2023 Day  2030 Day  2037 Day  2044 Day  2051 Day  2058 Day  2065 Day  2072 Day  2079 Day  2086 Day  2093 Day  2100 Day  2107 Day  2114 Day  2121 Day  2128 Day  2135 Day  2142 Day  2149 Day  2156 Day  2163 Day  2170 Day  2177 Day  2184 Day  2191 Day  2198 Day  2205 Day  2212 Day  2219 Day  2226 Day  2233 Day  2240 Day  2247 Day  2254 Day  2261 Day  2268 Day  2275 Day  2282 Day  2289 Day  2296 Day  2303 Day  2310 Day  2317 Day  2324 Day  2331 Day  2338 Day  2345 Day  2352 Day  2359 Day  2366 Day  2373 Day  2380 Day  2387 Day  2394 Day  2401 Day  2408 Day  2415 Day  2422 Day  2429 Day  2436 Day  2443 Day  2450 Day  2457 Day  2464 Day  2471 Day  2478 Day  2485 Day  2492 Day  2499 Day  2506 Day  2513 Day  2520 Day  2527 Day  2534 Day  2541 Day  2548 Day  2555 Day  2562 Day  2569 Day  2576 Day  2583 Day  2590 Day  2597 Day  2604 Day  2611 Day  2618 Day  2625 Day  2632 Day  2639 Day  2646 Day  2653 Day  2660 Day  2667 Day  2674 Day  2681 Day  2688 Day  2695 Day  2702 Day  2709 Day  2716 Day  2723 Day  2730 Day  2737 Day  2744 Day  2751 Day  2758 Day  2765 Day  2772 Day  2779 Day  2786 Day  2793 Day  2800 Day  2807 Day  2814 Day  2821 Day  2828 Day  2835 Day  2842 Day  2849 Day  2856 Day  2863 Day  2870 Day  2877 Day  2884 Day  2891 Day  2898 Day  2905 Day  2912 Day  2919 Day  2926 Day  2933 Day  2940 Day  2947 Day  2954 Day  2961 Day  2968 Day  2975 Day  2982 Day  2989 Day  2996 Day  3003 Day  3010 Day  3017 Day  3024 Day  3031 Day  3038 Day  3045 Day  3052 Day  3059 Day  3066 Day  3073 Day  3080 Day  3087 Day  3094 Day  3101 Day  3108 Day  3115 Day  3122 Day  3129 Day  3136 Day  3143 Day  3150 Day  3157 Day  3164 Day  3171 Day  3178 Day  3185 Day  3192 Day  3199 Day  3206 Day  3213 Day  3220 Day  3227 Day  3234 Day  3241 Day  3248 Day  3255 Day  3262 Day  3269 Day  3276 Day  3283 Day  3290 Day  3297 Day  3304 Day  3311 Day  3318 Day  3325 Day  3332 Day  3339 Day  3346 Day  3353 Day  3360 Day  3367 Day  3374 Day  3381 Day  3388 Day  3395 Day  3402 Day  3409 Day  3416 Day  3423 Day  3430 Day  3437 Day  3444 Day  3451 Day  3458 Day  3465 Day  3472 Day  3479 Day  3486 Day  3493 Day  3500 Day  3507 Day  3514 Day  3521 Day  3528 Day  3535 Day  3542 Day  3549 Day  3556 Day  3563 Day  3570 Day  3577 Day  3584 Day  3591 Day  3598 Day  3605 Day  3612 Day  3619 Day  3626 Day  3633 Day  3640 Day  3647 Day  3654 Day  3661 Day  3668 Day  3675 Day  3682 Day  3689 Day  3696 Day  3703 Day  3710 Day  3717 Day  3724 Day  3731 Day  3738 Day  3745 Day  3752 Day  3759 Day  3766 Day  3773 Day  3780 Day  3787 Day  3794 Day  3801 Day  3808 Day  3815 Day  3822 Day  3829 Day  3836 Day  3843 Day  3850 Day  3857 Day  3864 Day  3871 Day  3878 Day  3885 Day  3892 Day  3899 Day  3906 Day  3913 Day  3920 Day  3927 Day  3934 Day  3941 Day  3948 Day  3955 Day  3962 Day  3969 Day  3976 Day  3983 Day  3990 Day  3997 Day  4004 Day  4011 Day  4018 Day  4025 Day  4032 Day  4039 Day  4046 Day  4053 Day  4060 Day  4067 Day  4074 Day  4081 Day  4088 Day  4095 Day  4102 Day  4109 Day  4116 Day  4123 Day  4130 Day  4137 Day  4144 Day  4151 Day  4158 Day  4165 Day  4172 Day  4179 Day  4186 Day  4193 Day  4200 Day  4207 Day  4214 Day  4221 Day  4228 Day  4235 Day  4242 Day  4249 Day  4256 Day  4263 Day  4270 Day  4277 Day  4284 Day  4291 Day  4298 Day  4305 Day  4312 Day  4319 Day  4326 Day  4333 Day  4340 Day  4347 Day  4354 Day  4361 Day  4368 Day  4375 Day  4382 Day  4389 Day  4396 Day  4403 Day  4410 Day  4417 Day  4424 Day  4431 Day  4438 Day  4445 Day  4452 Day  4459 Day  4466 Day  4473 Day  4480 Day  4487 Day  4494 Day  4501 Day  4508 Day  4515 Day  4522 Day  4529 Day  4536 Day  4543 Day  4550 Day  4557 Day  4564 Day  4571 Day  4578 Day  4585 Day  4592 Day  4599 Day  4606 Day  4613 Day  4620 Day  4627 Day  4634 Day  4641 Day  4648 Day  4655 Day  4662 Day  4669 Day  4676 Day  4683 Day  4690 Day  4697 Day  4704 Day  4711 Day  4718 Day  4725 Day  4732 Day  4739 Day  4746 Day  4753 Day  4760 Day  4767 Day  4774 Day  4781 Day  4788 Day  4795 Day  4802 Day  4809 Day  4816 Day  4823 Day  4830 Day  4837 Day  4844 Day  4851 Day  4858 Day  4865 Day  4872 Day  4879 Day  4886 Day  4893 Day  4900 Day  4907 Day  4914 Day  4921 Day  4928 Day  4935 Day  4942 Day  4949 Day  4956 Day  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5663 Day  5670 Day  5677 Day  5684 Day  5691 Day  5698 Day  5705 Day  5712 Day  5719 Day  5726 Day  5733 Day  5740 Day  5747 Day  5754 Day  5761 Day  5768 Day  5775 Day  5782 Day  5789 Day  5796 Day  5803 Day  5810 Day  5817 Day  5824 Day  5831 Day  5838 Day  5845 Day  5852 Day  5859 Day  5866 Day  5873 Day  5880 Day  5887 Day  5894 Day  5901 Day  5908 Day  5915 Day  5922 Day  5929 Day  5936 Day  5943 Day  5950 Day  5957 Day  5964 Day  5971 Day  5978 Day  5985 Day  5992 Day  5999 Day  6006 Day  6013 Day  6020 Day  6027 Day  6034 Day  6041 Day  6048 Day  6055 Day  6062 Day  6069 Day  6076 Day  6083 Day  6090 Day  6097 Day  6104 Day  6111 Day  6118 Day  6125 Day  6132 Day  6139 Day  6146 Day  6153 Day  6160 Day  6167 Day  6174 Day  6181 Day  6188 Day  6195 Day  6202 Day  6209 Day  6216 Day  6223 Day  6230 Day  6237 Day  6244 Day  6251 Day  6258 Day  6265 Day  6272 Day  6279 Day  6286 Day  6293 Day  6300 Day  6307 Day  6314 Day  6321 Day  6328 Day  6335 Day  6342 Day  6349 Day  6356 Day  6363 Day  6370 Day  6377 Day  6384 Day  6391 Day  6398 Day  6405 Day  6412 Day  6419 Day  6426 Day  6433 Day  6440 Day  6447 Day  6454 Day  6461 Day  6468 Day  6475 Day  6482 Day  6489 Day  6496 Day  6503 Day  6510 Day  6517 Day  6524 Day  6531 Day  6538 Day  6545 Day  6552 Day  6559 Day  6566 Day  6573 Day  6580 Day  6587 Day  6594 Day  6601 Day  6608 Day  6615 Day  6622 Day  6629 Day  6636 Day  6643 Day  6650 Day  6657 Day  6664 Day  6671 Day  6678 Day  6685 Day  6692 Day  6699 Day  6706 Day  6713 Day  6720 Day  6727 Day  6734 Day  6741 Day  6748 Day  6755 Day  6762 Day  6769 Day  6776 Day  6783 Day  6790 Day  6797 Day  6804 Day  6811 Day  6818 Day  6825 Day  6832 Day  6839 Day  6846 Day  6853 Day  6860 Day  6867 Day  6874 Day  6881 Day  6888 Day  6895 Day  6902 Day  6909 Day  6916 Day  6923 Day  6930 Day  6937 Day  6944 Day  6951 Day  6958 Day  6965 Day  6972 Day  6979 Day  6986 Day  6993 Day

**ATTACHMENT IV:**  
**INSPECTOR CERTIFICATION**

# AEROSOL MONITORING & ANALYSIS, INC.

*This is to certify that*

**ANNA-LISA MARCUM**

*has met the attendance requirements and successfully completed  
the course entitled*

*4-Hr EPA AHERA Inspector Refresher*

**For Accreditation Under TSCA Title II.**

*David Truman*

2/10/2006

2/10/2006

2/10/2007

DAVID TRUMAN

**Course Date**

**Exam Date**

**Expiration Date**

**Principal Instructor**

082347

VA082347

E. RUSH BARNETT

*E. Rush Barnett*

**Certification No.**

**Virginia Certification No.**

**Course Director**

1331 Ashton Road

P.O. Box 646

Hanover, MD 21076

P: 410-684-3327

F: 410-684-3724

[www.amatraining.com](http://www.amatraining.com)

**APPENDIX F**

**INSTRUMENT CALIBRATION AND  
QUALITY CONTROL DATA**

**F1: Calibration Certificates  
F2: Control Chart Data**

**APPENDIX F-1**

**CALIBRATION CERTIFICATES**



Duratek Instrument Services  
 628 Gallaher Road  
 Kingston, TN 37763  
 Phone: (865) 376-8337  
 Fax: (865) 376-8331

**CALIBRATION  
 CERTIFICATE**

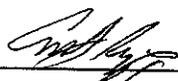
This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			DETECTOR INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Detector Model: 43-37		
Contact Name: Thomas F. Scott			Serial Number: 092765		
Customer Purchase: Order Number: N/A		Work Order Number: 2006-03726	Evaluation Method: Source		
DETECTOR EVALUATION INFORMATION					
Source Nuclide	Serial Number	Activity (dpm)	Net Response	Efficiency (%)	
Th-230	119709	2,442	338	13.8%	
Tc-99	119713	2,616	535	20.5%	
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background	Operating Voltage	Threshold
2224	125560	5/11/2007	4	1650V	Alpha (120mV)
2224	125560	5/11/2007	490	1650V	Beta (3.5-30mV)
ATTACHMENTS					
Voltage Plateau: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MDA/Cross Talk Evaluation: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
COMMENTS	LINEARITY TEST performed with Tc99 #119713				
Calibrated with 6ft cable  Calibrated in accordance with original equipment technical manual.	Count 1 (Left Toe)	1063	Count 1 (Right Toe)	991	
	Count 2 (Left Mid)	1027	Count 2 (Right Mid)	1028	
	Count 3 (Left Heel)	959	Count 3 (Right Heel)	1084	
			Average	1025.3	
			Pass/Fail	PASS (+/-10% Tolerance)	
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By:	Reviewed By:	Date: 5/11/06			
Certification Date: 5/11/2006			Certification Due: 5/11/2007		

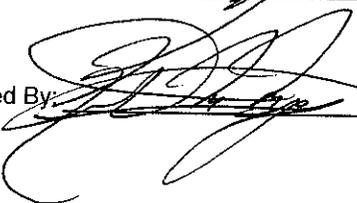
Detector 43-37 #092765 Raw Data (Counts)										
Voltage	Background		Th-230		Tc-99		N/A		N/A	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1600	1	355	269	423	0	806				
1625	1	418	301	517	1	923				
<b>1650</b>	<b>2</b>	<b>520</b>	<b>332</b>	<b>598</b>	<b>5</b>	<b>1021</b>				
1675	2	601	341	718	2	1050				
1700	2	586	399	696	5	1056				
1725	4	586	433	692	5	940				
1750	18	528	407	590	30	817				

Source Info					
Nuclide	Th-230	Tc-99	N/A	N/A	
ID	119709	119713			
Initial DPM	2442	2616			
Certification Date	10/14/1997	10/14/1997			
Today's Date	5/11/2006	5/11/2006	5/11/2006	5/11/2006	
Source Age (Years)	8.57	8.57	106.36	106.36	
Half-Life (Years)	7.70E+04	2.13E+05			
Corrected Activity	2442	2616	#DIV/0!	#DIV/0!	

Net CPM													
Voltage	MDA/Cross-Talk			Beta Eff. (%)	Alpha Eff. (%)	Th-230		Tc-99		N/A		N/A	
	Beta MDA	Alpha MDA	Beta-Alpha			Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1600	524.2	67.1	0.0%	17.24%	11.0%	268	68	-1	451	-1	-355	-1	-355
1625	506.8	59.9	0.1%	19.30%	12.3%	300	99	0	505	-1	-418	-1	-418
<b>1650</b>	<b>568.1</b>	<b>68.7</b>	<b>0.5%</b>	<b>19.15%</b>	<b>13.5%</b>	<b>330</b>	<b>78</b>	<b>3</b>	<b>501</b>	-2	-520	-2	-520
1675	680.3	66.9	0.2%	17.16%	13.9%	339	117	0	449	-2	-601	-2	-601
1700	642.0	57.1	0.5%	17.97%	16.3%	397	110	3	470	-2	-586	-2	-586
1725	852.3	68.4	0.5%	13.53%	17.6%	429	106	1	354	-4	-586	-4	-586
1750	992.3	140.9	3.5%	11.05%	15.9%	389	62	12	289	-18	-528	-18	-528
1775	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0
1800	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0

Performed By: 

Date: 5/11/06

Received By: 

Date: 5/11/06



Duratek Instrument Services  
628 Gallaher Road  
Kingston, TN 37763  
Phone: (865) 376-8337  
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2224	Serial Number: 125560
Contact Name: Tony Riggs		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2006-03726	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION							
Instrument Range	Calibration Standard Value	Ratemeter Response		Calibration Standard Value	Tolerances (cpm) ± 2%	Scaler Response	
		As Found	As Left			As Found	As Left
X 1	100	100	100	40	40	40	40
X 1	250	250	250	400	392-408	401	401
X 1	400	400	400	4,000	3,920-4,080	4,003	4,003
X 10	1,000	1,000	1,000	40,000	39.2K-40.8K	40,037	40,037
X 10	2,500	2,500	2,500	400,000	392K-408K	400,378	400,378
X 10	4,000	4,000	4,000				
X 100	10,000	10,000	10,000				
X 100	25,000	25,000	25,000				
X 100	40,000	40,000	40,000				
X 1000	100,000	100,000	100,000				
X 1000	250,000	250,000	250,000				
X 1000	400,000	400,000	400,000				

**STATEMENT OF CERTIFICATION**

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument		Reviewed By:		Date: 5/11/06
Calibrated By:		Calibration Due: 5/11/2007		

Model: 2224

Serial Number: 125560

M&TE				Environmental Conditions		
Volt Meter	ID# 6565015	Cal Due: 10/19/06		Barometer	ID# 2551	Cal Due: 10/13/06
Pulser	ID# 92851	Cal Due: 9/23/06		Thermometer	ID# 2551	Cal Due: 10/13/06
Humidity	ID# 958670	Cal Due: 03/29/07		Temp: 23.8°C	Pressure: 732mHg	Humidity: 62%
Special Test						
Geotropism		Sat (✓) Unsat ( )		As Found		As Left
Audio Check		Sat (✓) Unsat ( )		Alpha Sensitivity= 120mv		Alpha Sensitivity= 120mv
Mechanical Zero		Sat (✓) Unsat ( )		Beta Sensitivity= 3.5mv		Beta Sensitivity= 3.5mv
Reset		Sat (✓) Unsat ( )		Beta Window= 30mv		Beta Window= 30mv
HV Analog Display		Sat (✓) Unsat ( )		See detector sheet for proper High Voltage setting		
Batt. Ck. (Min. Volt 2.2VDC)		Sat (✓) Unsat ( )		Overload Not Set		Overload Not Set
High Voltage Calibration				H.V. Set With Detector Not Connected		
Voltage	Tolerance	As Found	As Left			
500	450-550	503	503			
1000	900-1100	1,004	1,004			
1500	1350-1650	1,528	1,528			
COMMENTS						
Calibrated in accordance with OEM Technical Manual						
Instrument				Reviewed By: 		
Calibrated By: 				Date: 5/11/06		
Calibration Date: 5/11/2006				Calibration Due: 5/11/2007		



Duratek Instrument Services  
 628 Gallaher Road  
 Kingston, TN 37763  
 Phone: (865) 376-8337  
 Fax: (865) 376-8331

**CALIBRATION  
 CERTIFICATE**

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			DETECTOR INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Rd. Kingston, TN 37763			Detector Model: 43-89		
Contact Name: Tom Scott			Serial Number: 199350		
Customer Purchase Order Number: N/A		Work Order Number: 2005-03302	Evaluation Method: Source		
DETECTOR EVALUATION INFORMATION					
Source Nuclide	Serial Number	Activity (dpm)	Net Response	Efficiency (%)	
Th-230	119709	2,442	404	16.5%	
Tc-99	119713	2,616	343	13.1%	
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background	Operating Voltage	Threshold
2224	118241	10/31/06	2	575V	Alpha (120mV)
2224	118241	10/31/06	235	575V	Beta (3.5-30mV)
ATTACHMENTS					
Voltage Plateau: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Statistical Evaluation: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
COMMENTS			LINEARITY TEST		
Precision test performed with Th-230#119709 Calibrated in accordance with original equipment technical manual. Calibrated with 5 foot cable.			Count 1 (Toe)	411	
			Count 2 (Mid)	434	
			Count 3 (Heel)	373	
			Average	406	
			Pass/Fail	PASS (+/-10% Tolerance)	
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By: <i>M. Paul</i>		Reviewed By: <i>Thomas G. Deal</i>		Date: <i>10-31-05</i>	
Certification Date: 10/31/05			Certification Due: 10/31/06		

**ORIGINAL**

Detector 43-89 #199359 Raw Data (Counts)											
Voltage	Background		Th-230		Tc-99		N/A		N/A		
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	
500	0	64	244	160	1	291					
525	0	157	319	219	3	386					
550	1	185	382	305	1	481					
<b>575</b>	<b>1</b>	<b>254</b>	<b>378</b>	<b>413</b>	<b>0</b>	<b>646</b>					
600	2	273	393	572	1	682					
625	3	346	392	857	1	775					
650	2	523	390	2092	2	1027					

Nuclide Th-230		Source Info		Tc-99		N/A		N/A	
ID	119739	Tc-99	119713						
Initial DPM	2442		2616						
Certification Date	10/14/1997		10/14/1997						
Today's Date	10/31/2005		10/31/2005						
Source Age (Years)	8.05		8.05	#####		#####			
Half-Life (Years)	7.70E+04		2.13E+05	105.83		105.83			
Corrected Activity	2442		2616	#DIV/0!		#DIV/0!			

Voltage	MDA/Cross-Talk			Beta Eff. (%)	Alpha Eff. (%)	Th-230		Tc-99		N/A		N/A	
	Beta MDA	Alpha MDA	Beta-Alpha			Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
500	460.2	27.1	0.3%	8.68%	10.0%	244	96	1	227	0	-64	0	-64
525	696.9	20.7	0.8%	8.75%	13.1%	319	62	3	229	0	-157	0	-157
550	583.2	47.2	0.2%	11.32%	15.6%	381	120	0	296	-1	-185	-1	-185
<b>575</b>	<b>512.9</b>	<b>47.7</b>	<b>0.0%</b>	<b>14.99%</b>	<b>15.4%</b>	<b>377</b>	<b>159</b>	<b>-1</b>	<b>392</b>	<b>-1</b>	<b>-254</b>	<b>-1</b>	<b>-254</b>
600	509.0	58.0	0.1%	15.63%	16.0%	391	299	-1	409	-2	-273	-2	-273
625	544.3	67.6	0.1%	16.40%	15.9%	389	511	-2	429	-3	-346	-3	-346
650	566.3	58.5	0.2%	19.27%	15.9%	388	1569	0	504	-2	-523	-2	-523
675	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0
700	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0

Performed By: Nike Pami

Date: 10/31/05

Reveiwed By: James G. Kelly

Date: 10-31-05

**ORIGINAL**



Duratek Instrument Services  
628 Gallaher Road  
Kingston, TN 37763  
Phone: (865) 376-8337  
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2224	Serial Number: 118241
Contact Name: Thomas F. Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2005-03302	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION							
Instrument Range	Calibration Standard Value	Ratemeter Response		Calibration Standard Value	Tolerances (cpm) ± 2%	Scaler Response	
		As Found	As Left			As Found	As Left
X 1	100	100	100	40	40	40	40
X 1	250	250	250	400	392-408	399	399
X 1	400	390	400	4,000	3920-4080	3,987	3,987
X 10	1,000	1,000	1,000	40,000	39.2K-40.8K	39,434	39,434
X 10	2,500	2,400	2,500	400,000	392K-408K	395,158	395,158
X 10	4,000	3,800	4,000				
X 100	10,000	10,000	10,000				
X 100	25,000	24,000	25,000				
X 100	40,000	38,000	40,000				
X 1000	100,000	100,000	100,000				
X 1000	250,000	240,000	250,000				
X 1000	400,000	380,000	400,000				

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument	
Calibrated By: <i>M. Pauli</i>	Reviewed By: <i>Thomas F. Scott</i> Date: <i>10-31-05</i>
Calibration Date: 10/31/05	Calibration Due: 10/31/06

**ORIGINAL**

M&TE				Environmental Conditions			
Volt Meter	ID# TW12663	Cal Due: 03/30/06	Barometer	ID# 2816	Cal Due: 04/19/06		
Pulser	ID# 101500	Cal Due: 09/28/06	Thermometer	ID# 2816	Cal Due: 04/19/06		
Humidity	ID# 958670	Cal Due: 03/22/06	Temp: 22.8 °C	Pressure: 749mmHg	Humidity: 28%		
Special Test							
Geotropism		Sat (✓) Unsat ( )	As Found		As Left		
Audio Check		Sat (✓) Unsat ( )	Alpha Sensitivity = 117mv		Alpha Sensitivity = 117mv		
Mechanical Zero		Sat (✓) Unsat ( )	Beta Sensitivity = 3.5mv		Beta Sensitivity = 3.5mv		
Reset		Sat (✓) Unsat ( )	Beta Window = 30mv		Beta Window = 30mv		
HV Analog Display		Sat (✓) Unsat ( )	Overload Not Set		Overload Not Set		
Batt. Ck. (Min. Volt 2.2VDC)		Sat (✓) Unsat ( )	See detector calibration certificate for HV setting				
High Voltage Calibration				H.V. Set With Detector Not Connected			
Voltage	Tolerance	As Found	As Left				
500	450-550	497	497				
1000	900-1100	1,004	1,004				
1500	1350-1650	1,510	1,510				
COMMENTS							
*Calibrated with 5ft. Cable*				Calibrated in accordance with OEM Technical Manual			
Instrument							
Calibrated By: <i>M. Pauli</i>				Reviewed By: <i>James Pauli</i> Date: <i>10-31-05</i>			
Calibration Date: 10/31/05				Calibration Due: 10/31/06			

**ORIGINAL**



Duratek Instrument Services  
 628 Gallaher Road  
 Kingston, TN 37763  
 Phone: (865) 376-8337  
 Fax: (865) 376-8331

**CALIBRATION  
 CERTIFICATE**

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			DETECTOR INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Detector Model: 43-89		
Contact Name: Thomas F. Scott			Serial Number: 469		
Customer Purchase: Order Number: N/A		Work Order Number: 2006-03486	Evaluation Method: Source		
DETECTOR EVALUATION INFORMATION					
Source Nuclide	Serial Number	Activity (dpm)	Net Response	Efficiency (%)	
Th-230	119709	2,442	376	15.4%	
Tc-99	119713	2,616	336	12.8%	
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background	Operating Voltage	Threshold
2224	163737	01/17/07	2	850V	Alpha (120mV)
2224	163737	01/17/07	267	850V	Beta (3.5-30mV)
ATTACHMENTS					
Voltage Plateau: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MDA/Cross Talk Evaluation: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
COMMENTS			LINEARITY TEST		
Calibrated with 5ft cable Precision test performed with Th-230 #119709 Calibrated in accordance with original equipment technical manual.			Count 1 (Toe)	376	
			Count 2 (Mid)	362	
			Count 3 (Heel)	341	
			Average	360	
			Pass/Fail	PASS (+/-10% Tolerance)	
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By:	Reviewed By:		Date: 5/10/06		
Certification Date: 5/10/2006		Certification Due: 5/10/2007			

Detector 43-89 #469 Raw Data (Counts)											
Voltage	Background		Th-230		Tc-99		N/A		N/A		
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	
800	3	119	352	147	2	345					
825	2	196	381	203	3	457					
<b>850</b>	<b>2</b>	<b>255</b>	<b>382</b>	<b>326</b>	<b>0</b>	<b>591</b>					
875	3	389	396	474	0	761					
900											

Nuclide Th-230		Source Info		Tc-99		N/A		N/A	
ID	119709				119713				
Initial DPM	2442				2616				
Certification Date	10/14/1997				10/14/1997				
Today's Date	5/10/2006				5/10/2006		5/10/2006		5/10/2006
Source Age (Years)	8.57				8.57		106.36		106.36
Half-Life (Years)	7.70E+04				2.13E+05				
Corrected Activity	2442				2616		#DIV/0!		#DIV/0!

Voltage	MDA/Cross-Talk			Net CPM										
	Beta MDA	Alpha MDA	Beta-Alpha	Beta Eff. (%)	Alpha Eff. (%)	Th-230 Alpha	Beta	Tc-99 Alpha	Beta	N/A Alpha	Beta	N/A Alpha	Beta	
800	618.9	75.3	0.6%	8.64%	14.3%	349	28	-1	226	-3	-119	-3	-119	
825	680.0	59.9	0.7%	9.98%	15.5%	379	7	1	261	-2	-196	-2	-196	
<b>850</b>	<b>599.6</b>	<b>59.7</b>	<b>0.0%</b>	<b>12.84%</b>	<b>15.6%</b>	<b>380</b>	<b>71</b>	<b>-2</b>	<b>336</b>	<b>-2</b>	<b>-255</b>	<b>-2</b>	<b>-255</b>	
875	664.4	66.9	0.0%	14.22%	16.1%	393	85	-3	372	-3	-389	-3	-389	
900	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0	
	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0	
	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0	
	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0	
	#DIV/0!	#DIV/0!	#DIV/0!	0.00%	0.0%	0	0	0	0	0	0	0	0	

Performed By: 

Date: 5/10/06

Reviewed By: 

Date: 5/10/06



Duratek Instrument Services  
628 Gallaher Road  
Kingston, TN 37763  
Phone: (865) 376-8337  
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2224	Serial Number: 163737
Contact Name: Thomas F. Scott		Probe: 43-89	Serial Number: 469
Customer Purchase Order Number: N/A	Work Order Number: 3471 2005-03486	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION							
Instrument Range	Calibration Standard Value	Ratemeter Response		Calibration Standard Value	Tolerances (cpm) ± 2%	Scaler Response	
		As Found	As Left			As Found	As Left
X 1	100	100	100	40	40	40	40
X 1	250	250	250	400	392-408	401	401
X 1	400	400	400	4,000	3920-4080	3,984	3,984
X 10	1,000	1,000	1,000	40,000	39.2K-40.8K	39,807	39,807
X 10	2,500	2,500	2,500	400,000	392K-408K	400,022	400,022
X 10	4,000	4,000	4,000				
X 100	10,000	10,000	10,000				
X 100	25,000	25,000	25,000				
X 100	40,000	40,000	40,000				
X 1000	100,000	100,000	100,000				
X 1000	250,000	250,000	250,000				
X 1000	400,000	400,000	400,000				

**STATEMENT OF CERTIFICATION**

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument			
Calibrated By: M. Pauli	Reviewed By: <i>Thomas F. Scott</i>	Date: 1-17-06	
Calibration Date: 01/17/06	Calibration Due: 01/17/07		

M&TE				Environmental Conditions			
Volt Meter	ID# TW12663	Cal Due: 03/30/06	Barometer	ID# 2816	Cal Due: 04/19/06		
Pulser	ID# 101500	Cal Due: 09/28/06	Thermometer	ID# 2816	Cal Due: 04/19/06		
Humidity	ID# 958670	Cal Due: 03/22/06	Temp: 24.3° C	Pressure: 731mmHg	Humidity: 42%		
Special Test							
Geotropism		Sat (√) Unsat ( )	As Found		As Left		
Audio Check		Sat (√) Unsat ( )	Alpha Sensitivity = 130mv		Alpha Sensitivity = 120mv		
Mechanical Zero		Sat (√) Unsat ( )	Beta Sensitivity = 3.5mv		Beta Sensitivity = 3.5mv		
Reset		Sat (√) Unsat ( )	Beta Window = 32mv		Beta Window = 30mv		
HV Analog Display		Sat (√) Unsat ( )	Overload Not Set		Overload Not Set		
Batt. Ck. (Min. Volt 2.2VDC)		Sat (√) Unsat ( )	See detector calibration certificate for HV setting				
High Voltage Calibration				H.V. Set With Detector Not Connected			
Voltage	Tolerance	As Found	As Left				
500	450-550	506	506				
1000	900-1100	1,001	1,001				
1500	1350-1650	1,496	1,496				
COMMENTS							
*Calibrated with 5ft. Cable*				Calibrated in accordance with OEM Technical Manual			
Instrument							
Calibrated By: <i>M. Pauli</i>				Reviewed By: <i>James G. Seal</i> Date: <i>1-17-06</i>			
Calibration Date: 01/17/06				Calibration Due: 01/17/07			



**CALIBRATION  
CERTIFICATE**

Duratek Instrument Services  
628 Gallaher Road  
Kingston, TN 37763  
Phone: (865) 376-8337  
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

Customer Information			Instrument Information		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 2929	Serial Number: 115563	
Contact Name: Thomas F. Scott			Probe: 43-10-1	Serial Number: 127216	
Customer Purchase Order Number: N/A		Work Order Number: 2005-03254	Calibration Method: Electronic And Source		
Instrument Calibration Information					
M&TE	ID Number	Calibration Due Date		Environmental Conditions	
Thermometer	2816	04/19/06		Temperature	22.1°C
Barometer	2816	04/19/06		Pressure	740mmHg
Hygrometer	958670	03/22/06		Humidity	60%
Pulse Generator	120935	04/26/06		Calibrated in accordance with CP-IN-WI-235 Rev. 1	
DVM	6565015	10/19/05			
Isotope	Source ID Number	Original Activity (dpm)		Source Cert. Date	Decayed Activity (dpm)
Th <sup>230</sup>	119737	18,720		10/20/97	18,720
Pu <sup>239</sup>	019442	13,613		06/01/92	13,613
Te <sup>99</sup>	119718	20,520		10/01/92	20,520
SrY <sup>90</sup>	129676	15,058		05/12/03	15,058
Frequency Calibration					
Desired (cpm)	Tolerances (cpm)	Alpha As Found (cpm)	Alpha As Left (cpm)	Beta As Found (cpm)	Beta As Left (cpm)
40	40	40	40	40	40
400	(392-408)	401	401	401	401
4,000	(3,920-4,080)	4,005	4,005	4,007	4,007
40,000	(39.2K-40.8K)	40,052	40,052	40,073	40,073
400,000	(392K-408K)	400,536	400,536	400,257	400,257
Background Determination		Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Counts, C <sub>b</sub>		6	6	1375	1213
Time, T <sub>b</sub> (min)		20	20	20	20
Rate, R <sub>b</sub> (cpm)		0.3	0.3	68.75	60.65
Statement of Certification					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument					
Calibrated By: <i>[Signature]</i>		Reviewed By: <i>[Signature]</i>		Date: 10/6/05	
Calibration Date: 10/6/2005			Calibration Due: 10/6/2006		

CROSS TALK SHEET & EFFICIENCY SHEET

Instrument ID: 115563

As Found Alpha Threshold (mv)	As Left Alpha Threshold (mv)
175	175

Alpha Source: Performed using Pu<sup>239</sup> #019442

Parameter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, C <sub>s</sub>	27,770	27,770	852	852
Time, T <sub>s</sub> (min)	5	5	5	5
Rate, R <sub>s</sub> (cpm)	R <sub>s[α]</sub> = 5554	R <sub>s[α]</sub> = 5554	R <sub>s[β]</sub> = 170.4	R <sub>s[β]</sub> = 170.4
EFF (% c/d) (>25%)	40.8%	40.8%	N/A	N/A
% Crosstalk [α to β] (< 10%)	$\frac{R_{s[\beta]} - R_{b[\beta]}}{R_{s[\alpha]} - R_{b[\alpha]}} = \frac{170.4 - 60.65}{5554 - 0.3} = 2\%$			

As Found Beta Low Threshold	As Left Beta Low Threshold	As Found Beta High Threshold	As Left Beta High Threshold
4.0mv	4.0mv	50mv	50mv

Beta Source: Performed using Tc<sup>99</sup> #119718

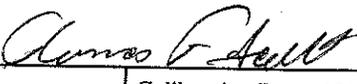
Parameter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, C <sub>s</sub>	2	2	21,322	21,322
Time, T <sub>s</sub> (min)	5	5	5	5
Rate, R <sub>s</sub> (cpm)	R <sub>s[α]</sub> = 0.4	R <sub>s[α]</sub> = 0.4	R <sub>s[β]</sub> = 4264.4	R <sub>s[β]</sub> = 4264.4
EFF (% c/d) (>10%)	N/A	N/A	20.5%	20.5%
% Crosstalk [β to α] (< 1%)	$\frac{R_{s[\alpha]} - R_{b[\alpha]}}{R_{s[\beta]} - R_{b[\beta]}} = \frac{0.4 - 0.3}{4264 - 60.65} = 0.00024\%$			

**High Voltage Power**

Desired Voltage	Tolerance	DVM As Found	DVM As Left	2929 Meter As Found	2929 Meter As Left
600	540 - 660	603	603	600	600
800	720 - 880	805	805	800	800
1,000	900 - 1,100	1,019	1,019	1,000	1,000
1,200	1,080 - 1,320	1,226	1,226	1,200	1,200
1,300	1,170 - 1,430	1,3119	1,3119	1,300	1,300
High Voltage		As Found	Vern Dial Reading	As Left	Vern Dial Reading
		1060V	4.27	1060V	4.27

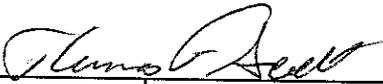
**Statement of Certification**

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument			
Calibrated By: 	Reviewed By: 	Date: <u>10-6-05</u>	
Calibration Date: 10/6/2005	Calibration Due: 10/6/2006		

EFFICIENCY SHEET

Instrument ID: 115563

As Found Alpha Threshold (mv)		As Left Alpha Threshold (mv)		
175		175		
Alpha Source: $\text{Th}^{230}$ #119737				
Parameter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, $C_s$	32,028	32,028	N/A	N/A
Time, $T_s$ (min)	5	5	N/A	N/A
Rate, $R_s$ (cpm)	$R_{s[\alpha]} = 6405.6$	$R_{s[\alpha]} = 6405.6$	$R_{s[\beta]} = \text{N/A}$	$R_{s[\beta]} = \text{N/A}$
EFF (% c/d) (>25%)	34.2%	34.2%	N/A	N/A
% Crosstalk [ $\alpha$ to $\beta$ ] (< 10%)	$\frac{R_{s[\beta]} - R_{b[\beta]}}{R_{s[\alpha]} - R_{b[\alpha]}} = \frac{\text{N/A}}{\text{N/A}} = \text{N/A}$			
As Found Beta Low Threshold	As Left Beta Low Threshold	As Found Beta High Threshold	As Left Beta High Threshold	
4.0mv	4.0mv	50mv	50mv	
Beta Source: $\text{SrY}^{90}$ #129676				
Parameter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, $C_s$	N/A	N/A	28,168	28,168
Time, $T_s$ (min)	N/A	N/A	5	5
Rate, $R_s$ (cpm)	$R_{s[\alpha]} = \text{N/A}$	$R_{s[\alpha]} = \text{N/A}$	$R_{s[\beta]} = 5633.6$	$R_{s[\beta]} = 5633.6$
EFF (% c/d) (>10%)	N/A	N/A	40.0%	40.0%
% Crosstalk [ $\beta$ to $\alpha$ ] (< 1%)	$\frac{R_{s[\alpha]} - R_{b[\alpha]}}{R_{s[\beta]} - R_{b[\beta]}} = \frac{\text{N/A}}{\text{N/A}} = \text{N/A}$			
Statement of Certification				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By: 	Reviewed By: 	Date: 10/6/05		
Calibration Date: 10/6/2005		Calibration Due: 10/6/2006		



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.

CUSTOMER CABRERA SERVICES ORDER NO. 253450 / 301183  
Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 176952  
Mfg. Ludlum Measurements, Inc. Model 44-20 Serial No. PR-183465  
Cal. Date 10-Apr-06 Cal Due Date 10-Apr-07 Cal. Interval 1 Year Meterface 202-159

Check mark  applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 23 % Alt 701.8 mm H

- 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) 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 Comments V Input Sens. Comment mV Det. Oper. Comments V at Comment mV Threshold Dial Ratio 100 = 10 mV

HV Readout (2 points) Ref./Inst. 500 / 499 V Ref./Inst. 2000 / 2002 V

## COMMENTS:

Peak Settings Gross Counts Firmware: 26 10 27  
High Voltage: 840V 1150V  
Threshold Setting: 642 100 (10mV) Overload checked but not set.  
Window Setting: 40 N/A HV set w/detector connected.  
Window Position: "IN" "OUT" Calibrated using 6' C-cable.

Resolution for Cs137  $\approx 9.21\%$

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*
x1K	400kcpm	400	400
x1K	100kcpm	100	100
x100	40kcpm	400	400
x100	10kcpm	100	100
x10	4kcpm	400	400
x10	1kcpm	100	100
x1	400cpm	400	400
x1	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
400kcpm	3998(0)	3998(0)	500kcpm	450K	450K
40kcpm	3998	3998	50kcpm	50K	50K
4kcpm	400	400	5kcpm	5K	5K
400cpm	40	40	500cpm	500	500
40cpm	4	4	50cpm	55	55

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 where the calibration system conforms to the requirements of ANSI/NCSL 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 Am241  $\approx$  0.83  $\mu$ CI  
 m 500 S/N 81084  Oscilloscope S/N  Multimeter S/N 78401030

Calibrated By: Sebastyan Gyallos Date 10-Apr-06

Reviewed By: Michael J Thomas Date 11-Apr-06

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.

AC Inst.  Passed Dielectric (Hi-Pot) and Continuity Test





of  
Scientific and Industrial  
Instruments

# CERTIFICATE OF CALIBRATION

POST OFFICE BOX 810 PH. 325-235-5494  
501 OAK STREET FAX NO. 325-235-4672  
SWEETWATER, TEXAS 79556, U.S.A. 239985  
239988, 293982

CUSTOMER CABRERA SERVICES

ORDER NO. 218559

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 218559

Mfg. Ludlum Measurements, Inc. Model 44-20 Serial No. 215488

Cal. Date 25-Aug-05 Cal Due Date 25-Aug-06 Cal. Interval 1 Year Meterface 202-159

check mark  applies to applicable Instr. and/or detector IAW mfg. spec. T. 70 °F RH 43 % 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. (Mln. 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 Comments V Input Sens. Comment mV Det. Oper. Comments V at Comment mV Threshold Dial Ratio 100 = 10 mV

HV Readout (2 points) Ref./Inst. 500 / 499 V Ref./Inst. 2000 / 2002 V

**COMMENTS:**

Peak settings  
High Voltage: 670V.  
Threshold dial: 642  
Window dial: 40  
Window Position: "IN"  
Resolution for Cs137: ~ 8.76 %  
Calibrated using 39" cable.

Gross Counts  
1000V.  
100 (10mv)  
n/a  
"OUT"  
n/a

Model 2221 currently set for "Peak settings".  
High voltage set with detector connected.

Firmware: 261028

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*
x1k	400kcpm		400
x1k	100kcpm		100
x100	40kcpm		400
x100	10kcpm		100
x10	4kcpm		400
x10	1kcpm		100
x1	400cpm		400
x1	100cpm		100

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

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm		39987		500kcpm		450K
40kcpm		3998		50kcpm		50K
4kcpm		400		5kcpm		5.1K
400cpm		40		500cpm		50.5
40cpm		4		50cpm		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 an International Standards Organization member, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. 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:**

T-137 Gamma S/N  1162  G112  M565  5105  T1008  T879  E552  E551  720  734  1616  Neutron Am-241 Be S/N T-304  
 Alpha S/N  Beta S/N  Other Am241 ~ 0.87 µCi  
 m 500 S/N 196745  Oscilloscope S/N  Multimeter S/N 80050663

Calibrated By: Eliud Chavez Date: 25-AUG-05

Reviewed By: Dorice Arago Date: 25 Aug 05

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





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.

CUSTOMER CABRERA SERVICES ORDER NO. 254788 / 301922

Mfg. Ludlum Measurements, Inc. Model 3 Serial No. 135696

Mfg. Ludlum Measurements, Inc. Model 44-9 Serial No. PR145224

Cal. Date 3-May-06 Cal Due Date 3-May-07 Cal. Interval 1 Year Meterface 202-002

Check mark  applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 39 % Alt 698.8 mm H

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 900 V Input Sens. 34 mV Det. Oper. 900 V at 34 mV Threshold Dial Ratio =

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

**COMMENTS:**

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 100	400kcpm	4K	4K
X 100	100kcpm	1K	1K
X 10	40kcpm	4K	4K
X 10	10kcpm	1K	1K
X 1	4kcpm	4K	4K
X 1	1kcpm	1K	1K
X 0.1	400cpm	4K	4K
X 0.1	100cpm	1K	1K

\*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			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/NCSL 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  5105  T1008  T879  E552  E551  720  734  1616  Neutron Am-241 Be S/N T-3

Alpha S/N                       Beta S/N                       Other                     

m 500 S/N 189509  Oscilloscope S/N                       Multimeter S/N 71300492

Calibrated By: Wendell J. Johnson Date 3-MAY-06

Reviewed By: Michael J. Thomas Date 3-May-06

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.

AC Inst.  Passed Dielectric (Hi-Pot) and Continuity Test



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

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

CONVERSION CHART

Customer CABRERA SERVICES Date 3-May-06 Order #. 254788 / 301922

Model 3 Serial No. 135696 Detector Model 44-9 Serial No. PR145224

Source CS137, 1162, E552 High Voltage 900 V

Input Sensitivity 34 mV

Reference Point	"As Found" Readings (CPM):		After Adjustment Readings (CPM):	
	Meter Reading	Range/Scale	Meter Reading	Range/Scale
150 mR/hr	4.2 K	X 100	4.2 K	X 100
50 mR/hr	2 K	X 100	2 K	X 100
15 mR/hr	0.7 K	X 100	0.7 K	X 100
5 mR/hr	2.1 K	X 10	2.1 K	X 10
1.5 mR/hr	0.55 K	X 10	0.55 K	X 10
1.0 mR/hr	3 K	X 1	3 K	X 1

Signature: Wendell Williams Date 3-MAY-06



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.

CUSTOMER CABRERA SERVICES ORDER NO. 247655/298001  
Mfg. Bicron Model MICRO REM Serial No. C853 F  
Mfg. \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_

Cal. Date 22-Dec-05 Cal Due Date 22-Dec-06 Cal. Interval 1 Year Meterface 0-200µrem

Check mark  applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 23 % Alt. 705.8 mm H

- 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) \_\_\_\_\_ 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 \_\_\_\_\_ V Input Sens. \_\_\_\_\_ mV Det. Oper. \_\_\_\_\_ V at \_\_\_\_\_ mV Threshold Dial Ratio \_\_\_\_\_ =

HV Readout (2 points) Ref./Inst. \_\_\_\_\_ / \_\_\_\_\_ V Ref./Inst. \_\_\_\_\_ / \_\_\_\_\_ V

**COMMENTS:**

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*
x1000	150 mR/hr	140	150
x1000	50 mR/hr	50	51
x100	15 mR/hr	155	150
x100	5 mR/hr	50	50
x10	1500 µR/hr	160	150
x10	500 µR/hr	52	50
x1	150 µR/hr	160	150
x1	100 µR/hr	95	95
x0.1	15 µR/hr	150	150
x0.1			

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

Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING

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/NCISL 7540-1-1994 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  5105  T1008  T879  E552  E551  720  734  1616  Neutron Am-241 Be S/N T-3
- Alpha S/N \_\_\_\_\_  Beta S/N \_\_\_\_\_  Other \_\_\_\_\_
- m 500 S/N \_\_\_\_\_  Oscilloscope S/N \_\_\_\_\_  Multimeter S/N \_\_\_\_\_

Calibrated By: Duane Jackson Date 22-Dec-05

Reviewed By: [Signature] Date 23 Dec 05

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AC Inst.  Passed Dielectric (Hi-Pot) and Continuity Test



**CALIBRATION  
CERTIFICATE**

Duratek Instrument Services  
628 Gallaher Road  
Kingston, TN 37763  
Phone: (865) 376-8337  
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

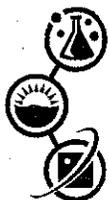
CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services		Manufacturer: F&J Specialty Inc.	
Contact Name: Thomas F. Scott		Model: LV-1	
Address: 628 Gallaher Road, Kingston, TN 37763		Serial Number: 2432	
Contract/Task Number: N/A	Work Order Number: 2005-03169	Calibration Method: Air Flow	

INSTRUMENT CALIBRATION INFORMATION					
Instrument Range (LPM)	Standard Value (LPM)	Tolerance (±10%)	As Found	As Left	Comments
10 - 100	60	54-66	58	60	Barometer: 2816 Cal Due: 04/19/06
					Thermometer: 2816 Cal Due: 04/19/06
					Humidity: 958670 Cal Due: 03/22/06
					Fixed Flow Calibration: 60 LPM
					Temperature: 21.6 °C
					Pressure: 746 mmHg
					Humidity: 60%
					Previous Media: FP-47M
					Current Media: FP-47M
					Flow Set to 60 LPM and indicated by an arrow.
					Limited Use: Flow set to 60LPM with FP-47M filter media. Rotometer marked to indicate 60LPM.

**STATEMENT OF CERTIFICATION**

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument			
Calibrated By:	Reviewed By:	Date: 9-7-05	
Calibration Date: 09/07/05	Calibration Due: 09/07/06		



# EBERLINE SERVICES

## CERTIFICATE OF CALIBRATION

Electroplated Beta Standard

S.O.# 6396

P.O.# 06-456

**Description of Standard:**

Model No. DNS-12 Serial No. 5649-06 Isotope Tc-99

Electroplated on polished SS disc, 0.79 mm thick.

Total diameter of 4.77 cm and an active diameter of 4.45 cm.

The radioactive material is permanently fixed to the disc by heat treatment without any covering over the active surface.

**Measurement Method:**

The 2pi beta emission rate was measured using an internal gas flow proportional chamber. Absolute counting of beta particles emitted in the hemisphere above the active surface was verified by counting above, below, and at the operative voltage. The calibration is traceable to NIST by reference to an NIST calibrated beta source S/N 4002-02.

**Measurement Result:**

The observed beta count rate from the surface of the disc per minute (cpm) on the calibration date was:

9,270 ± 278

The total disintegration rate (dpm) assuming 25 % backscatter of beta particles from the surface of the disc, was:

14,800 ± 444 ( 0.00668  $\mu$ Ci)

The uncertainty of the measurement is 3 %, which is the sum of random counting error at the 99% confidence level, and the estimated upper limit of systematic error in this measurement.

Calibrated by: ART REUST

Reviewed by: Stan Sanchez

Calibration Technician: Art Reust

Q.A. Representative: Anthony W. Roth

Calibration Date: 2-28-2006

Reviewed Date: 2-28-06

Analytical Services  
7021 Pan American Freeway NE  
Albuquerque, New Mexico 87109-4238  
(505) 345-3461 Fax (505) 761-5416  
Toll Free (866) RAD-LABS (723-5227)  
www.eberlineservices.com



# EBERLINE SERVICES

## CERTIFICATE OF CALIBRATION

Electroplated Alpha Standard

S.O.# 6396

P.O.# 06-456

**Description of Standard:**

Model No. DNS-11 Serial No. 5648-06 Isotope Th-230

Electroplated on polished SS disc, 0.79 mm thick.

Total diameter of 4.77 cm and an active diameter of 4.45 cm.

The radioactive material is permanently fixed to the disc by heat treatment without any covering over the active surface.

**Measurement Method:**

The 2pi alpha emission rate was measured using an internal gas flow proportional chamber. Absolute counting of alpha particles emitted in the hemisphere above the active surface was verified by counting above, below, and at the operative voltage. The calibration is traceable to NIST by reference to an NIST calibrated alpha source S/N 4001-02.

**Measurement Result:**

The observed alpha particles emitted from the surface of the disc per minute (cpm) on the calibration date was:

8,780 ± 263

The total disintegration rate (dpm) assuming 1.5% backscatter of alpha particles from the surface of the disc, was:

17,300 ± 518 ( 0.00779  $\mu$ Ci)

The uncertainty of the measurement is 3%, which is the sum of random counting error at the 99% confidence level, and the estimated upper limit of systematic error in this measurement.

Calibrated by: ART REUST

Reviewed by: [Signature]

Calibration Technician: [Signature]

Q.A. Representative: Anthony W. Toth

Calibration Date: 2-28-2006

Reviewed Date: 2-28-06

Analytical Services  
7021 Pan American Freeway NE  
Albuquerque, New Mexico 87109-4238  
(505) 345-3461 Fax (505) 761-5416  
Toll Free (866) RAD-LABS (723-5227)  
www.eberlineservices.com



# EBERLINE SERVICES

## CERTIFICATE OF CALIBRATION

Electroplated Beta Standard

S.O.# 6058  
P.O.# 04-386

**Description of Standard:**

Model No. DNS-2 Serial No. 8343 Isotope SrY-90

Electroplated on polished Ni disc, 0.79 mm thick.

Total diameter of 3.18 cm and an active diameter of 2.54 cm.

The radioactive material is permanently fixed to the disc by heat treatment without any covering over the active surface.

**Measurement Method:**

The 2pi beta emission rate was measured using an internal gas flow proportional chamber. Absolute counting of beta particles emitted in the hemisphere above the active surface was verified by counting above, below, and at the operative voltage. The calibration is traceable to NIST by reference to an NIST calibrated beta source S/N 4001-02.

**Measurement Result:**

The observed beta count rate from the surface of the disc per minute (cpm) on the calibration date was:

3,150 + 126

The total disintegration rate (dpm) assuming 40 % backscatter of beta particles from the surface of the disc, was:

4,500 + 180 ( 0.00203  $\mu$ Ci)

The uncertainty of the measurement is 4 %, which is the sum of random counting error at the 99% confidence level, and the estimated upper limit of systematic error in this measurement.

Calibrated by: ART REUST Reviewed by: [Signature]

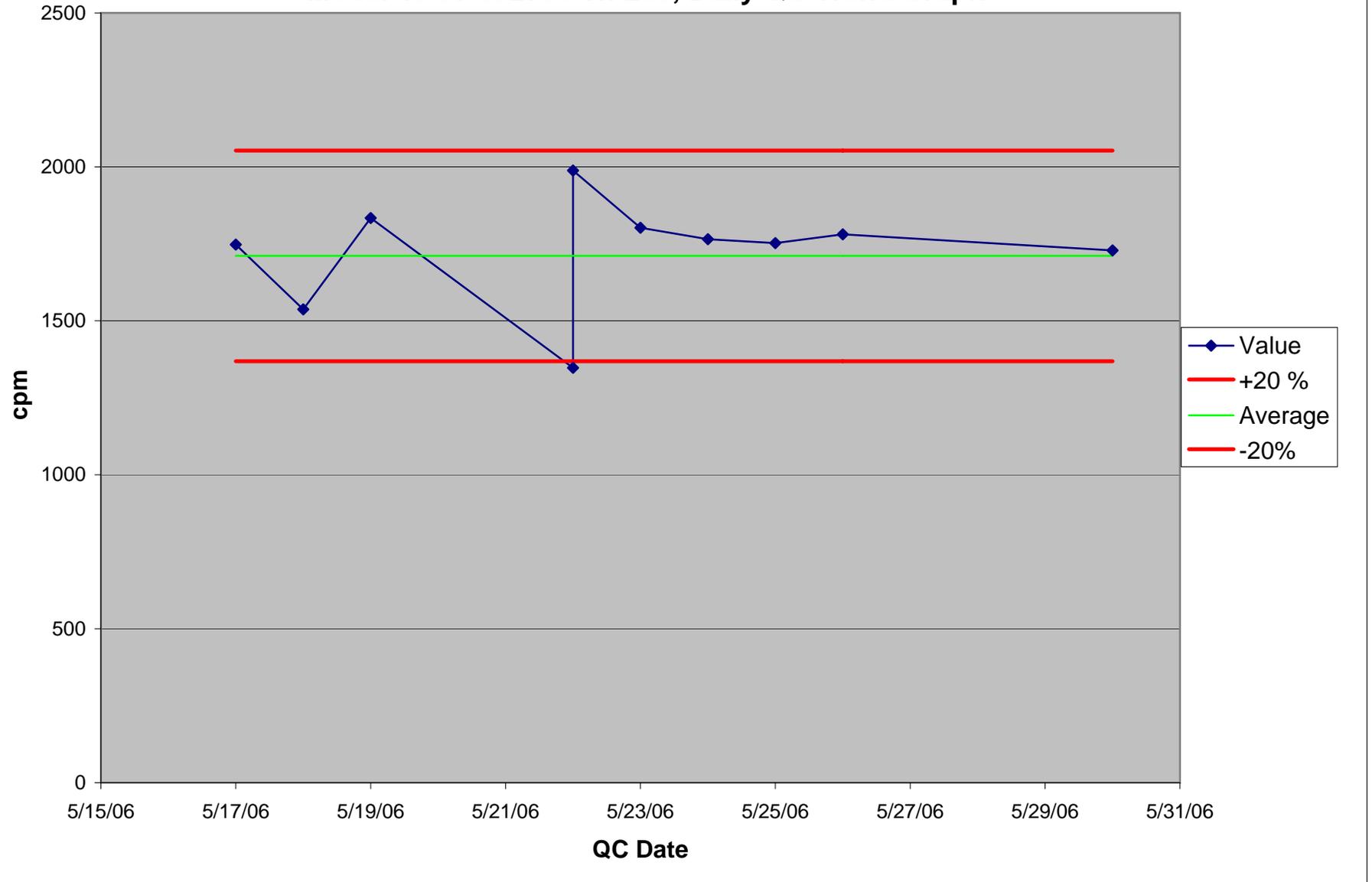
Calibration Technician: [Signature] Q.A. Representative: [Signature]

Calibration Date: 5-12-2004 Reviewed Date: 051204

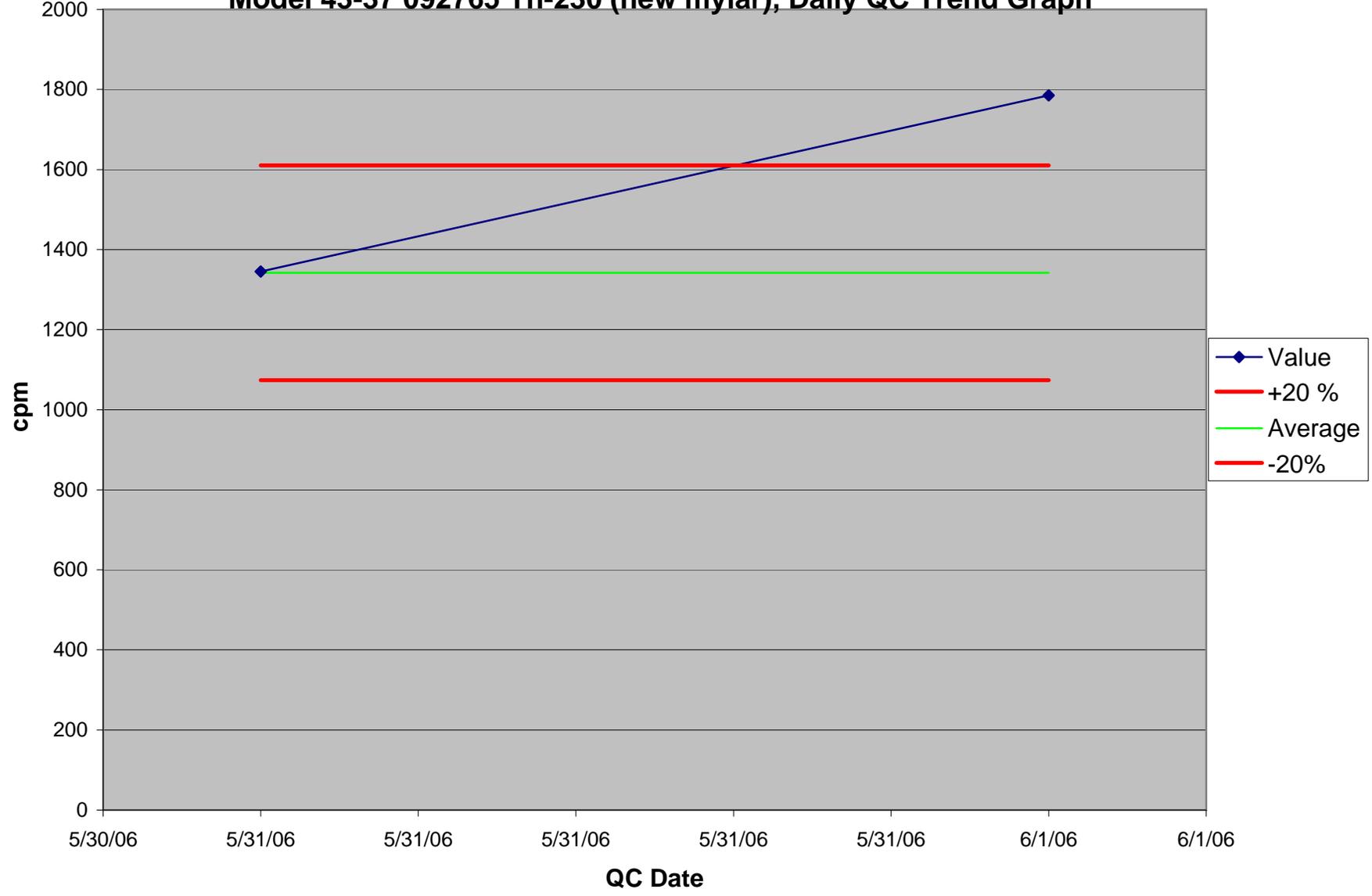
Analytical Services  
7021 Pan American Freeway NE  
Albuquerque, New Mexico 87109-4238  
(505) 345-3461 Fax (505) 761-5416  
Toll Free (866) RAD-LABS (723-5227)  
www.eberlineservices.com

**APPENDIX F-2**  
**CONTROL CHART DATA**

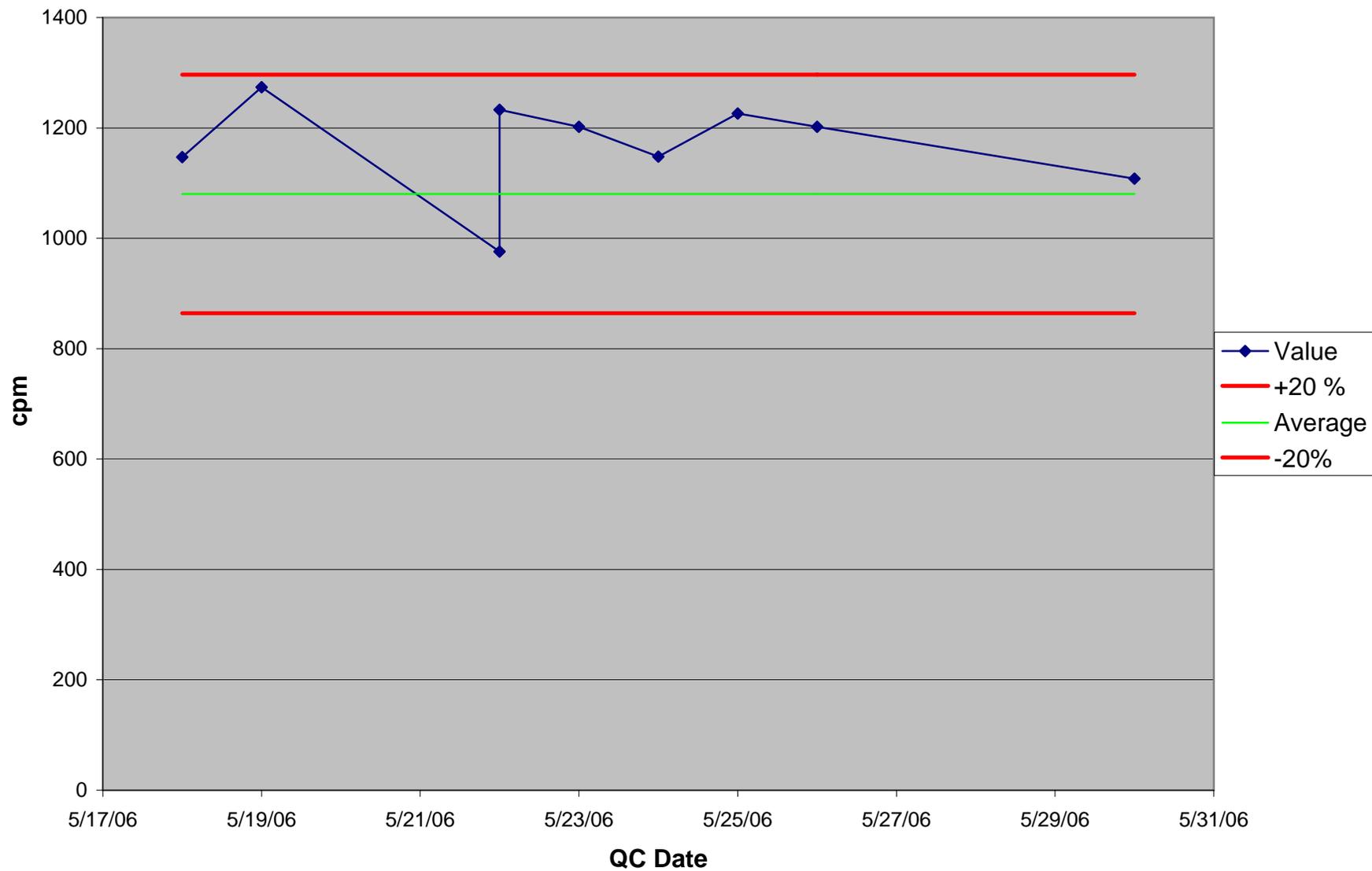
**Model 43-37 092765 Th-230, Daily QC Trend Graph**



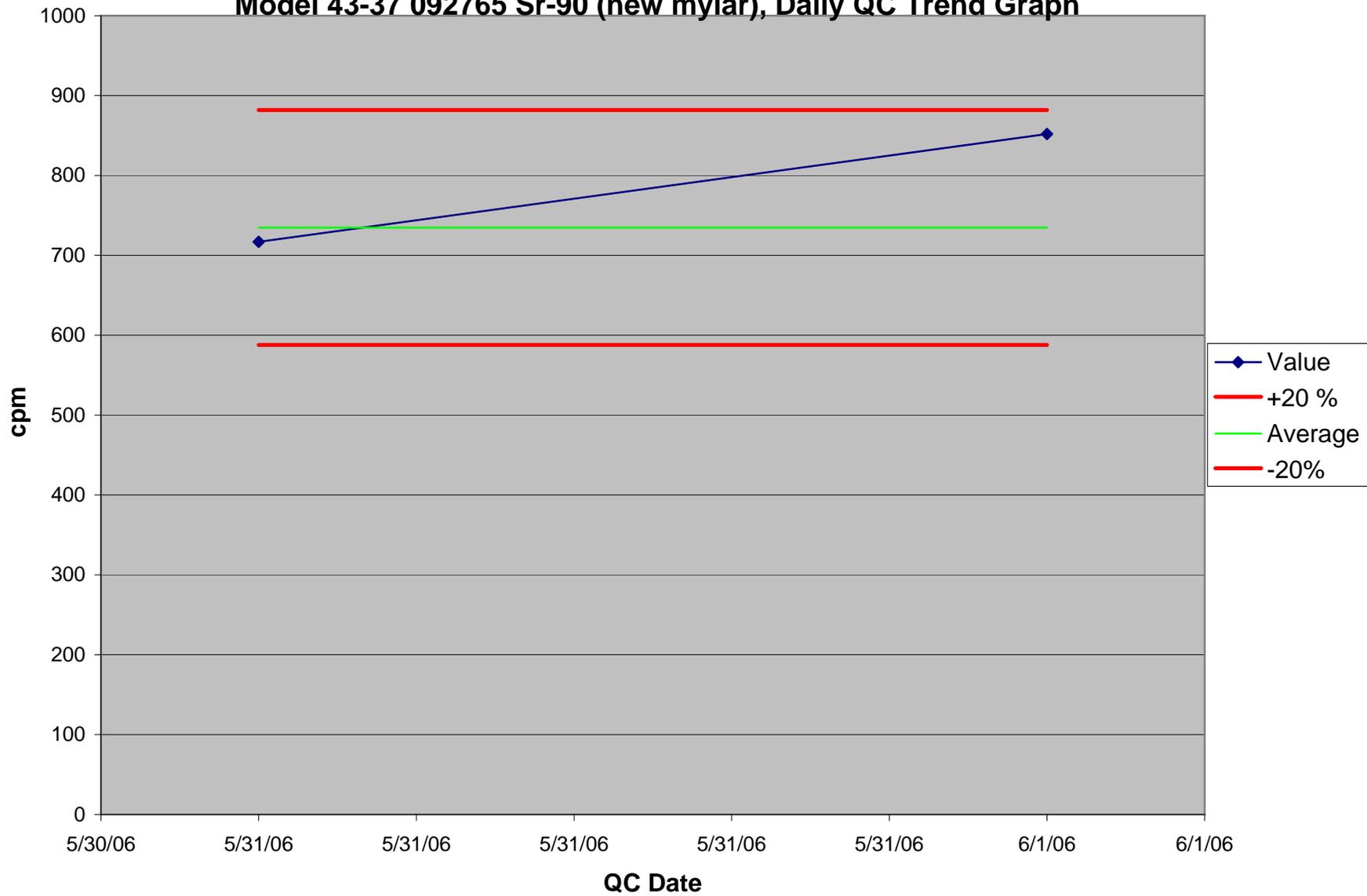
### Model 43-37 092765 Th-230 (new mylar), Daily QC Trend Graph



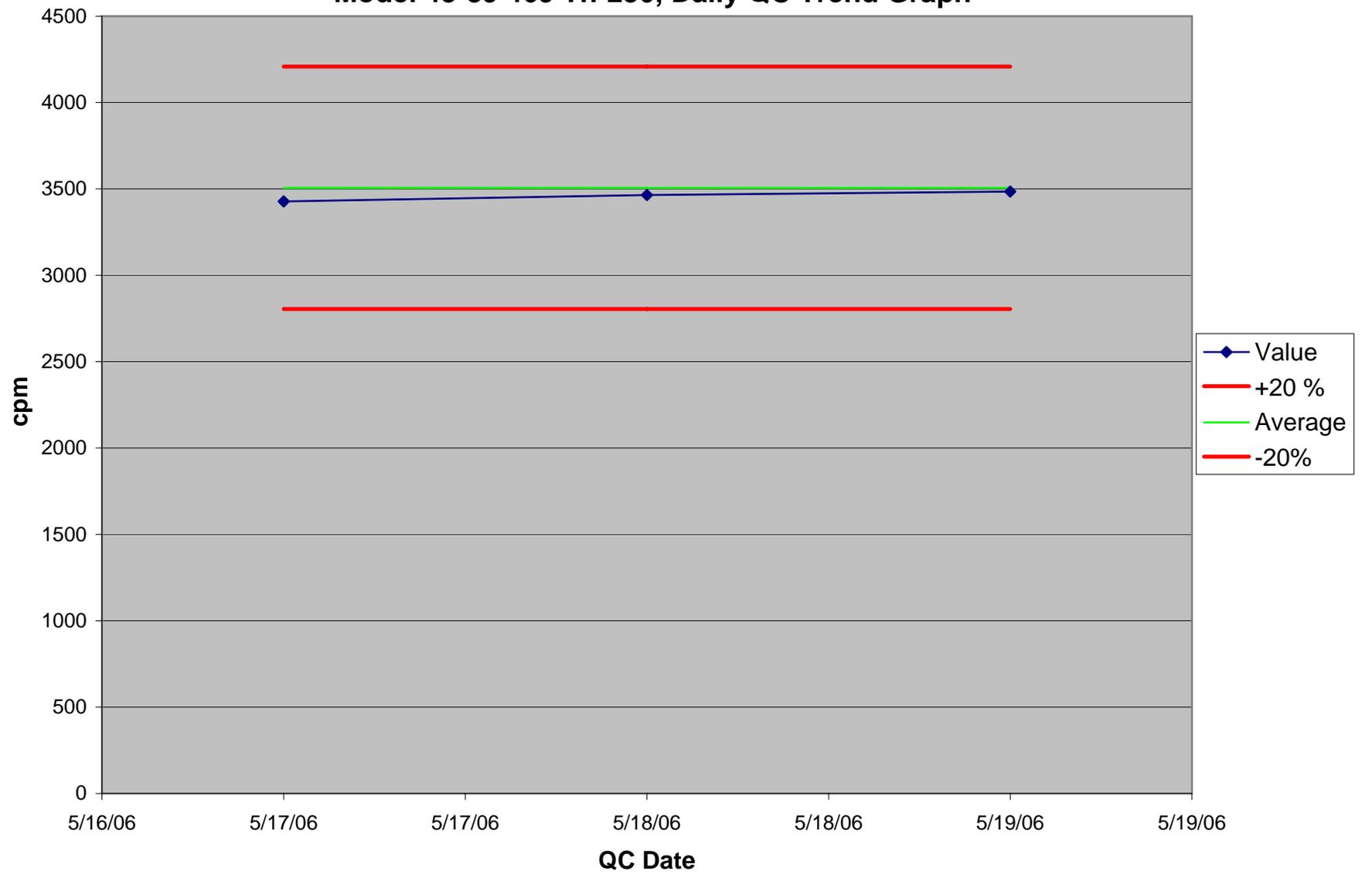
Model 43-37 092765 Sr-90, Daily QC Trend Graph



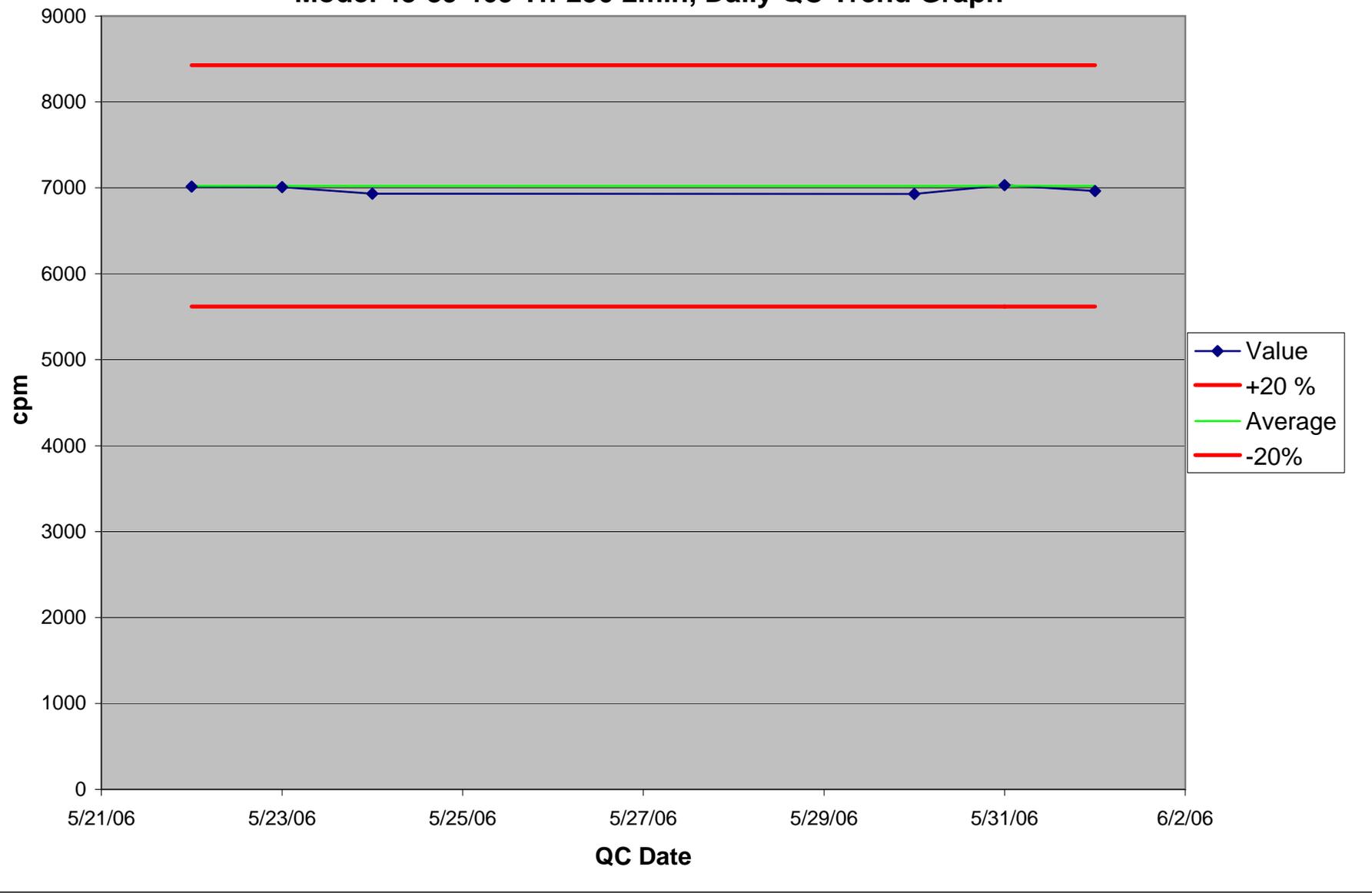
### Model 43-37 092765 Sr-90 (new mylar), Daily QC Trend Graph



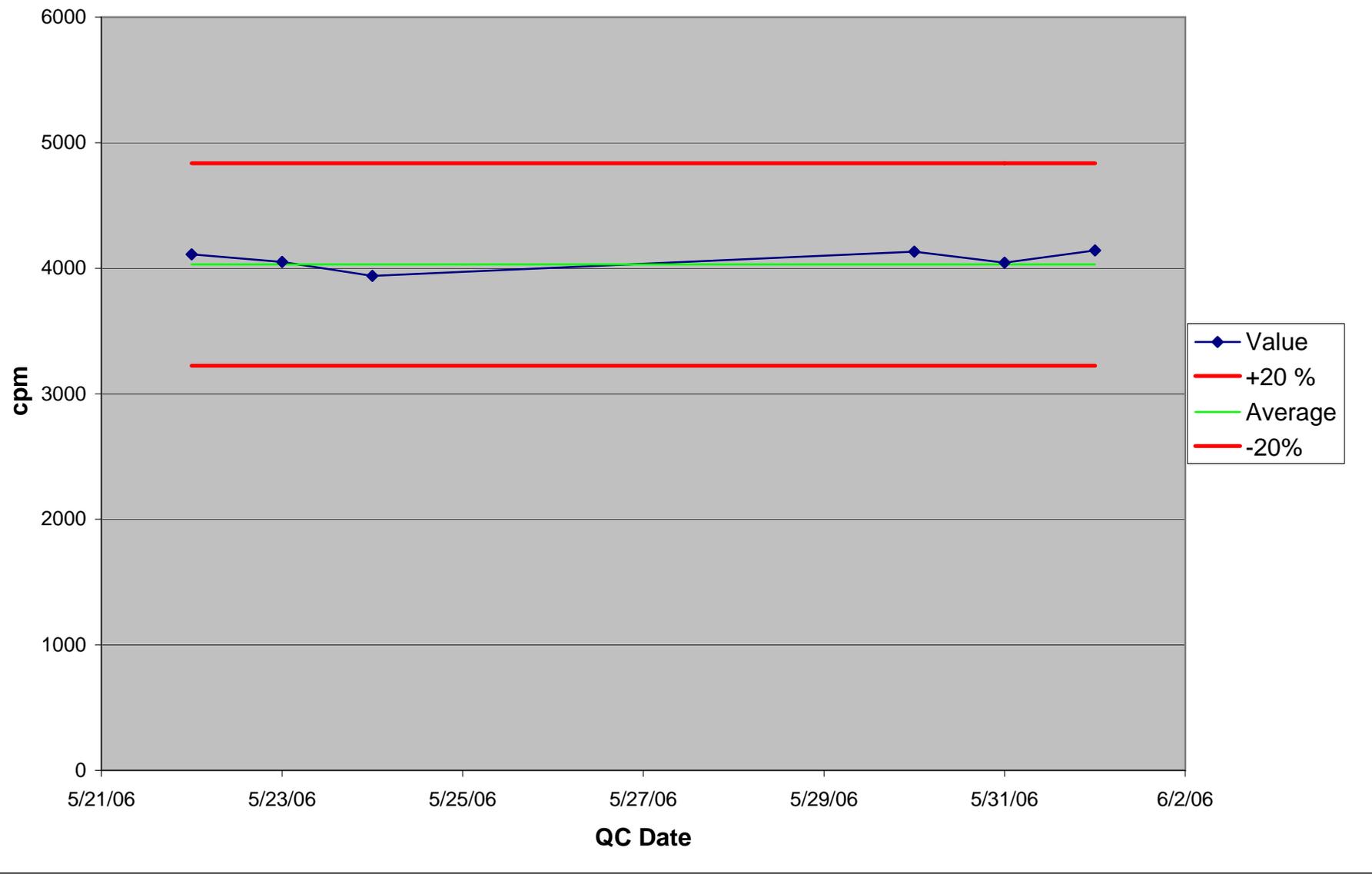
**Model 43-89 469 Th-230, Daily QC Trend Graph**



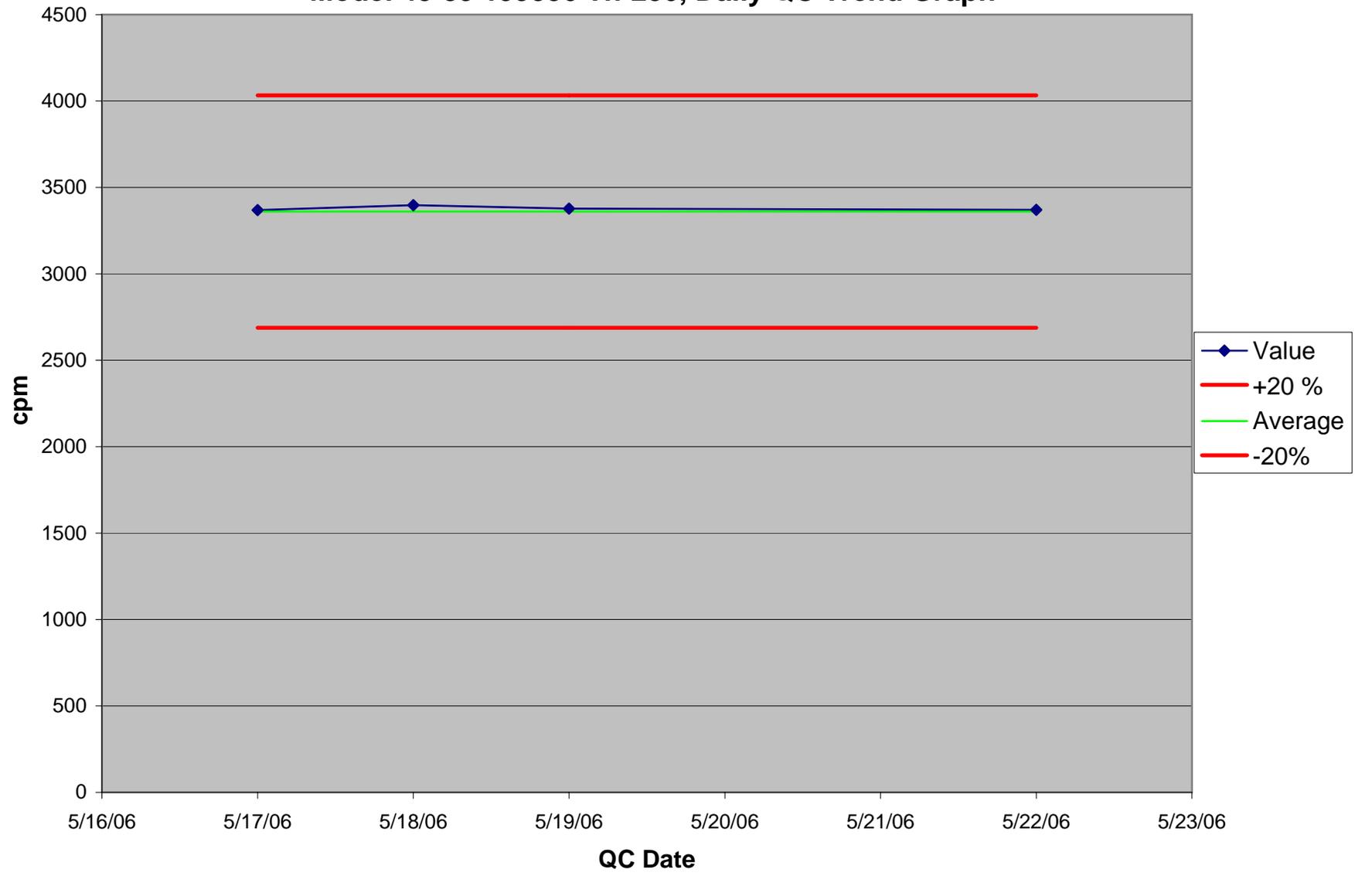
**Model 43-89 469 Th-230 2min, Daily QC Trend Graph**



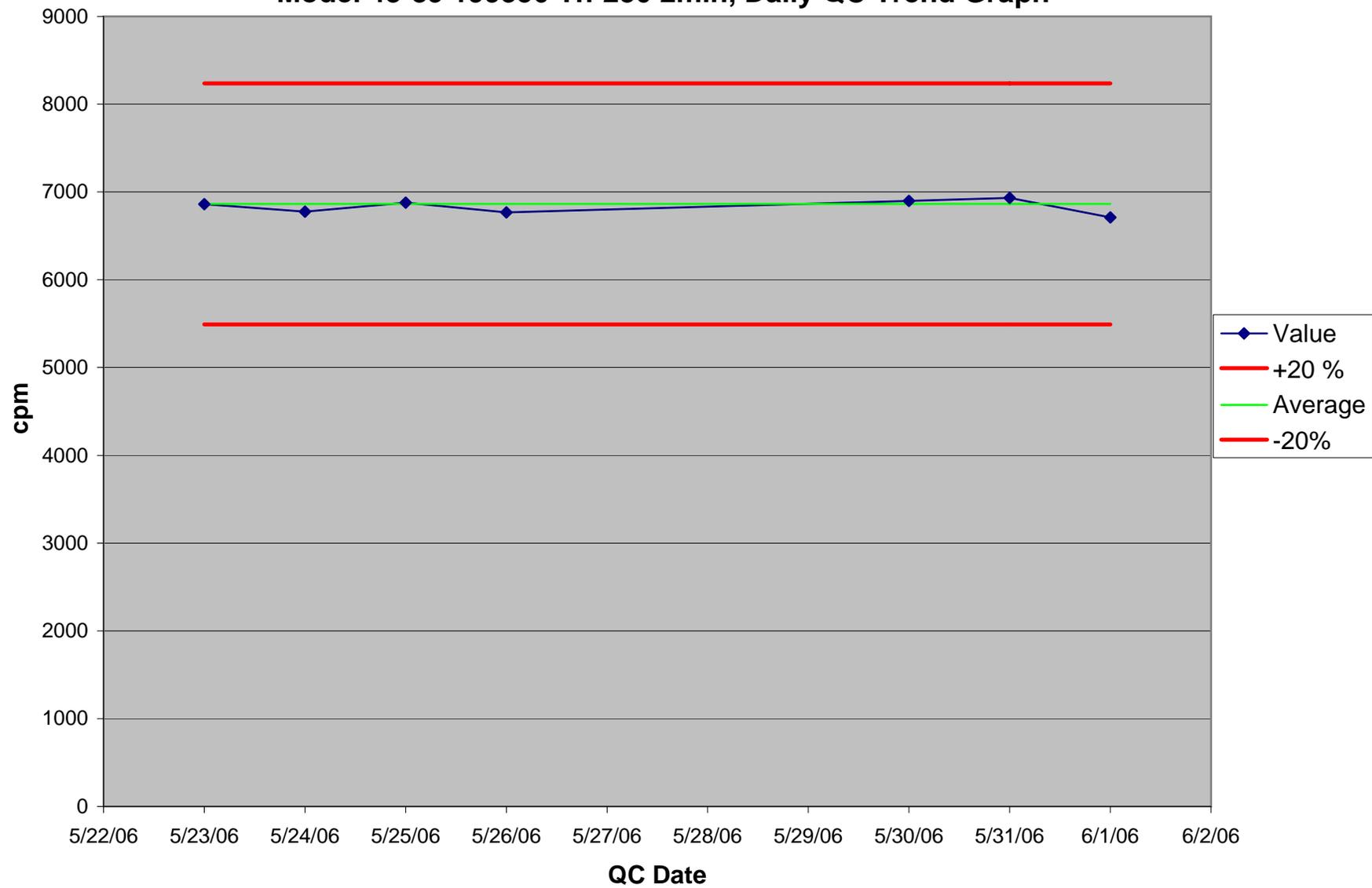
**Model 43-89 469 Sr-90, Daily QC Trend Graph**



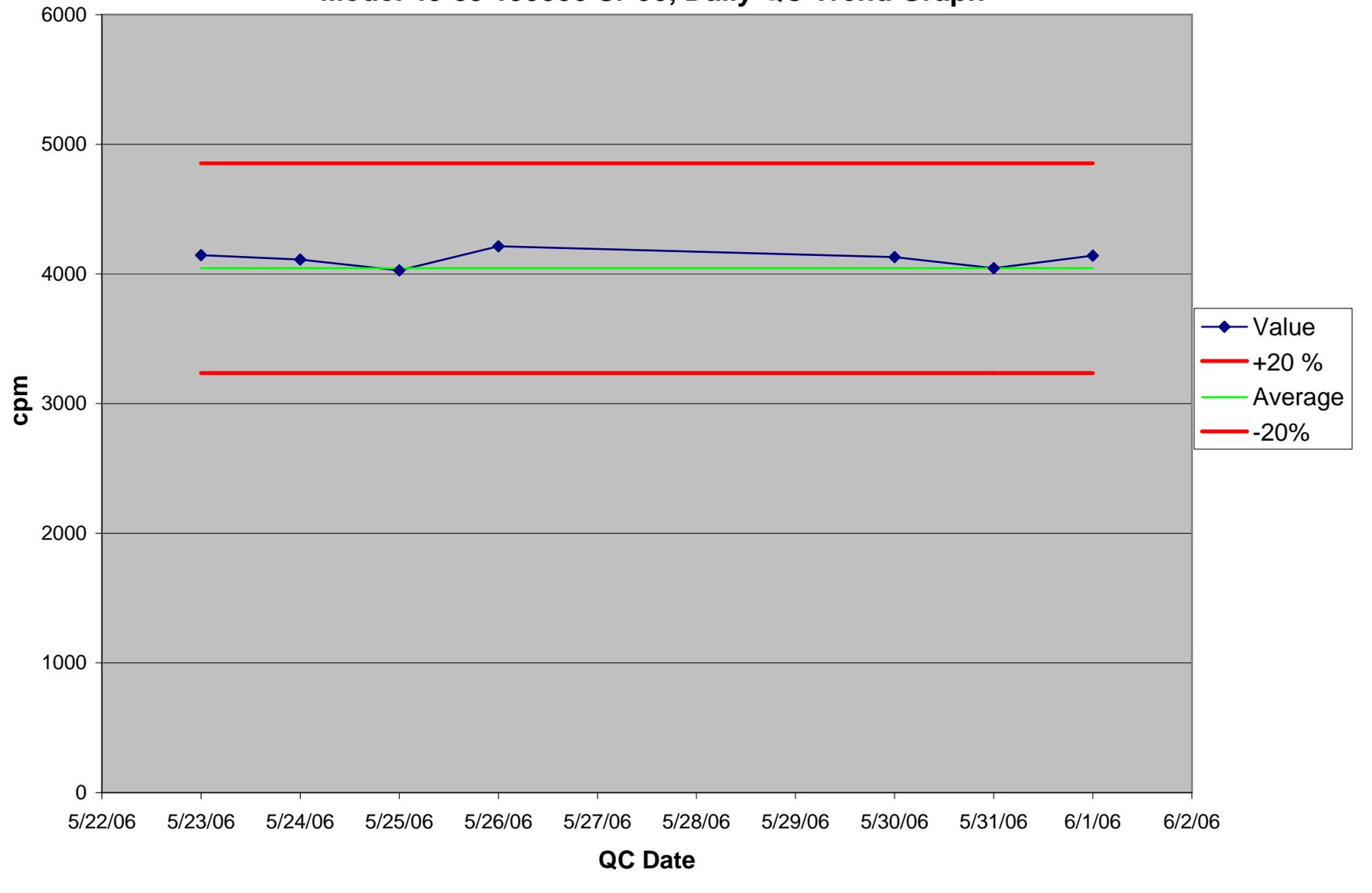
**Model 43-89 199350 Th-230, Daily QC Trend Graph**



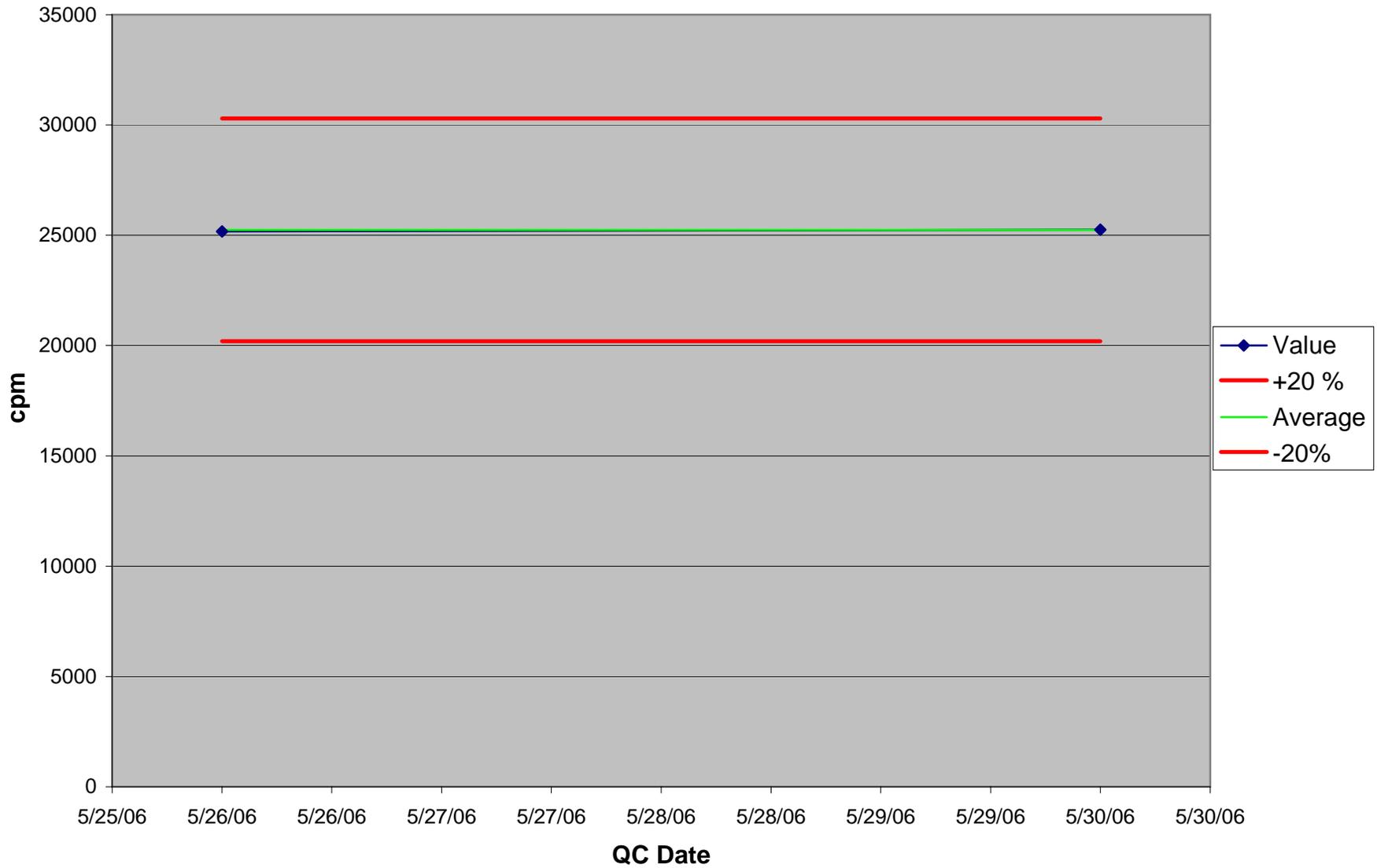
**Model 43-89 199350 Th-230 2min, Daily QC Trend Graph**



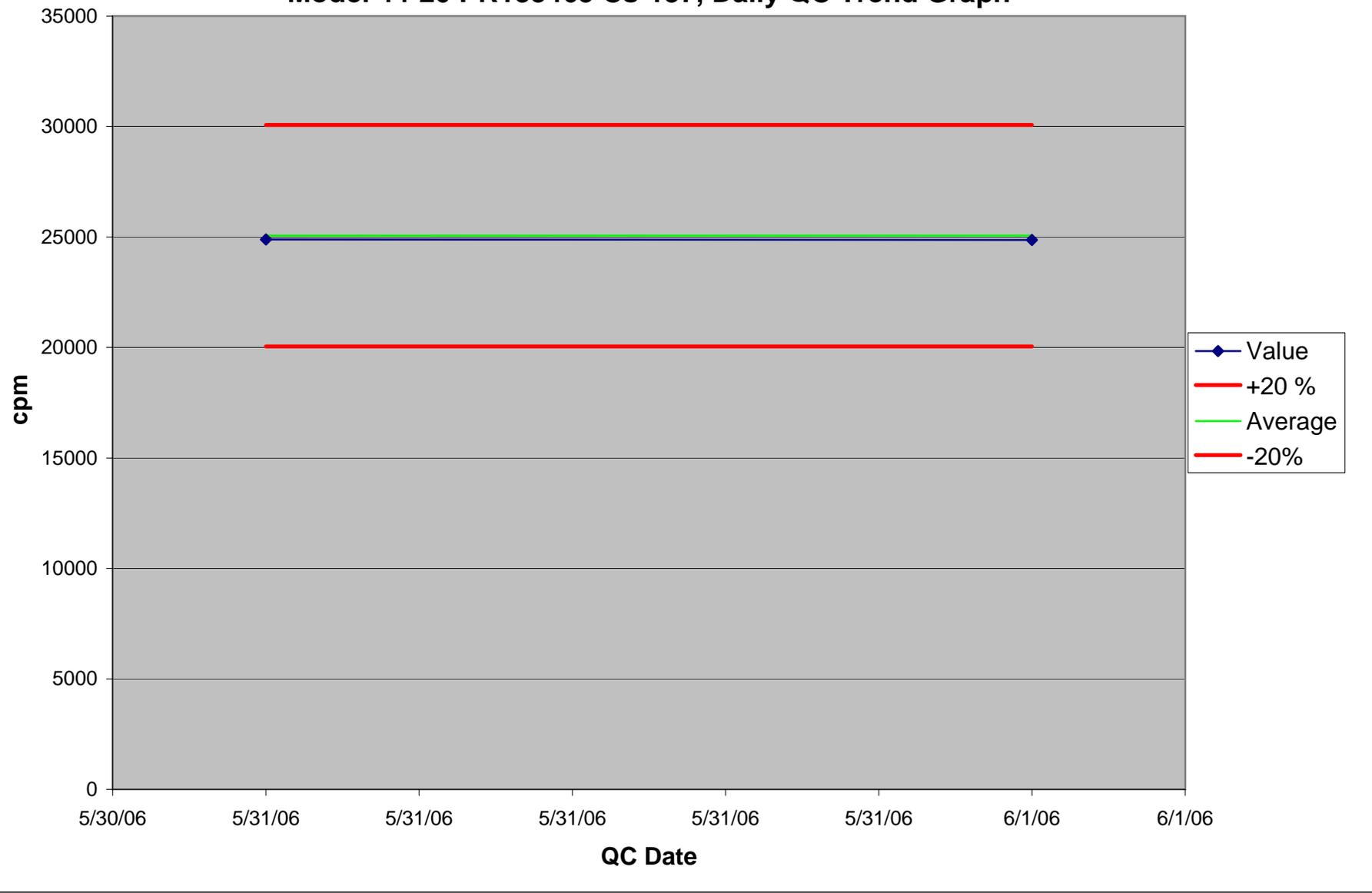
**Model 43-89 199350 Sr-90, Daily QC Trend Graph**



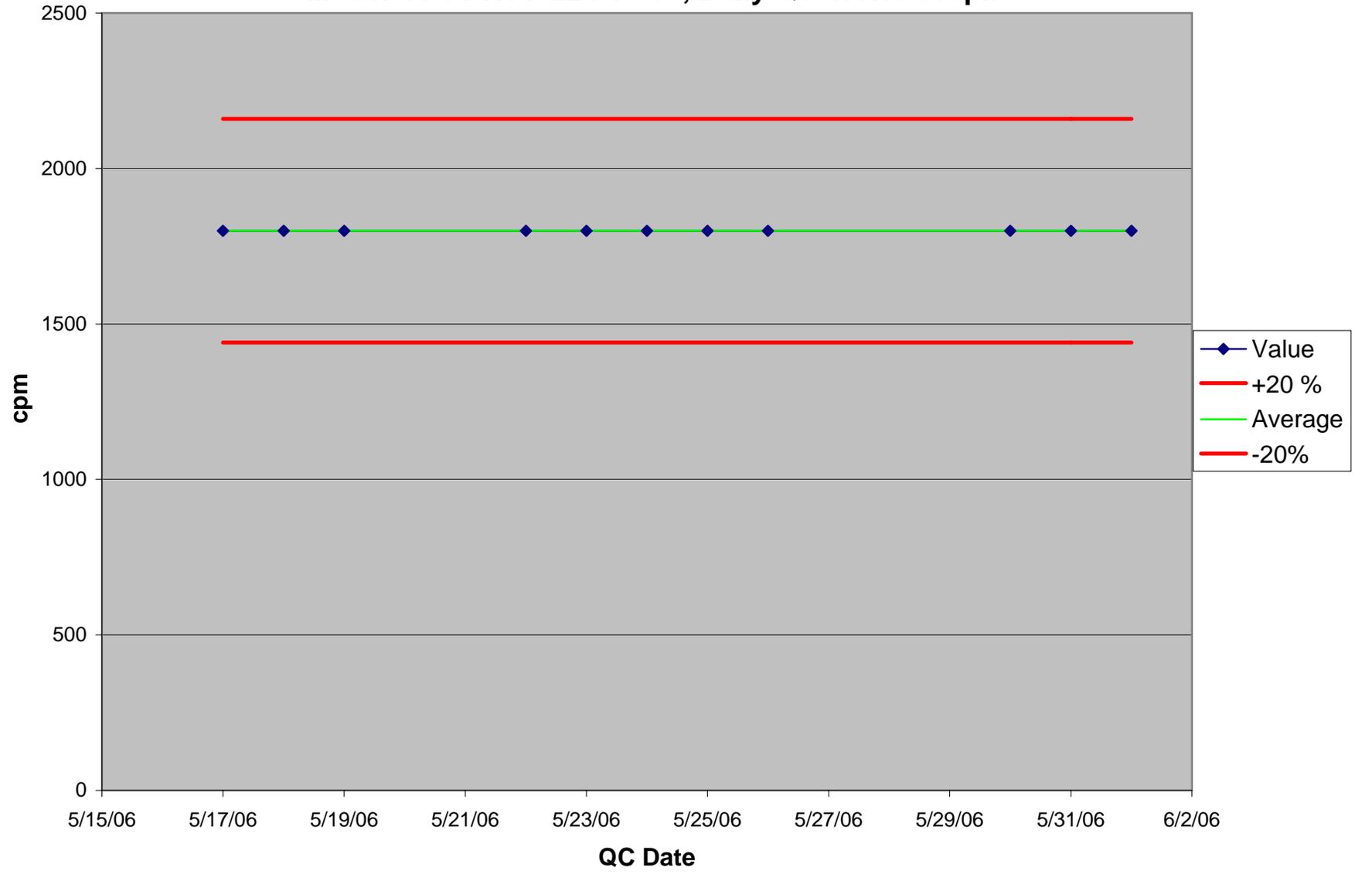
**Model 44-20 PR215468 Cs-137, Daily QC Trend Graph**



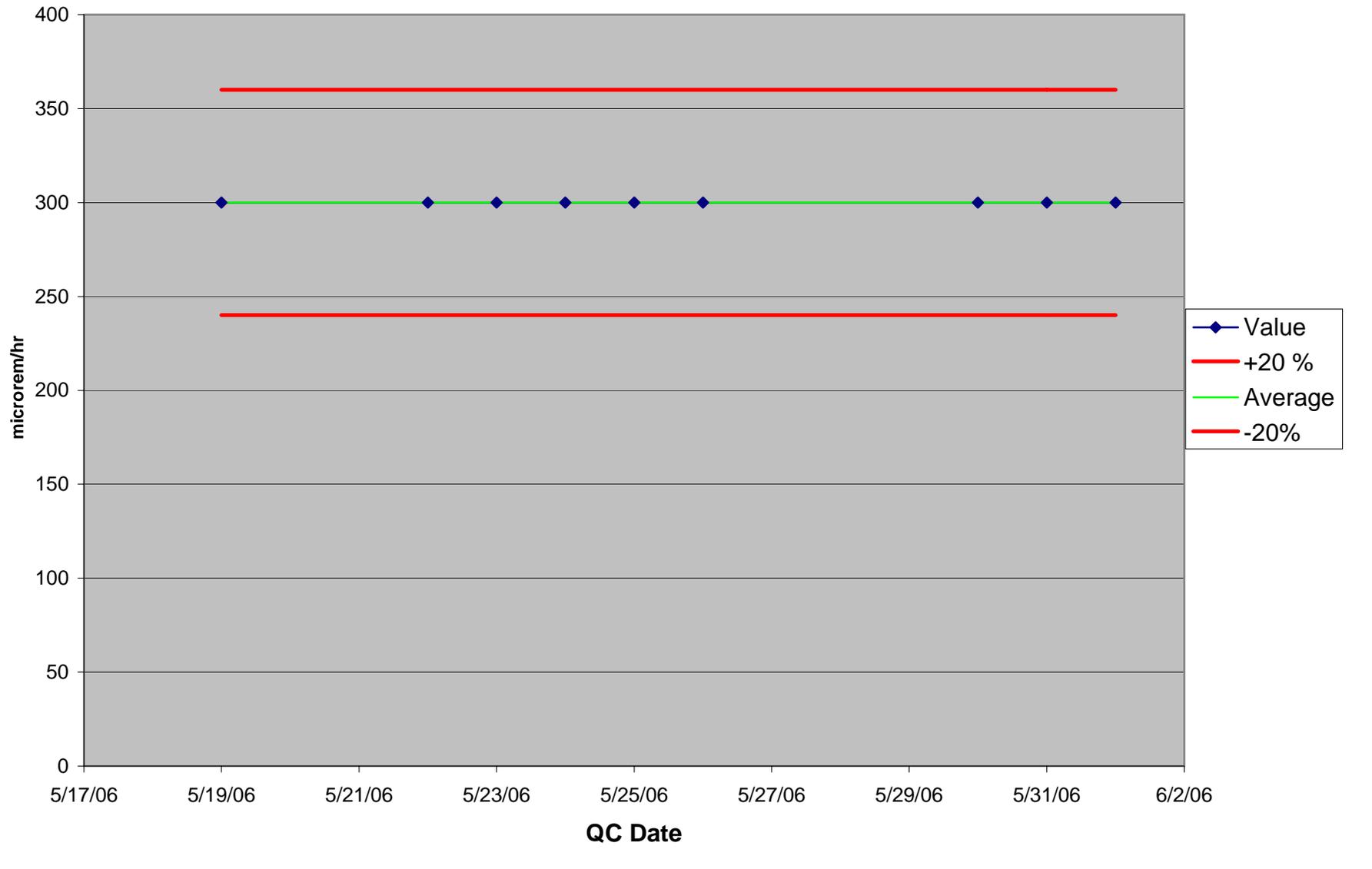
**Model 44-20 PR183465 Cs-137, Daily QC Trend Graph**



**Model 44-9 PR145224 Tc-99, Daily QC Trend Graph**



### Bicron Microrem C853F Cs-137, Daily QC Trend Graph



# CABRERA ALPHA-BETA COUNTING INSTRUMENT (Rev 5)

Counting Instrument:	2929	Detector:	43-10-1	Calibration Date:	10/6/2005
Serial #:	1115563	Serial #:	127216	12 month calibration:	OK
Detector Active Area or Area Covered by Smear (cm <sup>2</sup> ):			100	NRC 6 Mo Cal. Due Date?	WARNING

	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	T <sub>1/2</sub> (yr)	Source Decayed Activity	Required MDA (DPM/100cm <sup>2</sup> )	Control Chart & Daily Bkg Count Time	Control Chart & Daily Source-Sample Count Time	Control Chart bkg Average α/β cpm	Control Chart bkg 1 sigma, cpm	Control Chart Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm
<b>Alpha</b>	0.3930	Th-230	1328	17,300	2/28/2006	7.70E+04	17,300	10	20	2	0.06	0.04	6831.2	40.85
<b>Beta</b>	0.2100	Sr-90	1144	4,500	5/12/2004	2.88E+01	4,286	100	20	2	42.14	2.05	1865.8	39.25

Date	Daily Bkg Counts		Daily Check Source Counts		Daily Bkg Rate (cpm)		Net Daily Source Rate (cpm)		Bkg QC Pass/Fail		Source QC Pass/Fail		MDA α (dpm)	MDA β (dpm)	α MDA OK?	β MDA OK?
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta				
5/22/2006	2	853	13666	3736	0.1	42.7	6832.9	1825.4	PASS	PASS	PASS	PASS	5.78	83	Yes	Yes
5/23/2006	2	871	13839	3877	0.1	43.6	6919.4	1895.0	PASS	PASS	QUESTION	PASS	5.78	84	Yes	Yes
5/24/2006	2	870	13577	3785	0.1	43.5	6788.4	1849.0	PASS	PASS	PASS	PASS	5.78	84	Yes	Yes
5/25/2006	1	903	13507	3704	0.1	45.2	6753.5	1806.9	PASS	PASS	PASS	PASS	5.21	85	Yes	Yes
5/26/2006	1	909	13535	3795	0.1	45.5	6767.5	1852.1	PASS	PASS	PASS	PASS	5.21	85	Yes	Yes
5/30/2006	2	887	13575	3796	0.1	44.4	6787.4	1853.7	PASS	PASS	PASS	PASS	5.78	85	Yes	Yes
5/31/2006	2	878	13422	3869	0.1	43.9	6710.9	1890.6	PASS	PASS	QUESTION	PASS	5.78	84	Yes	Yes
6/1/2006	2	834	13418	3781	0.1	41.7	6708.9	1848.8	PASS	PASS	QUESTION	PASS	5.78	82	Yes	Yes
6/2/2006	2	848	13574	3722	0.1	42.4	6786.9	1818.6	PASS	PASS	PASS	PASS	5.78	83	Yes	Yes

# CABRERA ALPHA-BETA COUNTING INSTRUMENT (Rev 5)

Counting Instrument:	2929	Detector:	43-10-1	Calibration Date:	10/6/2005
Serial #:	1115563	Serial #:	127216	12 month calibration:	OK
Detector Active Area or Area Covered by Smear (cm <sup>2</sup> ):			100	NRC 6 Mo Cal. Due Date?	WARNING

	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	T <sub>1/2</sub> (yr)	Source Decayed Activity	Required MDA (DPM/100cm <sup>2</sup> )	Control Chart & Daily Bkg Count Time	Control Chart & Daily Source-Sample Count Time	Control Chart bkg Average α/β cpm	Control Chart bkg 1 sigma, cpm	Control Chart Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm
<b>Alpha</b>	0.3930	Th-230	1328	17,300	2/28/2006	7.70E+04	17,300	10	20	5	0.06	0.04	#DIV/0!	#VALUE!
<b>Beta</b>	0.2100	Sr-90	1144	4,500	5/12/2004	2.88E+01	4,285	100	20	5	42.14	2.05	1859.7	20.29

Date	Daily Bkg Counts		Daily Check Source Counts		Daily Bkg Rate (cpm)		Net Daily Source Rate (cpm)		Bkg QC Pass/Fail		Source QC Pass/Fail		MDA α (dpm)	MDA β (dpm)	α MDA OK?	β MDA OK?
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta				
5/26/2006	1	909		9626	0.1	45.5		1879.8	PASS	PASS		PASS		56		Yes
5/30/2006	2	887	33726	9553	0.1	44.4	6745.1	1866.3	PASS	PASS	#DIV/0!	PASS	2.85	55	Yes	Yes
5/31/2006	2	878	34002	9439	0.1	43.9	6800.3	1843.9	PASS	PASS	#DIV/0!	PASS	2.85	55	Yes	Yes
6/1/2006	2	834	34047	9505	0.1	41.7	6809.3	1859.3	PASS	PASS	#DIV/0!	PASS	2.85	53	Yes	Yes

# CABRERA ALPHA-BETA COUNTING INSTRUMENT (Rev 5)

Counting Instrument:	2929	Detector:	43-10-1	Calibration Date:	10/6/2005
Serial #:	1115563	Serial #:	127216	12 month calibration:	OK
Detector Active Area or Area Covered by Smear (cm <sup>2</sup> ):			100	NRC 6 Mo Cal. Due Date?	WARNING

	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	T <sub>1/2</sub> (yr)	Source Decayed Activity	Required MDA (DPM/100cm <sup>2</sup> )	Control Chart & Daily Bkg Count Time	Control Chart & Daily Source-Sample Count Time	Control Chart bkg Average α/β cpm	Control Chart bkg 1 sigma, cpm	Control Chart Source-bkg Average α/β cpm	Control Chart source 1 sigma, cpm
<b>Alpha</b>	0.3930	Th-230	1328	17,300	2/28/2006	7.70E+04	17,300	10	20	4	0.06	0.04	6799.8	40.59
<b>Beta</b>	0.1910	Tc-99	1327	14,800	2/28/2006	2.13E+07	14,800	100	20	4	42.14	2.05	2822.0	26.29

Date	Daily Bkg Counts		Daily Check Source Counts		Daily Bkg Rate (cpm)		Net Daily Source Rate (cpm)		Bkg QC Pass/Fail		Source QC Pass/Fail		MDA α (dpm)	MDA β (dpm)	α MDA OK?	β MDA OK?
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta				
5/17/2006	2	823	27230	11529	0.1	41.2	6807.4	2841.1	PASS	PASS	PASS	PASS	3.36	64	Yes	Yes
5/18/2005	2	830	27303	11339	0.1	41.5	6825.7	2793.3	PASS	PASS	PASS	PASS	3.36	65	Yes	Yes
5/19/2006	6	852	27246	11310	0.3	42.6	6811.2	2784.9	<b>FAIL</b>	PASS	PASS	PASS	4.42	66	Yes	Yes
5/19/2006	3	845	27246	11310	0.2	42.3	6811.4	2785.3	QUESTION	PASS	PASS	PASS	3.68	65	Yes	Yes

**APPENDIX G**

**SITE PHOTOGRAPHS (ON CD)**  
**(December 2005)**