FINAL

BUILDING 1103A AREA CHARACTERIZATION SURVEY REPORT

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

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RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

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ACRONYMS AND ABBREVIATIONS

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

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 (μR/hr). The highest reported contact reading was 120 μR/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}U], Uranium-235 [^{235}U], and Uranium-238 [^{238}U]) and their short-lived decay progeny (thorium-234 [^{234}Th], protactinium-234m [^{234m}Pa], and thorium-231 [^{231}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}U, ^{235}U, and ^{238}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.

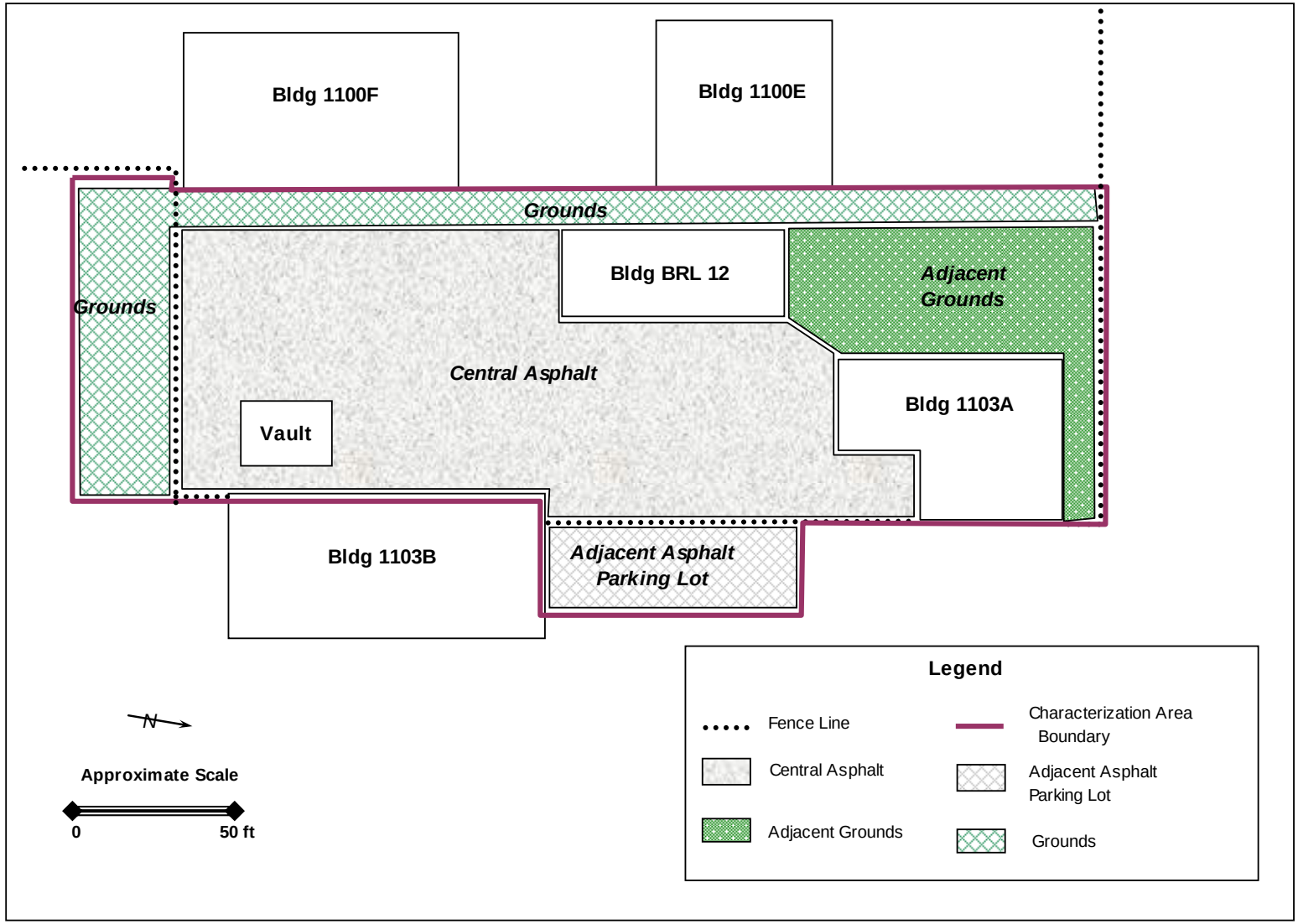

Figure 1-1: Building 1103A Area Layout

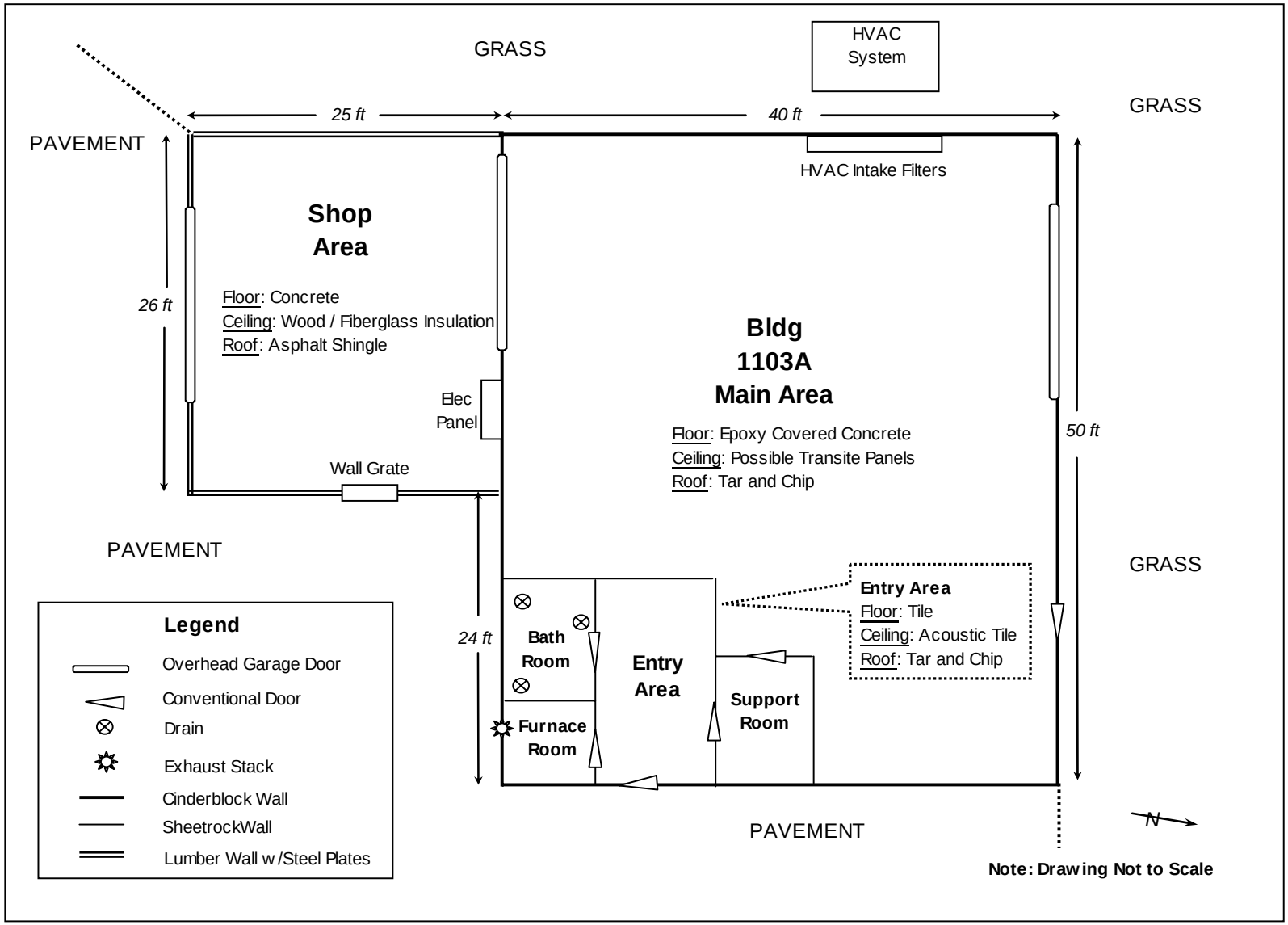

Figure 1-2: Building 1103A Floor Plan

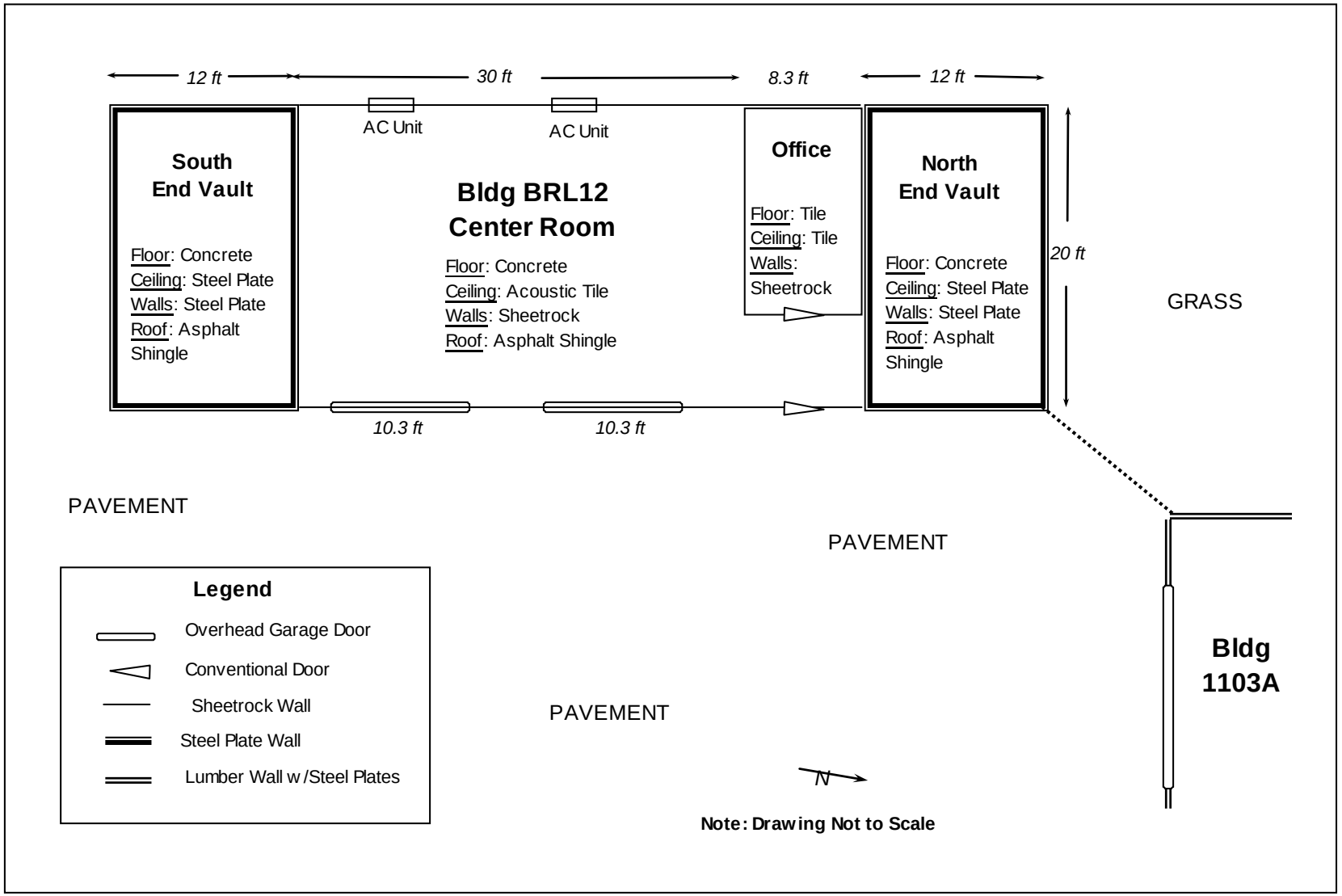

Figure 1-3: Building BRL12 Floor Plan

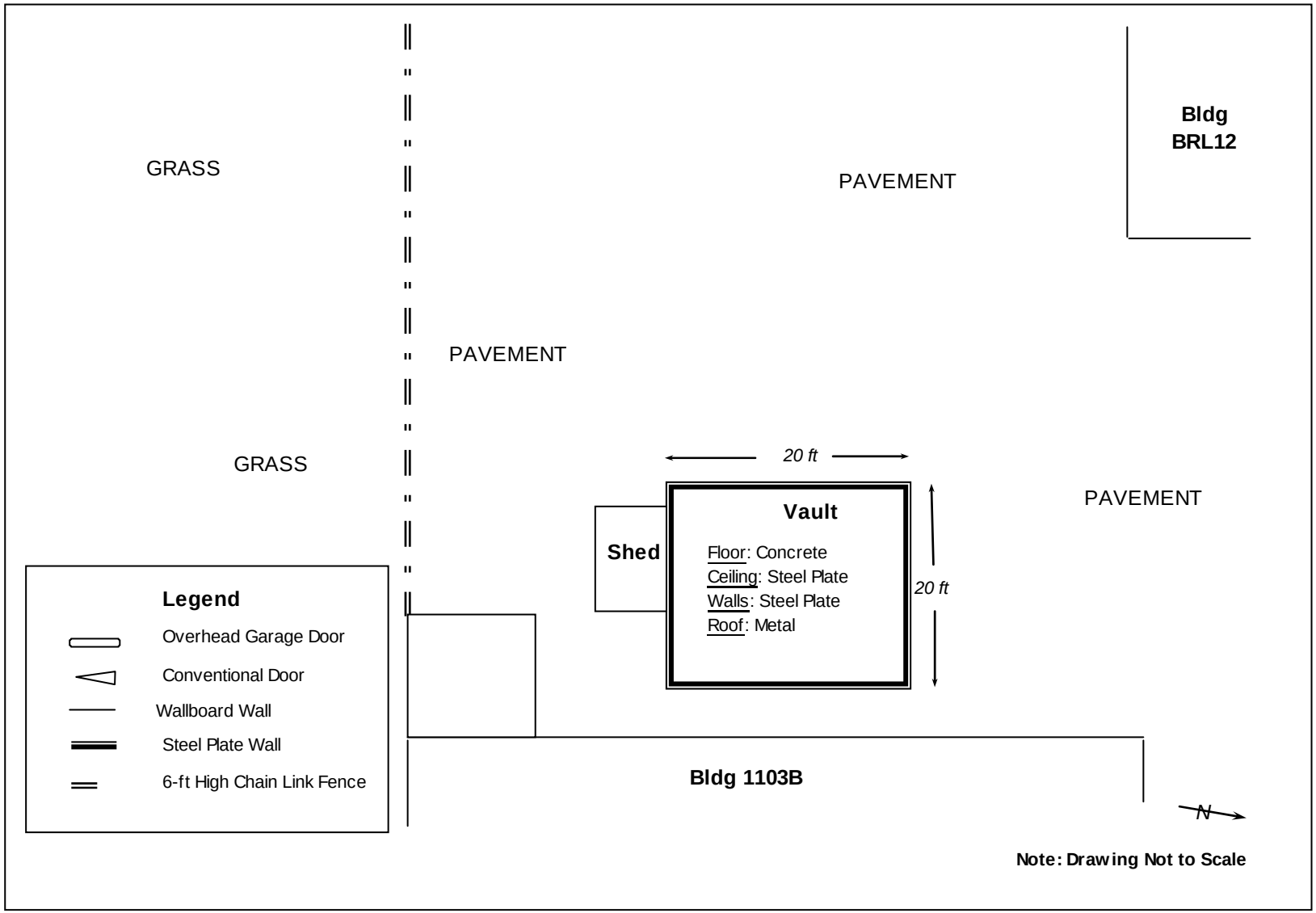

Figure 1-4: Freestanding Vault

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

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

dpm = disintegrations per minute cm^2 = square centimeters pCi/g = picocuries per gram
[a] 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_{crit} = 0.90 [NRC, 1999]).
[b] Transferable activity limit represents 10% of the total building surface screening limit, as recommended in NUREG 1757 (NRC, 2003).
[c] 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^2) 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^2, 97.6 dpm/100 cm^2, and 101 dpm/100 cm^2 for ^{234}U, ^{235}U, and ^{238}U, respectively. The calculated activity fractions are 0.084, 0.012, and 0.904 for ^{234}U, ^{235}U, and ^{238}U, respectively. The surface screening limit of 100 dpm / 100 cm^2 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 ^{234}U, ^{235}U, and ^{238}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^2 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}U, ^{235}U, and ^{238}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

Parameter	Action Level	Reference
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^2. 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^2.

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^2)	Probe Width (cm)	Efficiency (cpm /dpm)	Bkgrd (cpm)	Scan Speed (cm/sec)	Pause Time (sec)	P(n>=1)	Dwell Time (sec)	P(n>=2)
Alpha Measurements									
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
Beta Measurements									
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^2 = square centimeters
cm = centimeters
cpm = counts per minute
dpm = disintegrations per minute
sec = second
P = probablility

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^2 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^2)	Efficiency (cpm /dpm)	Background (cpm)	Static MDC (dpm / 100 cm^2)
Alpha Measurements						
43-89	1	1	126	0.15	3	60
2929	4	20	Smear	0.39	2	8
Beta Measurements						
43-89	2	2	126	0.34	400	130
2929	2	20	Smear	0.21	265	83

min = minutes
cpm = counts per minute
cm^2 = 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^2 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^2 per pCi[1] was applied to the analytical results to confirm specific locations where the transferable analysis screening limit of 10 dpm/100 cm^2 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 (^{137}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.

[1] 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}Th) were used to calculate the amount of DU in the samples by assuming secular equilibrium between ^{238}U and ^{234}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}U. Thus, the activity concentration of DU in each sample is calculated as follows:

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

where: DU = Activity concentration of depleted uranium (pCi/g)
^{234}Th = Activity concentration of surrogate ^{234}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^2), 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^2, 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Main Area		
Average	68	28
Standard Deviation	42	25
Maximum	172	88
Number of Data Points	18	18
Shop Area		
Average	80	16
Standard Deviation	62	13
Maximum	276	56
Number of Data Points	16	16
Entry Area		
Average	8	2.2
Standard Deviation	7	1.3
Maximum	20	4.3
Number of Data Points	8	8

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 ^{234}U, 1.78 pCi/g ^{235}U, and 99 pCi/g ^{238}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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Main Area		
Average	10	0.4
Standard Deviation	8	0.7
Maximum	26	1.3
Number of Data Points	10	10
Main Area (Horizontal Surfaces)		
Average	1245	284
Standard Deviation	1045	198
Maximum	2654	644
Number of Data Points	12	12
Shop Area		
Average	33	7.2
Standard Deviation	15	6.2
Maximum	52	18
Number of Data Points	8	8
Shop Area (Horizontal Surfaces)		
Average	711	159
Standard Deviation	771	145
Maximum	1562	315
Number of Data Points	3	3
Entry Area (Horizontal Surfaces)		
Average	375	68
Standard Deviation	301	69
Maximum	812	179
Number of Data Points	5	5

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 ^{234}U, 1.24 pCi/g ^{235}U, and 85 pCi/g ^{238}U. In addition, the top of one of the concrete samples (from boring location No. 4) contained 17 pCi/g ^{234}U, 1.71 pCi/g ^{235}U, and 132 pCi/g ^{238}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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Main Area		
Average	432	60
Standard Deviation	239	36
Maximum	864	124
Number of Data Points	10	10
Shop Area		
Average	386	7.0
Standard Deviation	59	1.5
Maximum	428	8.0
Number of Data Points	2	2
Entry Area		
Average	87	7.8
Standard Deviation	73	7.0
Maximum	236	20
Number of Data Points	7	7

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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

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

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Central Room		
Average	9	4.4
Standard Deviation	12	3.2
Maximum	40	8.7
Number of Data Points	12	12
North Vault		
Average	-1	0.8
Standard Deviation	7	1.0
Maximum	10	2.3
Number of Data Points	6	6
South Vault		
Average	1	0.3
Standard Deviation	3	0.7
Maximum	6	1.3
Number of Data Points	6	6

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Central Room		
Average	19	0.7
Standard Deviation	15	0.9
Maximum	36	1.3
Number of Data Points	3	3
North Vault		
Average	0	0.4
Standard Deviation	0	0.6
Maximum	0	0.8
Number of Data Points	2	2
South Vault		
Average	4	1.4
Standard Deviation	0	1.5
Maximum	4	2.4
Number of Data Points	2	2

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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

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

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
East		
Average	7	1.0
Standard Deviation	8	1.6
Maximum	22	3.6
Number of Data Points	8	8
South		
Average	6	0.6
Standard Deviation	5	1.2
Maximum	12	2.3
Number of Data Points	4	4
West		
Average	4	0.3
Standard Deviation	7	0.6
Maximum	12	1.0
Number of Data Points	8	8
North		
Average	5	0.9
Standard Deviation	6	1.1
Maximum	12	2.3
Number of Data Points	4	4

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Vault		
Average	16	3.3
Standard Deviation	37	4.2
Maximum	104	12.6
Number of Data Points	8	8

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Vault		
Average	1	0.1
Standard Deviation	1	0.3
Maximum	2	0.3
Number of Data Points	2	2

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Vault		
Average	46	3.0
Standard Deviation	14	2.6
Maximum	56	4.8
Number of Data Points	2	2

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
Vault - East		
Average	9	1.5
Standard Deviation	16	1.1
Maximum	20	2.3
Number of Data Points	2	2
Vault - South		
Average	3	0.1
Standard Deviation	7	0.8
Maximum	10	1.3
Number of Data Points	4	4
Vault - West		
Average	23	0.3
Standard Deviation	10	0.6
Maximum	38	0.8
Number of Data Points	4	4
Vault - North		
Average	12	1.2
Standard Deviation	3	0.7
Maximum	16	2.3
Number of Data Points	4	4
Tool Shed		
Average	5	0.6
Standard Deviation	7	1.1
Maximum	18	2.3
Number of Data Points	8	8

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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 α Count Rate (dpm/100 cm^2)	
	Direct Reading	Smear
West		
Average	13	1.0
Standard Deviation	4	1.8
Maximum	16	2.3
Number of Data Points	2	2
North		
Average	17	0.8
Standard Deviation	7	1.0
Maximum	32	2.3
Number of Data Points	12	12

dpm/100 cm^2 = disintegrations per minute per 100 square centimeters

Note: Screening limits are 100 dpm/100 cm^2 for direct readings and 10 dpm/100 cm^2 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}U, ^{235}U, and ^{238}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}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}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}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^2), an acceptance criterion of +/- 3-sigma (3σ) 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}U and ^{238}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 ^{234m}Pa and ^{234}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}U (0.049 +/- 0.028 pCi/g) and ^{235}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}U

and ^{235}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}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 dechachlorobiphenyl (DCB) and tetrachloro-meta-xylene (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 ± 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.

6.0 REFERENCES

ANL, 1999. *Derived Uranium Guidelines for the Depleted Uranium Study Area of the Transonic Range, Aberdeen Proving Ground, Maryland*. M. Picel and S. Kamboj, Argonne National Laboratory, Environmental Assessment Department. April 1999.

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APPENDIX A

ARL NUCLEAR MATERIALS LICENSE

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 27

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.

Licensee	In accordance with the letter dated January 13, 2005,
1. Department of the Army U. S. Army Research, Development and Engineering Command Army Research Laboratory 2. Aberdeen Proving Ground, Maryland 21005-5066	3. License number SMB-141 is amended in its entirety to read as follows: 4. Expiration date June 30, 2011 5. Docket No. 040-06394 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Natural Uranium	A. Metal and metal oxide	A. 100 kilograms
B. Depleted Uranium	B. Metal and metal oxide	B. 200,000 kilograms
C. Thorium	C. Metal and metal oxide	C. 100 kilograms
D. Transuranics and technetium-99 contaminants in depleted uranium	D. Contaminants contained in depleted uranium metal and metal oxide	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

9. Authorized use:

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.

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 Ullrich
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

ML053410278

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

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 7th 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

ML053410278

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 α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
INTERIOR WALLS								
Main Area - North Interior Wall								
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)
Main Area - East Interior Wall (near lathe and drill press)								
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)
Main Area - West Interior Wall								
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)
Main Area - East Interior Wall (near Shop Area)								
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)
Main Area - South Interior Wall (adjacent to Shop Area)								
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)
Shop Area - North Interior Wall								
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)
Shop Area - East Interior Wall								
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)
Shop Area - South Interior Wall								
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 α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
Shop Area - West Interior Wall								
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)
Entry Area - North Interior Wall in Changing Room								
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)
Entry Area - North Interior Wall in Meeting Room								
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)
Entry Area - South Interior Wall in Meeting Room								
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)
Entry Area - North Wall of Bathroom								
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)
CEILINGS								
Main Area - Ceiling								
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)
Main Area - Ceiling Ducts, Vents, Light Fixtures, Conduits								
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 α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**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)
Shop Area - Ceiling and High Walls								
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)
Shop Area - Ceiling Ducts, Fixtures, Conduits								
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)
Entry Area - Ceiling in Changing Room (Horizontal Surface)								
CL-1103A-186	812.0	yes	199350 (2min)		CL-1103A-155	179.3	yes	2929 (2min)
Entry Area - Above Ceiling in Changing Room								
CL-1103A-196	156.0	yes	199350 (2min)		CL-1103A-165	20.2	yes	2929 (2min)
Entry Area - Above Ceiling in Meeting Room								
CL-1103A-197	36.0		199350 (2min)		CL-1103A-166	2.3		2929 (5min)
Entry Area - Above Ceiling in Bathroom								
CL-1103A-198	452.0	yes	199350 (2min)		CL-1103A-167	64.8	yes	2929 (2min)
Entry Area - Above Ceiling at Furnace Room Door								
CL-1103A-199	418.0	yes	199350 (2min)		CL-1103A-168	74.9	yes	2929 (2min)
FLOORS								
Main Area - Floor								
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

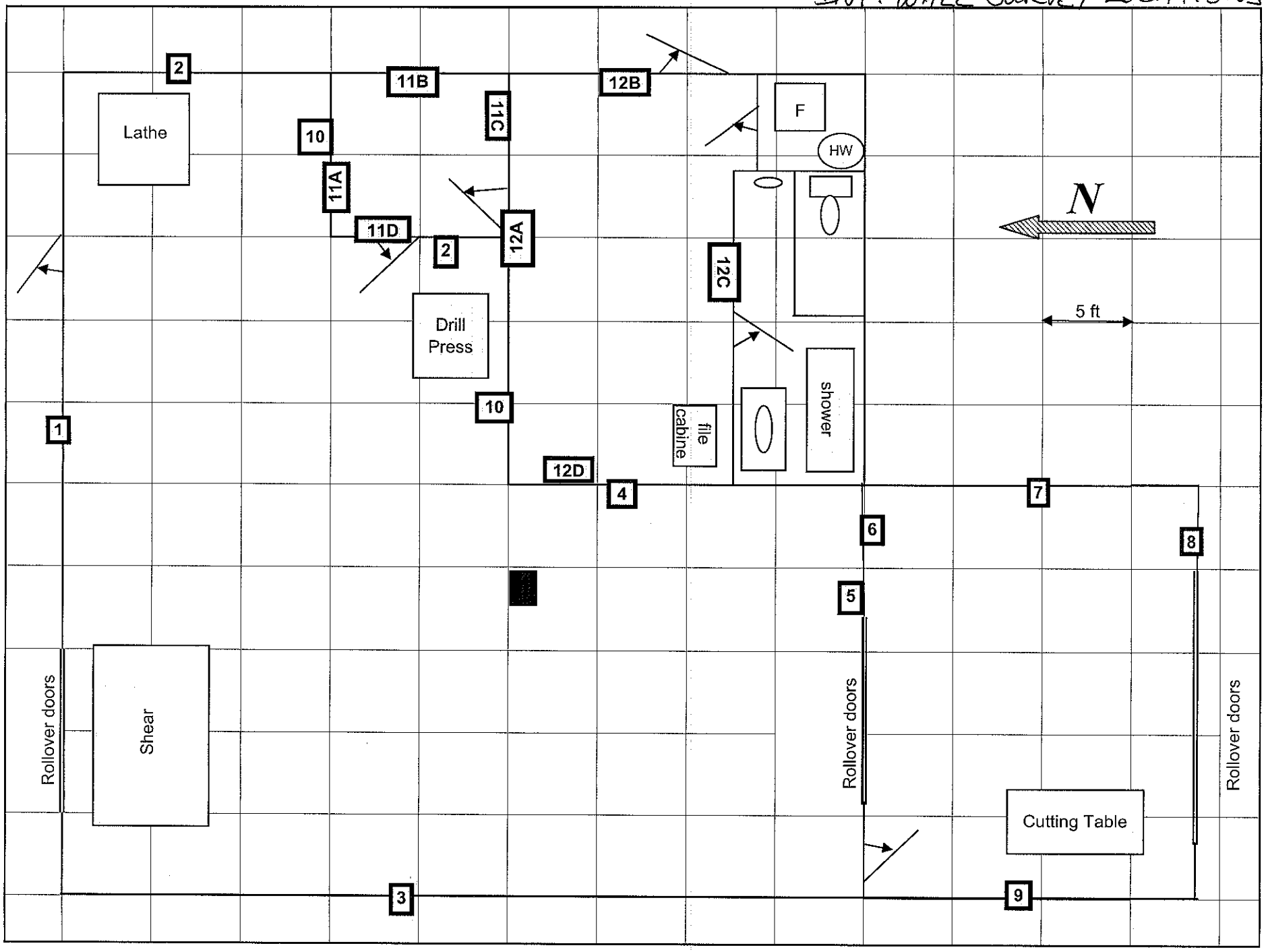
Direct Measurements					Smear Measurements			
Sample ID#	**Sample α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
Shop Area - Floor								
FL-1103A-1	428.0	yes	469 (1min)		FL-1103A-1	8.0		2929 (4min)
FL-1103A-2	344.0	yes	469 (1min)		FL-1103A-2	5.9		2929 (5min)
Entry Area - Floor in Changing Room								
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)
Entry Area - Floor in Meeting Room								
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)
Entry Area - Floor in Bathroom								
FL-1103A-18	124.0	yes	469 (1min)		FL-1103A-18	3.6		2929 (4min)
Entry Area - Floor in Furnace Room								
FL-1103A-19	48.0		469 (1min)		FL-1103A-19	1.7		2929 (4min)
EXTERIOR WALLS								
East Wall - northern portion								
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)
East Wall - southern portion								
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)
South Wall - eastern portion								
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)
South Wall - western portion								
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 α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
West Wall - northern portion								
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)
West Wall - southern portion								
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)
North Wall								
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)

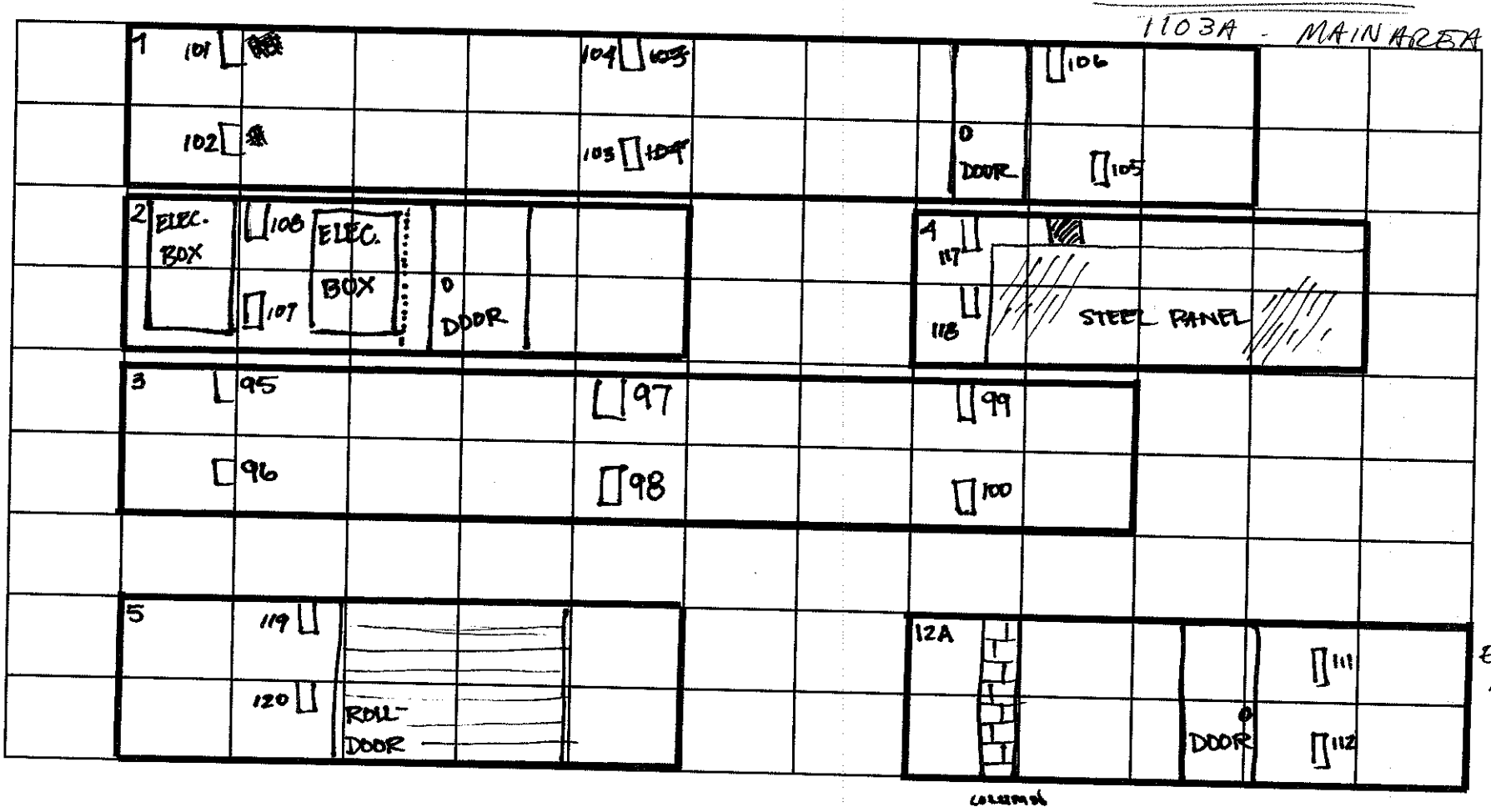
Building 1103A

INT. WALL SURVEY LOCATIONS



BUILDING 1103A
2 MINUTE COUNTS
5-23-06

INT. WALL SURVEY
1103A - MAIN AREA



12A - ENTRY AREA

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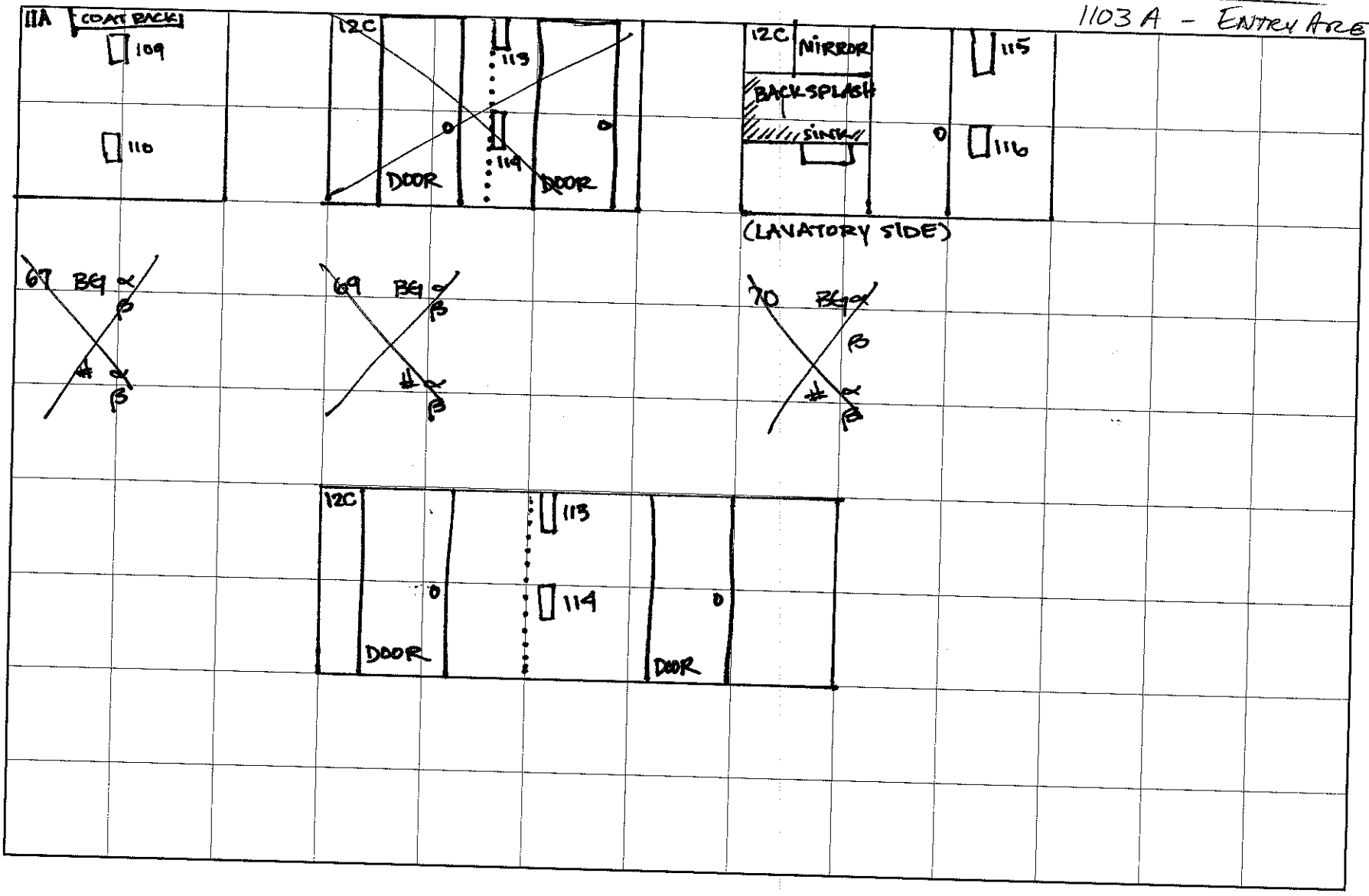
BUILDING 1103A
5.23.06
2 MINUTE COUNTS

INT. WALL SURVEY

1103 A - ENTRY AREA



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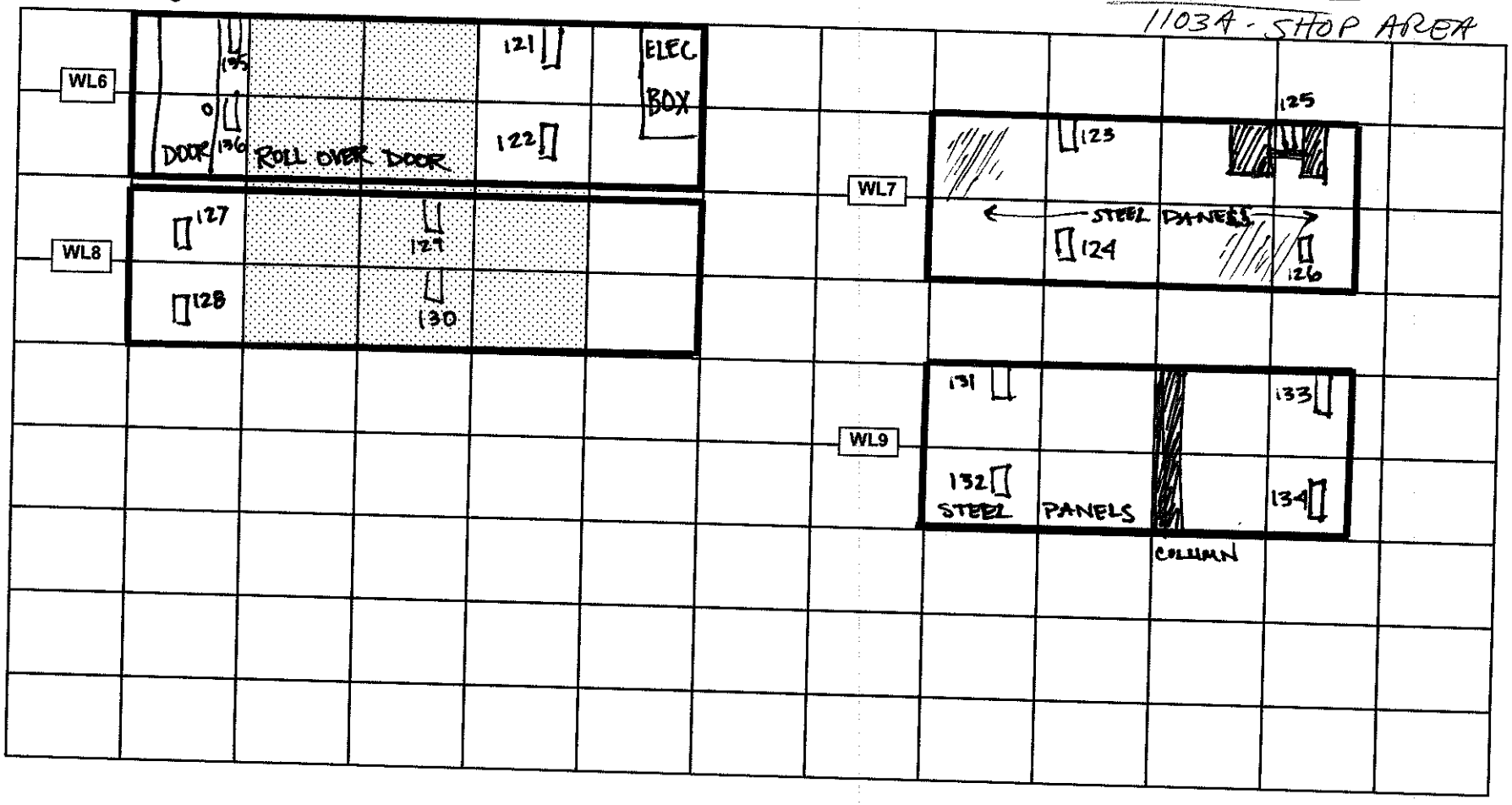
BUILDING 1103A ENTRY
2 MINUTE COUNTS
5·23·06

INT. WALL SURVEY
1103A - SHOP AREA



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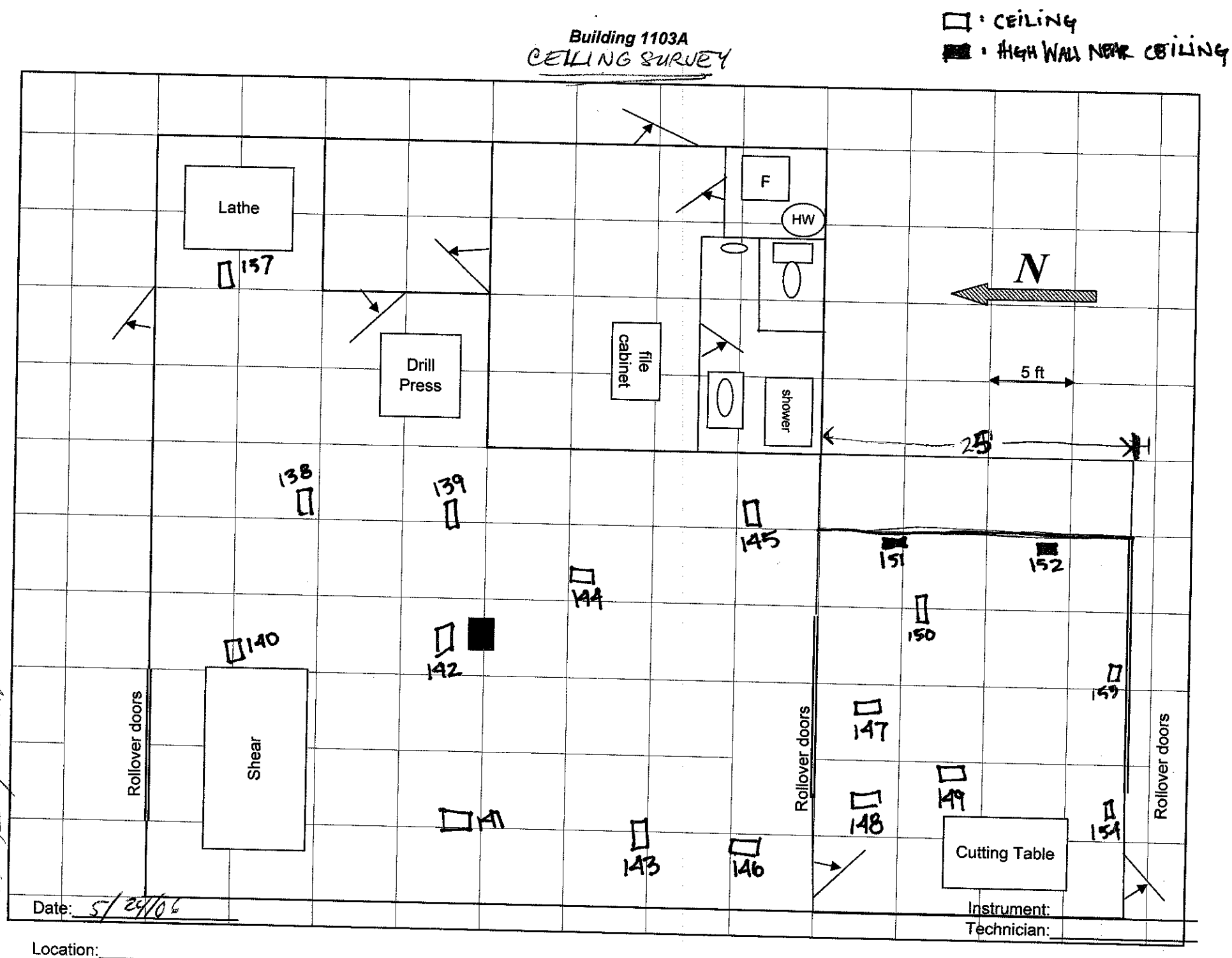
rescanned 5/24/06


Building 1103A
CEILING SURVEY
: CEILING
: HIGH WALL NEAR CEILING
Lathe
157
Drill Press
file cabinet
F
HW
shower
N
5 ft
25
138
139
145
151
152
144
150
140
142
159
147
Rollover doors
Shear
149
148
154
141
143
146
Cutting Table
Rollover doors
Rollover doors
Date: 5/24/06
Instrument:
Technician:
Location:

HORIZONTAL SURFACE READINGS

INST: 43-89 #199350

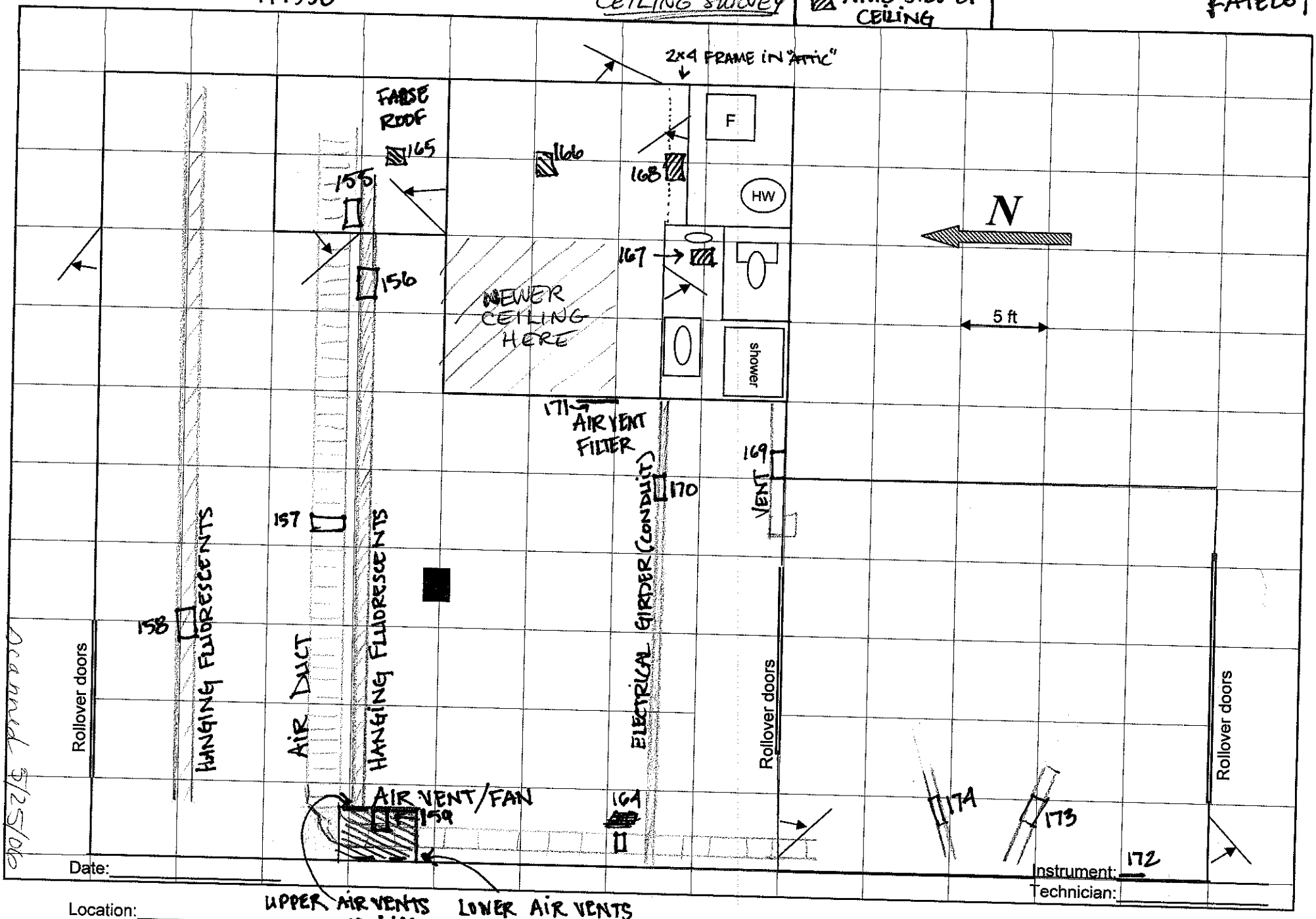
Building 1103A

CEILING SURVEY

ATTIC SIDE OF CEILING

5-25-06

CLARKE KATELEY

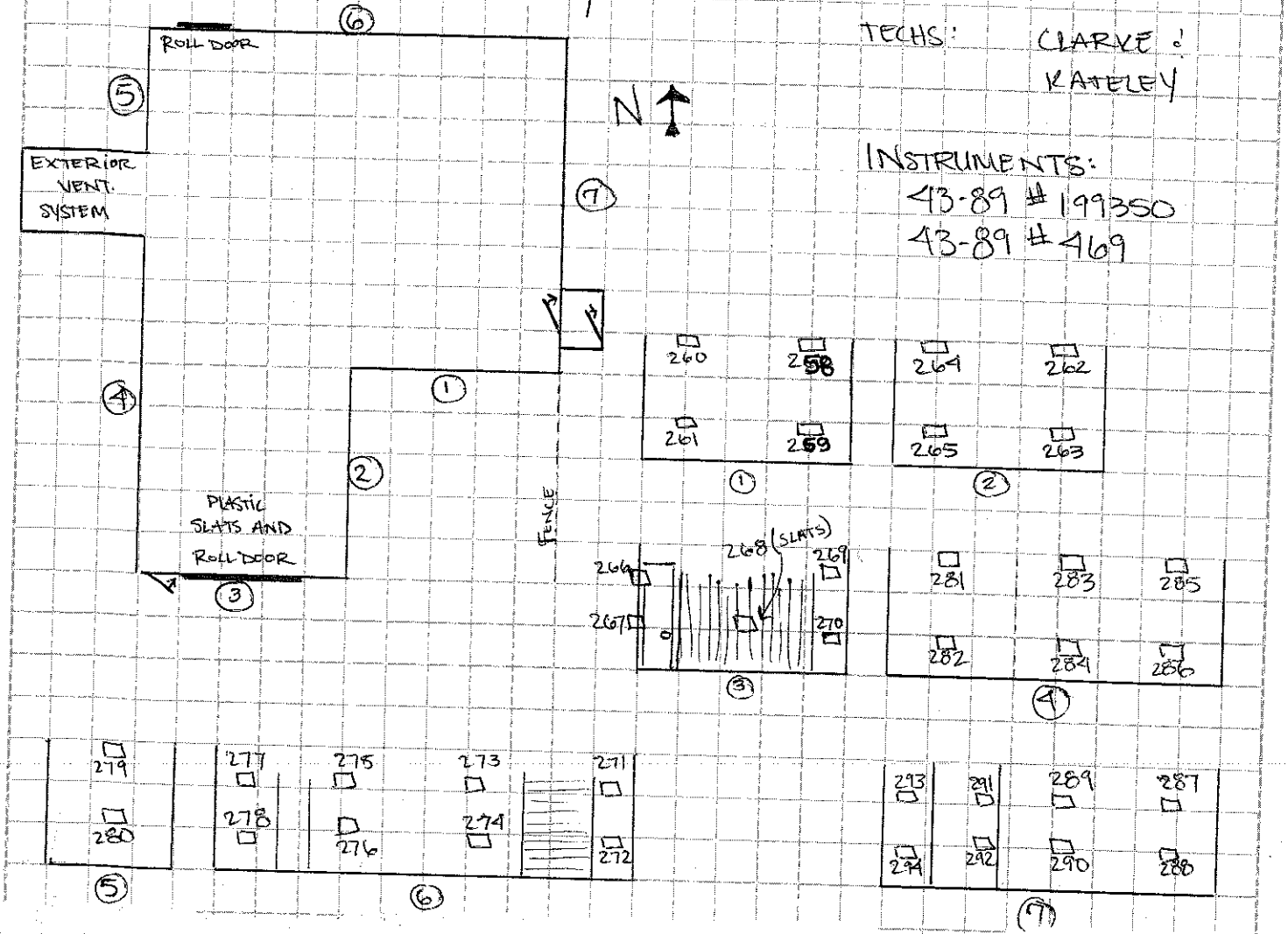


BUILDING 1103A
External Wall Survey

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 α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
INTERIOR WALLS								
Central Room - walls at 1 meter height								
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)
Central Room - walls at 2 meter height								
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)
North Vault - walls at 1 meter height								
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)
North Vault - walls at 2 meter height								
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)
South Vault - walls at 1 meter height								
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)
South Room - walls at 2 meter height								
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)
CEILINGS								
Central Room - ceiling								
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)
North Vault - ceiling								
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

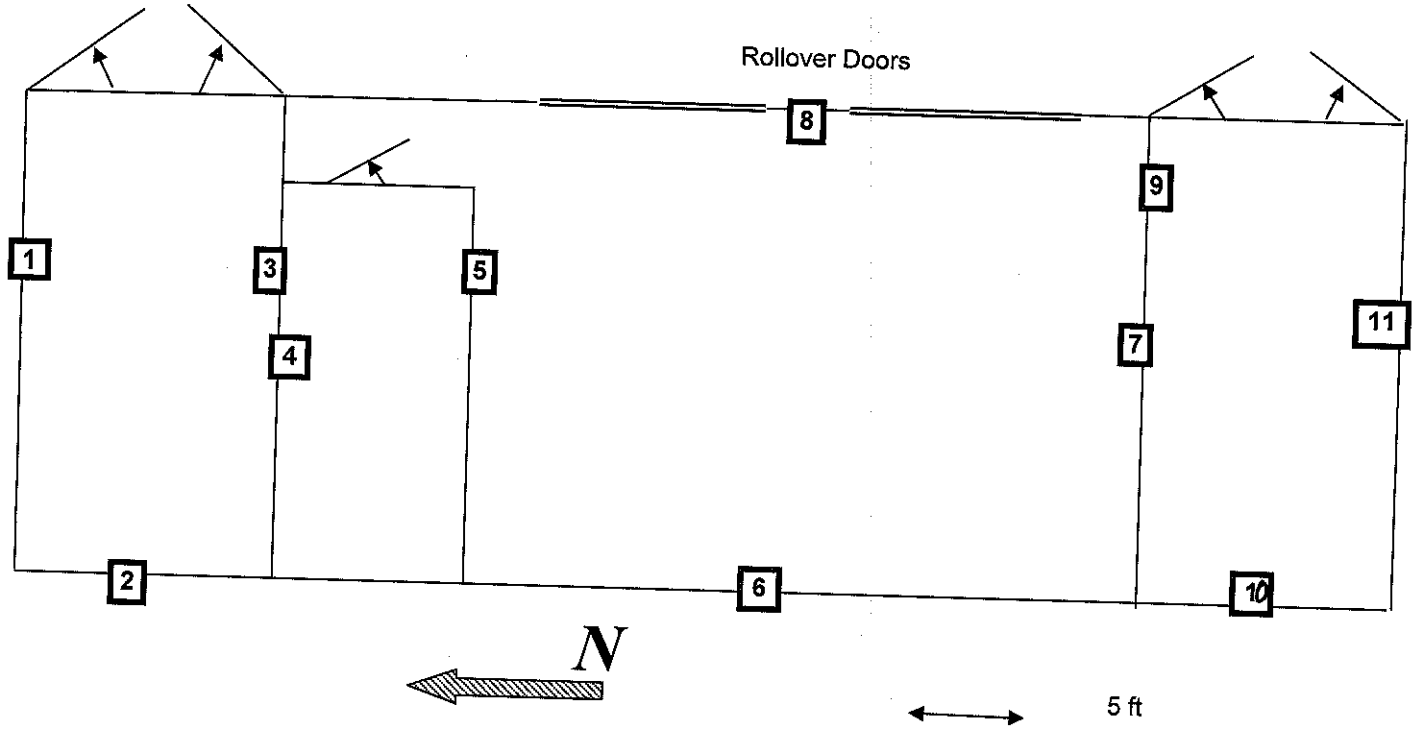
Direct Measurements					Smear Measurements			
Sample ID#	**Sample α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
South Vault - ceiling								
FL-BRL12-223	4		199350 (2min)		FL-1103A-192	0.3		2929 (5min)
FL-BRL12-224	4		199350 (2min)		FL-1103A-193	2.4		2929 (2min)
FLOORS								
Central Room - floor								
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)
Office - floor								
FL-BRL12-215	98		199350 (2min)		FL-1103A-184	7.5		2929 (2min)
North Vault - floor								
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)
South Vault - floor								
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)
EXTERIOR WALLS								
East Wall								
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 α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
South Wall								
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)
West Wall								
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)
North Wall								
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)

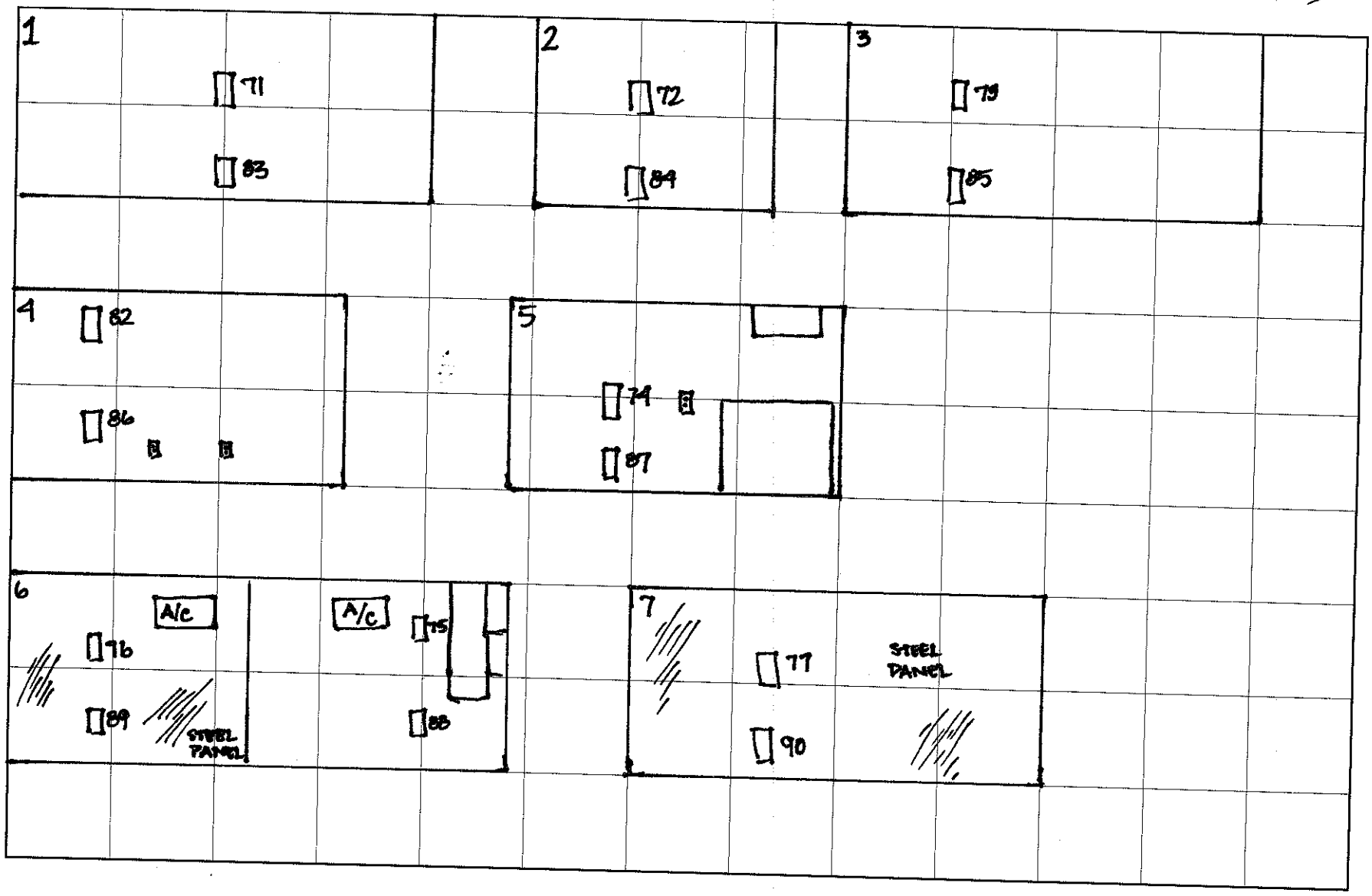
Building BRL12 ~~(Vault)~~

INTERIOR WALL SURVEY LOCATIONS



BRL12
WALL ART page 1 of 2

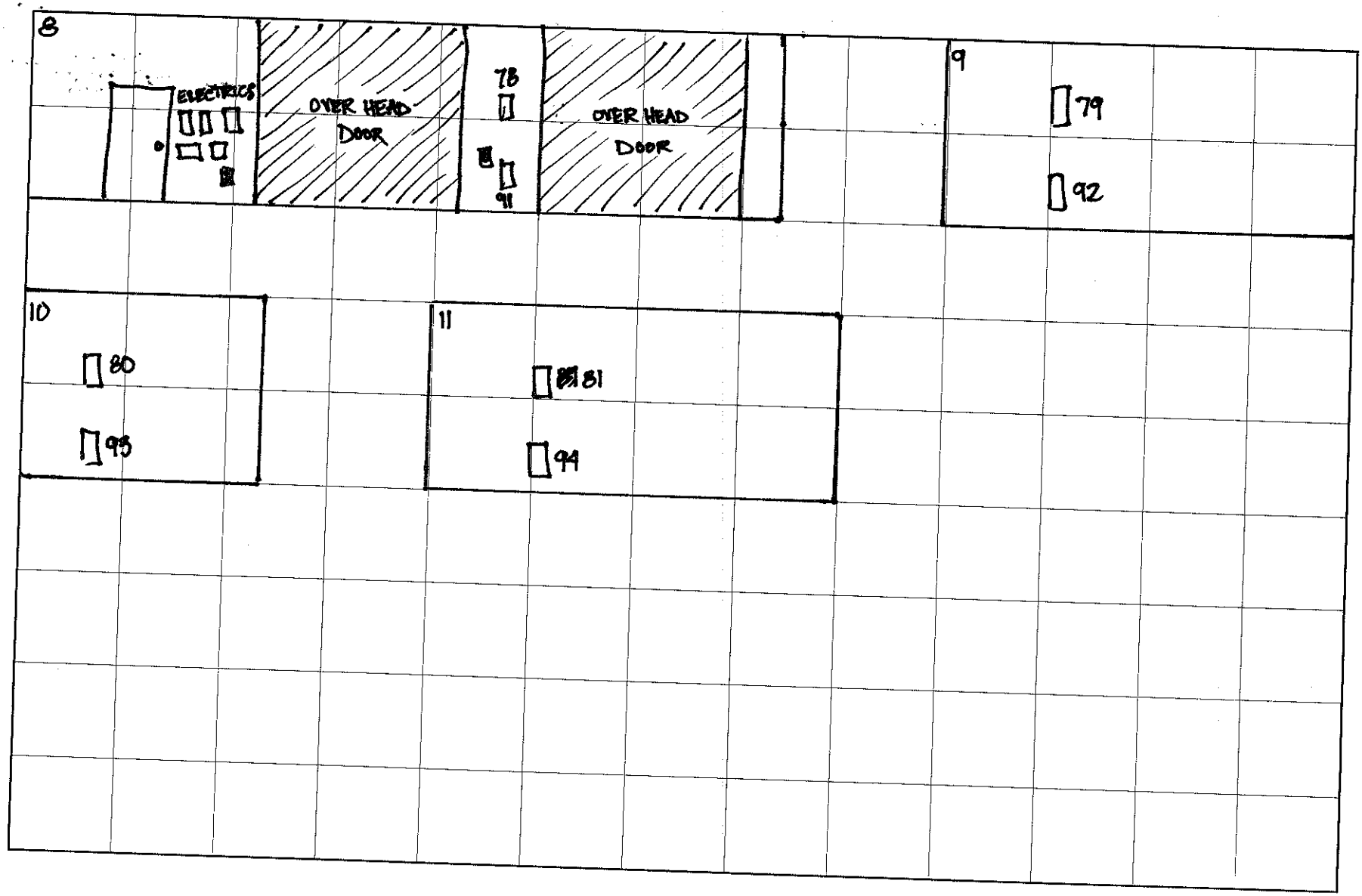
SURVEY LOCATIONS
5/22/06
(INTERIOR WALLS)



scanned 5/22/06

SURVEY LOCATIONS
5/22/06
(INTERIOR WALLS)

BRL12
WALL ART page 2 of 2



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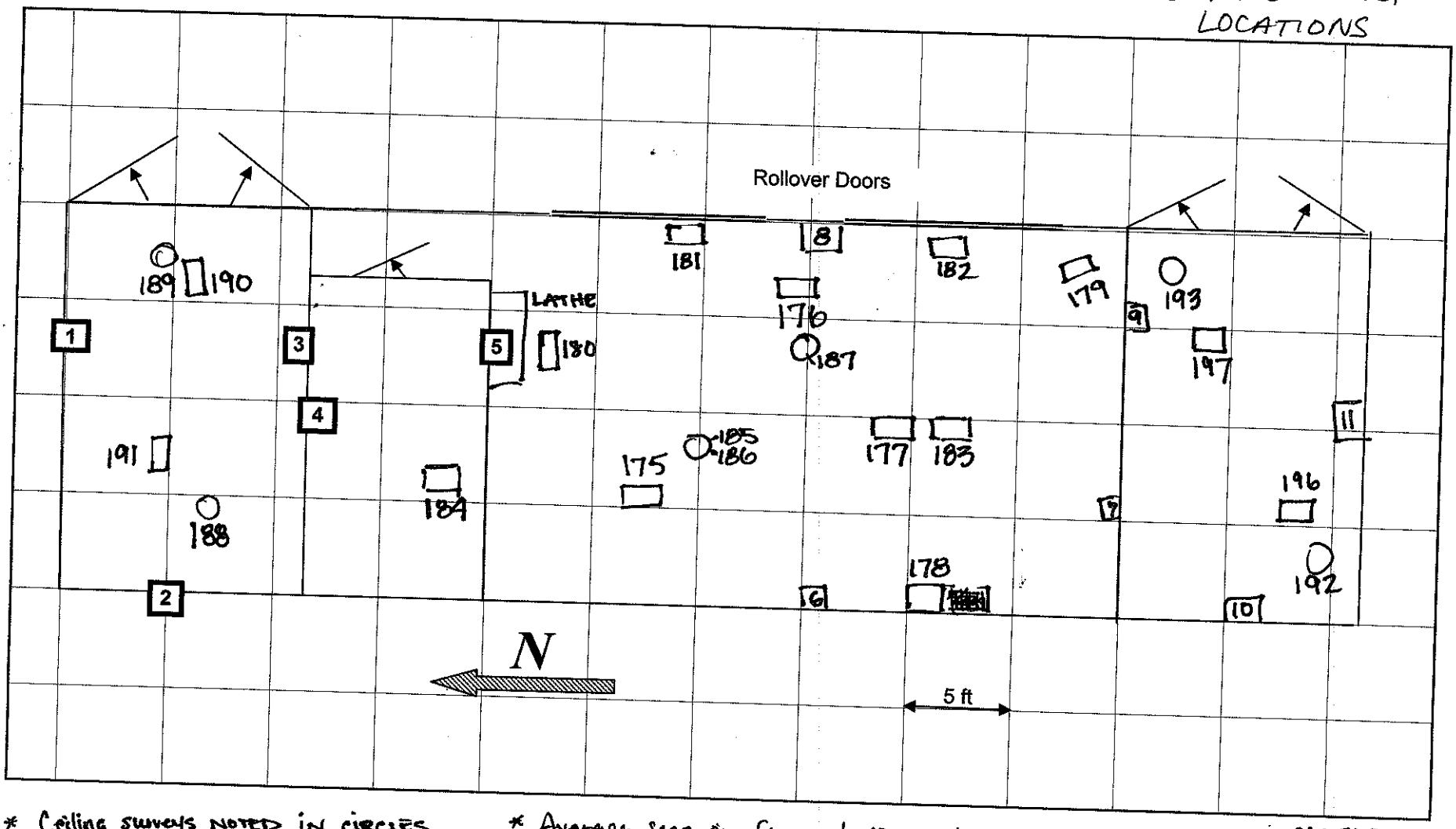
5.25.06

Building BRL12 ~~(Vault)~~

FLOOR SURVEY
CEILING SURVEY
LOCATIONS

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 → 2,000 cpm (MAIN ROOM)
* HOTSPOTS NOTED & SAMPLED FURTHER. w/ 43.89 # 199350 (MAIN ROOM)

CLARKE
KATELEY

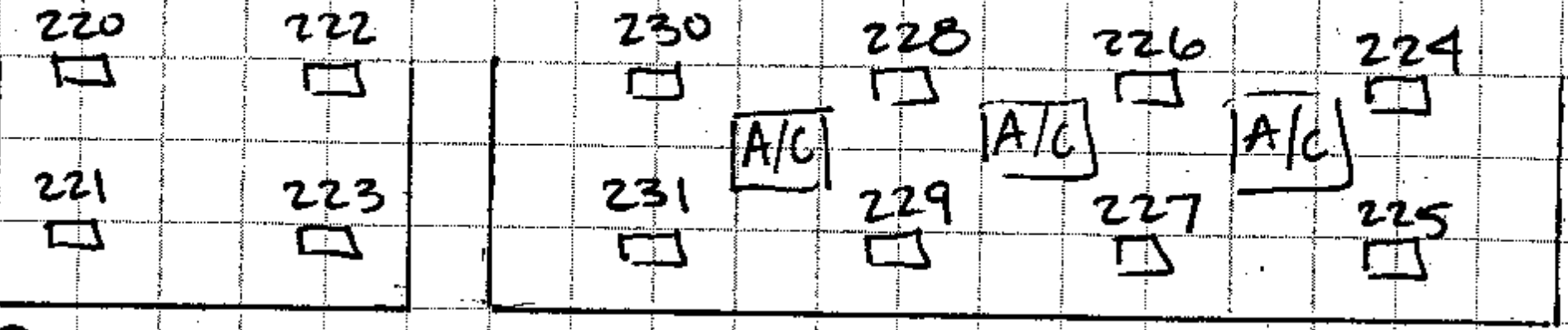
5.25.06
5.26.06

Scanned 5/25/06

.25 in. X .25 in.

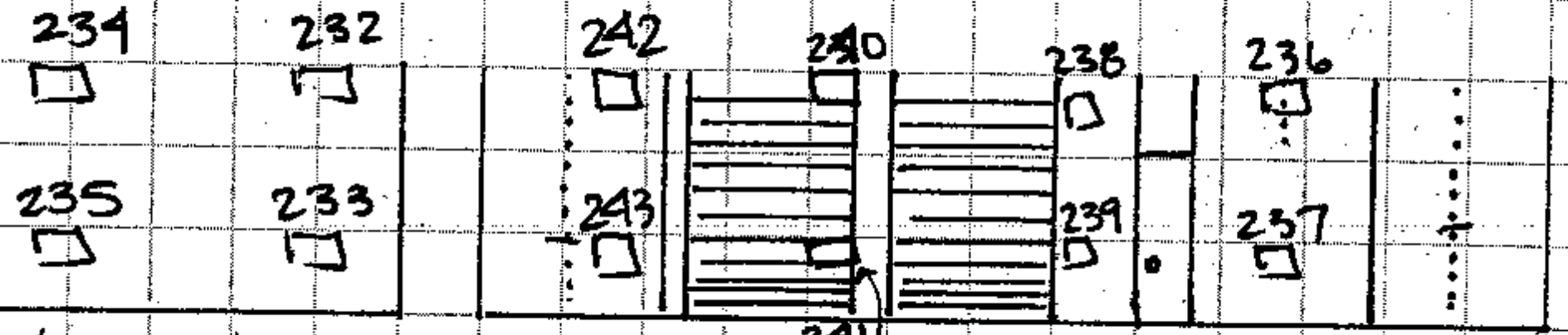
BRL12 5·30·06

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

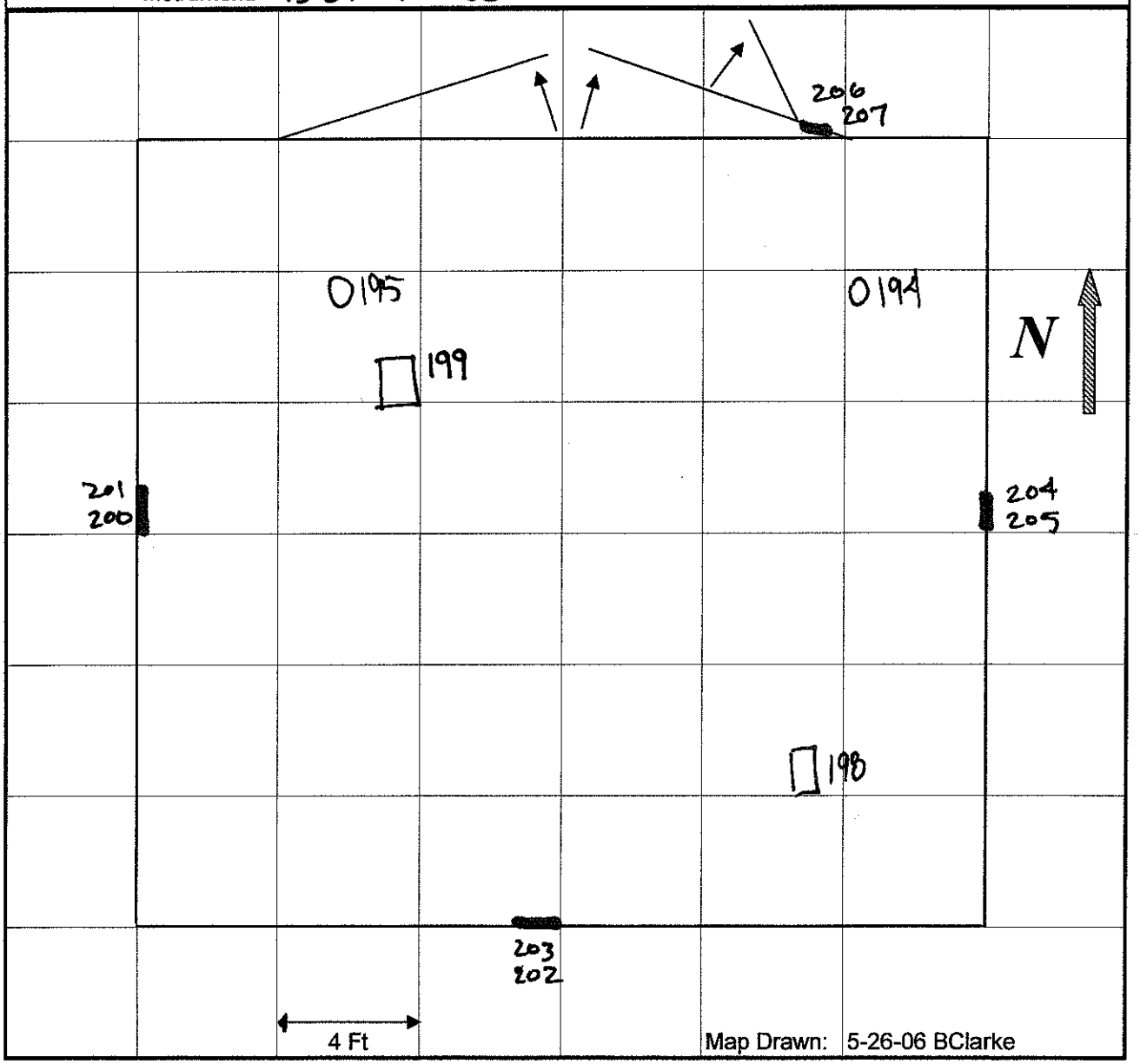
Direct Measurements					Smear Measurements			
Sample ID#	**Sample α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
INTERIOR WALLS								
WL-VAULT-231	10		199350 (2min)		WL-VAULT-200	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)
CEILING								
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)
FLOOR								
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)
EXTERIOR WALLS								
East Wall								
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)
South Wall								
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)
West Wall								
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)
North Wall								
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)
Tool Shed								
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

Building 1103 Vault (Large Stand Alone)

Date: 5·26·06 Techs: CLARKE / KATELEY

Instrument: 43·89 # 199350



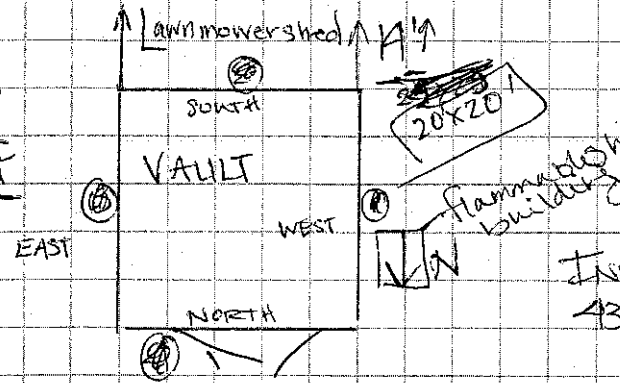
Smear #'s 200 → 207

Marked on walls @ 1:2 meter heights

* circles are ceiling locations
* rectangles are floor locations

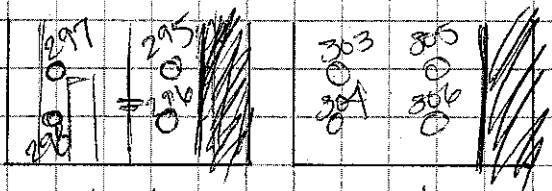
Scanned 5·26·06

5-31-06



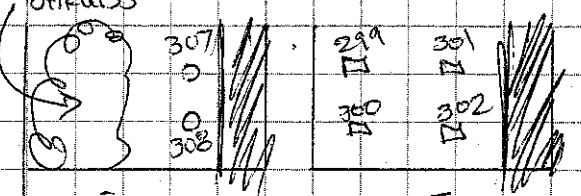
INSTRUMENT: 43-89 #469

CLARKE & KATELEY



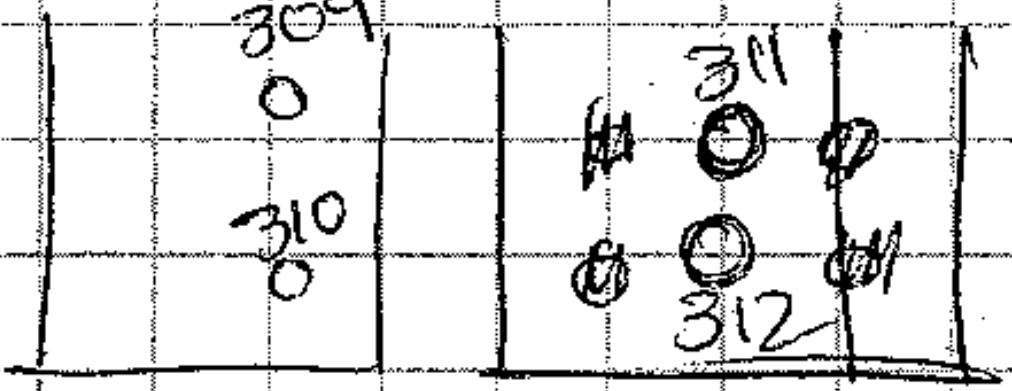
NORTH WALL

SOUTH WALL (UNDER SHED ROOF)



SHED ON BACK OF STANDALONE VAULT

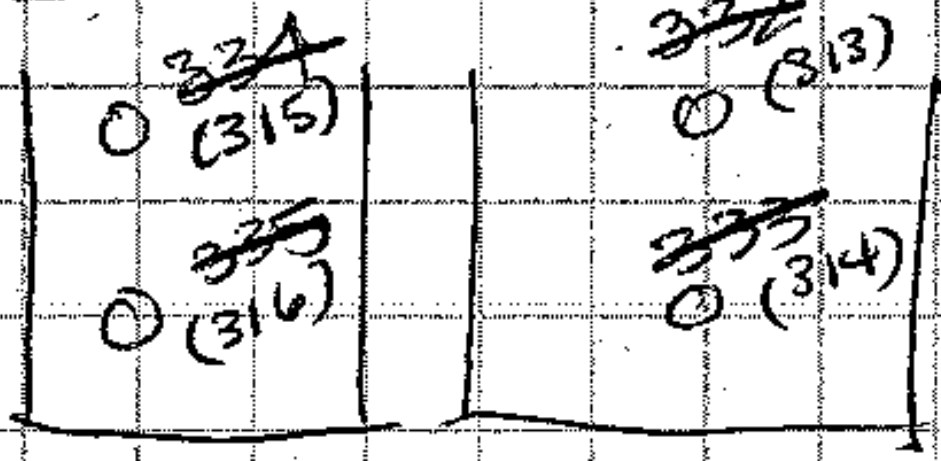
INSIDE



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 α (dpm/100 cm^2)**	**α > 100 dpm / 100 cm^2 ?**	**Instrument (count time)**		**Sample ID#**	**Sample α (dpm/100 cm^2)**	**α > 10 dpm / 100 cm^2 ?**	**Instrument (count time)**
EXTERIOR WALLS								
North Wall								
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)
West Wall								
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

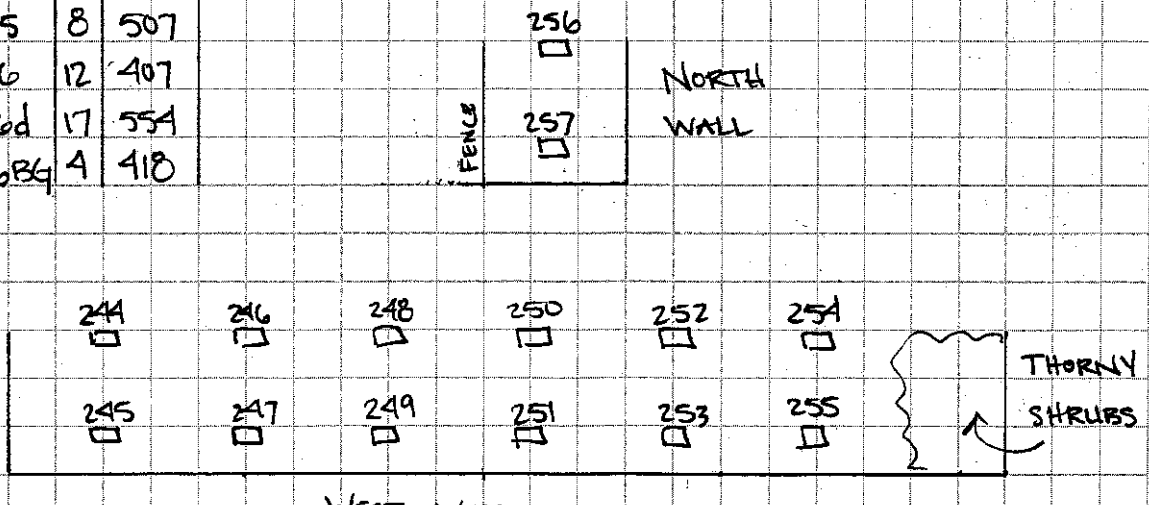
5·30·06

5'
SCALE

TECHS:
~~INSTRUMENT~~:
CLARKE ;
KATELEY

INSTRUMENT :
43-89 # 199350

Direct #	α	β
263	19	451
264BG	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
276BG	4	418



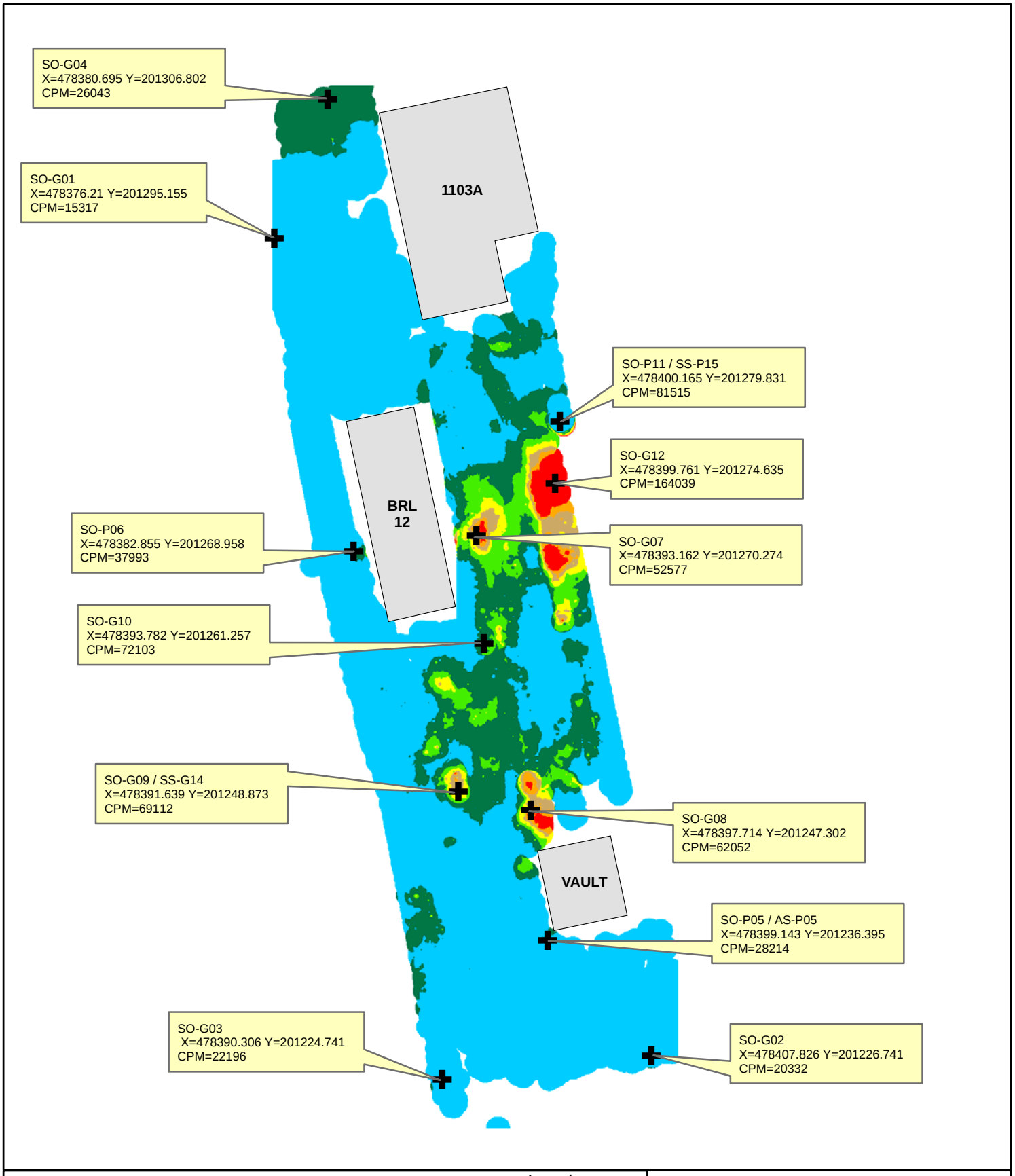
APPENDIX C

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



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

CABRERA SERVICES
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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

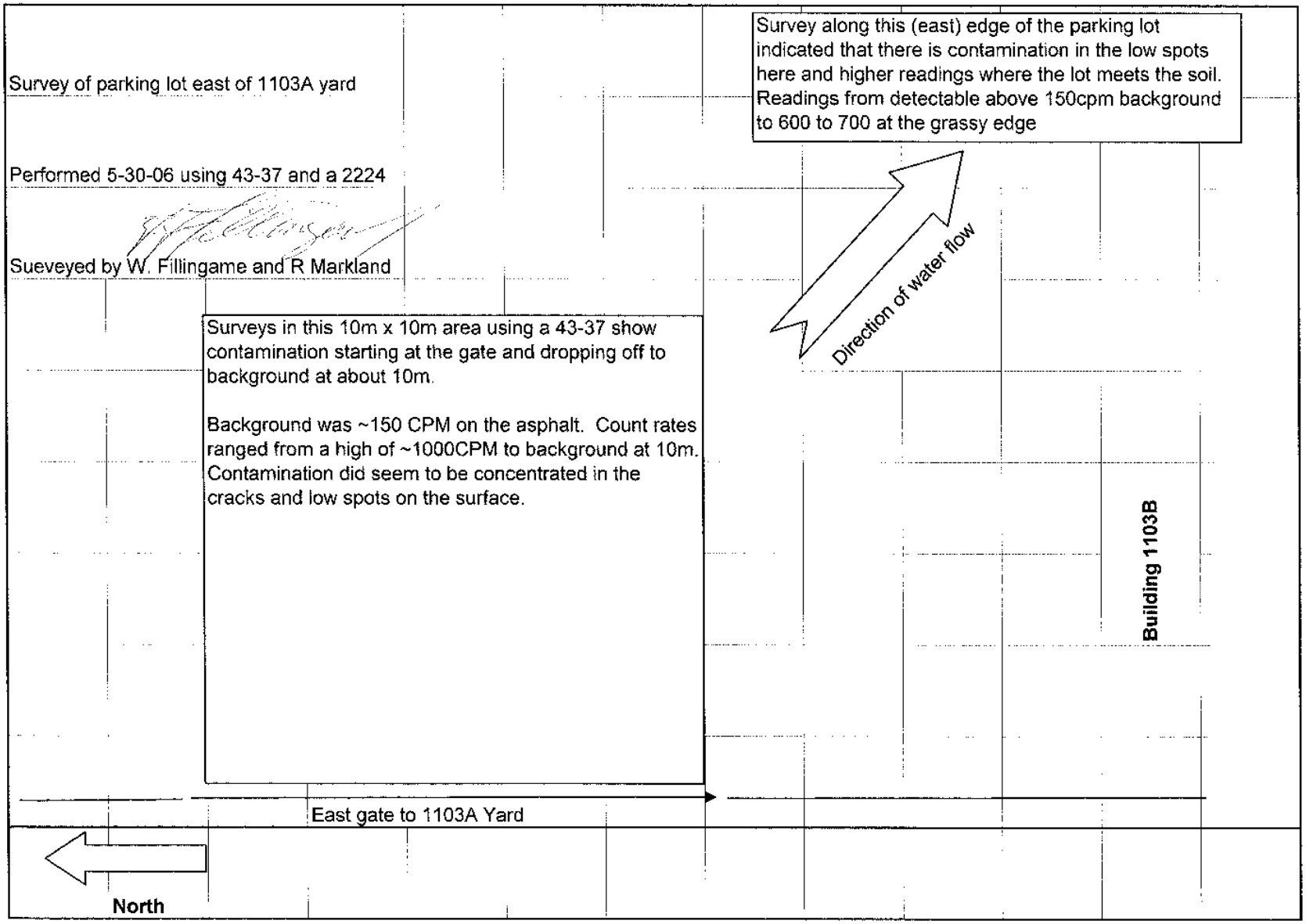
CPM	Northing	Easting	ZSCORE	Surface Sample ID	Subsurface Sample ID
164039	**201274.635**	**478399.761**	**17.21**	**SO-G12**	
106438	201273.908	478400.096	10.43		
100800	201275.31	478399.797	9.77		
94821	201274.434	478399.74	9.06		
93084	201275.15	478399.541	8.86		
81515	**201279.831**	**478400.165**	**7.50**	**SO-P11**	**SS-P15**
78082	201279.964	478400.42	7.09		
77182	201274.097	478398.15	6.99		
72103	**201261.257**	**478393.782**	**6.39**	**SO-G10**	
71520	201275.996	478399.414	6.32		
70500	201268.368	478399.24	6.20		
69112	**201248.873**	**478391.639**	**6.04**	**SO-G09**	**SS-G14**
68423	201250.38	478391.371	5.96		
67985	201273.737	478399.718	5.90		
66605	201274.796	478398.23	5.74		
62052	**201247.302**	**478397.714**	**5.21**	**SO-G08**	
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		
52577	**201270.274**	**478393.162**	**4.09**	**SO-G07**	
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.

CPM VALUE STATISTICS	
Mean	**17834.69**
Standard Error	**147.66**
Median	**16185**
Mode	**21298**
Standard Deviation	**8494.20**
Sample Variance	**72151503.47**
Kurtosis	**43.71**
Skewness	**4.54**
Range	**162129**
Minimum	**1910**
Maximum	**164039**
Sum	**59015003**
Count	**3309**

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
Sueveyed by W. Fillingame and R Markland
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
Direction of water flow
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.
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

SAMPLE IDENTIFICATION KEY

Samples collected during the characterization effort were identified by a unique number code that accompanied the sample from collection through analysis and data review. The general format of the numbering scheme was as follows:

XX – YNN

Where:	XX (Sample Matrix Code)	=	SO for Surface Soil, SS for Subsurface Soil PT for Paint CL for Ceiling Material WL for Wall Material FL for Floor Material SM for Smear Sample
	Y (Location Code)	=	A for Building 1103A B for Building BRL12 C for the Vault D for Building 1103B G for Grounds P for Pavement R for Concrete
	NN (Sample Number)	=	01, 02, 03, etc.

Field data records documenting the collection of each volumetric sample are attached.

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-P05 QC SAMPLES COLLECTED: n/a

SAMPLE DATA

DEPTH OF SAMPLE: 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [ ] GRAVEL [ ] CLAY [X] OTHER asphalt

LOCATION COORDINATES: ~~145075/591304~~ (dlo 11/6/07) 478399.143/201236.395

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER ____

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID: ____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION: 28,214 cpm

AFTER SAMPLE COLLECTION: ____ cpm

DETECTOR Type: 44-20 Serial No.: PR215468

METER Type: 2221 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-P05 for location description.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES: Two asphalt samples associated with SO-P05.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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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 0730 END 0830 CONTAINER TIME —

FIELD SAMPLE ID CL-A13 QC SAMPLES COLLECTED n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES bathroom

MATERIAL:
- [ ] WALLBOARD (WL)
- [X] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [X] OTHER razor knife

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

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"x3"x0.5" 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
[X]	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	[X]
[ ]	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	[ ]
[X]	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	[X]
[ ]	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	[ ]
[ ]	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	[ ]

NOTES
Two samples were collected from this location.

SAMPLED BY: B. Clarke/D. Kateley

RECEIVED BY: M. Driscoll

CABRERA SERVICES
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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 0730 END 0830 | CONTAINER TIME: -

FIELD SAMPLE ID: CL-A15 (2) | QC SAMPLES COLLECTED: n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: Inner office

MATERIAL:
- [ ] WALLBOARD (WL)
- [X] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [X] OTHER razor knife

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI water

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.

SAMPLE ANALYSES

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

NOTES

Two samples were collected from this location.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

PROJECT: ARL Building 1103A Characterization | JOB NUMBER: 05-3060.06, Task 3 | DATE: 6/1/06

LOCATION ID: 1103A - outer office | ACTIVITY TIME: START 0730 END 0830 | CONTAINER TIME: —

FIELD SAMPLE ID: CL-A17 (2) | QC SAMPLES COLLECTED: n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: outer office

MATERIAL:
- [ ] WALLBOARD (WL)
- [X] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [X] OTHER razor knife

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

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.)

~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
[X]	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	[X]
[ ]	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	[ ]
[X]	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	[X]
[ ]	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	[ ]
[ ]	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	[ ]

NOTES

Two samples were collected from this location.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: Smear #142

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [X] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [X] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER: DI Water

RINSATE BLANK ID:

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
9α/275β cpm	____ cpm	Type: 43-89	Type: 2224
		Serial No.: 469	Serial No.: ____

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

Grey paint chips, peeling off of ceiling.

SAMPLE ANALYSES

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

NOTES

Location was in NW corner of main work room.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: Smear #137

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [X] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [X] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

RINSATE BLANK ID:

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
4α/315β cpm	_____ cpm	Type: 43-89	Type: 2224
		Serial No.: 469	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
[X]	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	[X]
[ ]	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	[ ]
[X]	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	[X]
[X]	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	[X]
[ ]	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	[ ]

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

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: Smear #188

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [X] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [X] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER: DI Water

RINSATE BLANK ID:

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
1α/171β cpm	_____ cpm	Type: 43-89	Type: 2224
		Serial No.: 199350	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
[X]	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	[X]
[ ]	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	[ ]
[X]	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	[X]
[X]	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	[X]
[ ]	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	[ ]

NOTES

Location was in main shop room.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: Smear #195

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [X] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [X] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

RINSATE BLANK ID:

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
1α/1647β cpm	_____ cpm	Type: 43-89	Type: 2224
		Serial No.: 199350	Serial No.: _____

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

Rust-color paint chips, peeling from ceiling.

SAMPLE ANALYSES

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

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 1210 END 1400 | CONTAINER TIME: —

FIELD SAMPLE ID: FL-A19 | QC SAMPLES COLLECTED: n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: bathroom

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [X] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [X] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER _____

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

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.)

SAMPLE ANALYSES

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

NOTES

SAMPLED BY: M. Driscoll / W. Fillingame

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: 5-24-06

LOCATION ID: 1103A | ACTIVITY TIME: START ____ END ____ | CONTAINER TIME: —

FIELD SAMPLE ID: FL-A21 | QC SAMPLES COLLECTED: n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: Core #2

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [X] OTHER: footing material

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [X] HAND CORER / AUGER
- [ ] S.S. SPOON
- [X] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER ____

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER: DI Water

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.)

Black piece of footing material / expansion joint.

SAMPLE ANALYSES

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

NOTES

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

SAMPLED BY: W. Fillingame

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #1

MATERIAL:
[ ] WALLBOARD (WL)
[ ] CEILING TILE (CL)
[ ] FLOOR TILE (FL)
[ ] PAINT CHIP (PT)
[ ] SMEAR (SM)
[X] OTHER concrete core

EQUIPMENT INFORMATION

EQUIPMENT USED:
[X] HAND CORER / AUGER
[ ] S.S. SPOON
[ ] S.S. SHOVEL / TROWEL
[ ] S.S. SPATULA
[ ] GEOPROBE
[ ] OTHER

DECON FLUIDS USED:
[ ] DI WATER N2 PURGE
[ ] POTABLE WATER
[ ] LIQUINOX SOLUTION
[X] OTHER DI water

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.)

6" cores with 6" depth.

SAMPLE ANALYSES

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

~~X Gamma spec~~

NOTES

SAMPLED BY: W. Filling ame

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #2

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [X] OTHER concrete core

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [X] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

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.)

6" core with 6.5" depth.

SAMPLE ANALYSES

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

NOTES

SAMPLED BY: W. Fillingame

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: Core #3

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [X] OTHER: concrete core

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [X] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER: _____

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER: DI Water

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.)

6" core with 4" depth.

SAMPLE ANALYSES

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

NOTES

SAMPLED BY: W. Fillingame

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #4

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [X] OTHER concrete core

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [X] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI water

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.)

6" core with 5" depth.

SAMPLE ANALYSES

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

NOTES

SAMPLED BY: W. Fillingame

RECEIVED BY: M. Driscoll

CABRERA SERVICES
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FIELD DATA RECORD
VOLUMETRIC SAMPLING

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-R47 QC SAMPLES COLLECTED n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #5

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [X] OTHER concrete core

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [X] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [ ] OTHER

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

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.)

6" core with 5" depth

SAMPLE ANALYSES

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

NOTES

SAMPLED BY: W. Fillingame

RECEIVED BY: M. Driscoll

CABRERA SERVICES
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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-A06 QC SAMPLES COLLECTED n/a

SAMPLE DATA

TYPE OF SAMPLE: ☐ DISCRETE ☒ COMPOSITE

LOCATION COORDINATES bathroom sink drain

MATERIAL:
☐ WALLBOARD (WL)
☐ CEILING TILE (CL)
☐ FLOOR TILE (FL)
☐ PAINT CHIP (PT)
☒ SMEAR (SM)
☐ OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
☐ HAND CORER / AUGER
☐ S.S. SPOON
☐ S.S. SHOVEL / TROWEL
☐ S.S. SPATULA
☐ GEOPROBE
☒ OTHER snake, paper towel

DECON FLUIDS USED:
☐ DI WATER N2 PURGE
☐ POTABLE WATER
☐ LIQUINOX SOLUTION
☒ OTHER DI Water

RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	3 μrem/hr.	Type: Bicron	Type: _____
		Serial No.: C853F	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
☐	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	☐
☒	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	☒
☐	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	☐
☐	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	☐
☐	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	☐

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: Bldg 1103A | ACTIVITY TIME: START 0700 END 0720 | CONTAINER TIME: —

FIELD SAMPLE ID: SM - A07 | QC SAMPLES COLLECTED: n/a

SAMPLE DATA

TYPE OF SAMPLE: ☐ DISCRETE ☒ COMPOSITE

LOCATION COORDINATES: shower drain

MATERIAL:
- ☐ WALLBOARD (WL)
- ☐ CEILING TILE (CL)
- ☐ FLOOR TILE (FL)
- ☐ PAINT CHIP (PT)
- ☒ SMEAR (SM)
- ☐ OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- ☐ HAND CORER / AUGER
- ☐ S.S. SPOON
- ☐ S.S. SHOVEL / TROWEL
- ☐ S.S. SPATULA
- ☐ GEOPROBE
- ☒ OTHER snake, paper towel

DECON FLUIDS USED:
- ☐ DI WATER N2 PURGE
- ☐ POTABLE WATER
- ☐ LIQUINOX SOLUTION
- ☒ OTHER DI water

RINSATE BLANK ID: _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	3 µrem/hr.	Type: Bicron	Type: _____
		Serial No.: C853F	Serial No.: _____

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

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

SAMPLE ANALYSES

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

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

TYPE OF SAMPLE: ☐ DISCRETE ☒ COMPOSITE

LOCATION COORDINATES: washing machine drain

MATERIAL:
☐ WALLBOARD (WL)
☐ CEILING TILE (CL)
☐ FLOOR TILE (FL)
☐ PAINT CHIP (PT)
☒ SMEAR (SM)
☐ OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
☐ HAND CORER / AUGER
☐ S.S. SPOON
☐ S.S. SHOVEL / TROWEL
☐ S.S. SPATULA
☐ GEOPROBE
☒ OTHER snake, paper towel

DECON FLUIDS USED:
☐ DI WATER N2 PURGE
☐ POTABLE WATER
☐ LIQUINOX SOLUTION
☒ OTHER DI Water

RINSATE BLANK ID: _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
_____ cpm	4 µrem/hr	Type: Bicron	Type: _____
		Serial No.: C853F	Serial No.: _____

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

Paper towel is dry with brown smudges, no odor.

SAMPLE ANALYSES

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

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

CABRERA SERVICES
RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #1

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

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.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (1)
[X]	RCRA Metals (TCLP)	EPA 900.0	Cool 4°C	1 @ 8oz glass	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #2a

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [X] GRAVEL [X] CLAY [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

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.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (1)
[X]	RCRA Metals (TCLP)	EPA 900.0	Cool 4°C	1@8oz glass	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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 / M. Driscoll

RECEIVED BY: M. Driscoll

CABRERA SERVICES
RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #3

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION _____ cpm

AFTER SAMPLE COLLECTION _____ cpm

DETECTOR Type: _____ Serial No.: _____

METER Type: _____ Serial No.: _____

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

Medium brown clayey silt, low plasticity.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (1)
[X]	RCRA Metals (TCLP)	EPA 900.0	Cool 4°C	1 @ 80z glass	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #4

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [X] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

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.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (1)
[X]	RCRA Metals (TCLP)	EPA 900.0	Cool 4°C	1 @ 8oz glass	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #5

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER _____

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

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 to medium brown silty clay, medium plasticity.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (1)
[X]	RCRA Metals (TCLP)	EPA 900.0	Cool 4°C	1@8oz glass	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-G01 QC SAMPLES COLLECTED n/a

SAMPLE DATA

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES
~~195090.1 / 541364.2~~ 478376.21 / 201295.155

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
15,317 cpm	____ cpm	Type: 44-20	Type: 2221
		Serial No.: PR215468	Serial No.: 218559

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
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~-145062.4/541243.8 NAD 1927~~ 478407.826/201226.741

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
20,332 cpm	____ cpm	Type: 44-20	Type: 2221
		Serial No.: PR2154168	Serial No.: 218559

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.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 6-1-06

LOCATION ID Buffer Zone Ground ACTIVITY TIME START 1000 END 1455 CONTAINER TIME --

FIELD SAMPLE ID SO-G03 QC SAMPLES COLLECTED n/a

SAMPLE DATA

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~495080.5/541292.4~~ NAD 1983 478390.306/201224.741

TYPE OF SOIL: [ ] ORGANIC [X] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

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

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

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES dep 1116607
~~-195084.4/591375.5~~
478380.695/201306.802

TYPE OF SOIL: [ ] ORGANIC [X] SAND [ ] GRAVEL [ ] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
26,043 cpm	____ cpm	Type: 44-20	Type: 2221
		Serial No.: PR215468	Serial No.: 218559

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

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-607 QC SAMPLES COLLECTED n/a

SAMPLE DATA

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~545074.8 / 541338.3~~ 478393.162 / 201270.274

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
52,577 cpm	____ cpm	Type: 44-20	Type: 2221
		Serial No.: PR215468	Serial No.: 218559

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 BR112.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES Gravelly surface @ sample location.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-G08 QC SAMPLES COLLECTED n/a

SAMPLE DATA

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~195071.9 / 591315~~ 1116167

TYPE OF SOIL: [ ] ORGANIC [X] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
62,052 cpm	____ cpm	Type: 44-20	Type: 2221
		Serial No.: PR2154168	Serial No.: 218559

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
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-G09 — QC SAMPLES COLLECTED: n/a

SAMPLE DATA

DEPTH OF SAMPLE: 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [X] OTHER silt

LOCATION COORDINATES: ~~145077.7/591317~~ dm 6/1/06
478391.639/201248.873

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER ______

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID: ______

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION: 69,112 cpm

AFTER SAMPLE COLLECTION: ______ cpm

DETECTOR Type: 44-20 Serial No.: PR215468

METER Type: 2221 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
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES: Gravelly surface, yellow soil. Surface sample associated with SS-G14.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~145074.7/591324.2~~ 116107
478393.782/201261.257

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
72,103 cpm	____ cpm	Type: 44-20	Type: 2221
		Serial No.: PR2154168	Serial No.: 218559

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

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES Gravelly surface @ sample location.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE: 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [X] OTHER silt

LOCATION COORDINATES: ~~195067.9/591342.2~~ (initialed, 1/16/07) 478399.761/201274.635

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER ____

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID: ____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION: 164,039 cpm

AFTER SAMPLE COLLECTION: ____ cpm

DETECTOR Type: 44-20 Serial No.: PR215468

METER Type: 2221 Serial No.: 218559

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.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES 1103A downspout

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [ ] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

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
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke

RECEIVED BY: M. Driscoll

CABRERA SERVICES
RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-G40 QC SAMPLES COLLECTED n/a

SAMPLE DATA

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES BRL12 downspout

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [ ] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION _____ cpm

AFTER SAMPLE COLLECTION _____ cpm

DETECTOR Type: _____ Serial No.: _____

METER Type: _____ Serial No.: _____

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

Dark grey clayey, sandy silt with small to medium gravel (10%), low plasticity.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke

RECEIVED BY: M. Driscoll

CABRERA SERVICES
RADIOLOGICAL • ENVIRONMENTAL • REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Grassy area south of vault

TYPE OF SOIL: [ ] ORGANIC [X] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [ ] OTHER

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION _____ cpm

AFTER SAMPLE COLLECTION _____ cpm

DETECTOR Type: _____ Serial No.: _____

METER 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
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

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

SAMPLED BY: D. Kateley

RECEIVED BY: M. Driscoll

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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-P05 QC SAMPLES COLLECTED n/a

SAMPLE DATA

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~-145075/59130+~~ 40 166107
478399.143/201236.395

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

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.: PR2154168	Serial No.: 218559

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

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES
Surface soil sample associated with AS-P05 (2 samples of asphalt).

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

CABRERA SERVICES
RADIOLOGICAL • ENVIRONMENTAL • REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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-P06
QC SAMPLES COLLECTED: n/a

SAMPLE DATA

DEPTH OF SAMPLE: 0-0.5' FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

TYPE OF SOIL: [ ] ORGANIC [X] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

LOCATION COORDINATES: ~~195085.2/541337.6~~ 478382.855/201268.958

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER ________

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID: ________

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION: 37,993 cpm
AFTER SAMPLE COLLECTION: ________ cpm

DETECTOR Type: 44-20 Serial No.: PR215468

METER Type: 2221 Serial No.: 218559

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
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

CABRERA SERVICES
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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~146067.2/691347.4~~ 478400.165/201279.831

TYPE OF SOIL: [ ] ORGANIC [X] SAND [ ] GRAVEL [ ] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

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

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
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES Surface sample associated with SS-P15.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

CABRERA SERVICES
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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0-0.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES E of BRL12, SE of 1103A

TYPE OF SOIL: [X] ORGANIC [X] SAND [ ] GRAVEL [ ] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

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

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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

SAMPLED BY: W. Fillingame

RECEIVED BY: M. Driscoll

CABRERA SERVICES
RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0.5-1 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #26

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [X] GRAVEL [X] CLAY [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION _____ cpm

AFTER SAMPLE COLLECTION _____ cpm

DETECTOR Type: _____ Serial No.: _____

METER Type: _____ Serial No.: _____

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

Medium brown soft clay with some fines, 5% gravel, slightly moist.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (1)
[X]	RCRA Metals (TCLP)	EPA 900.0	Cold 4°C	1@ 8oz glass	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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

CABRERA SERVICES
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FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

PROJECT ARL Building 1103A Characterization JOB NUMBER 05-3060.06, Task 3 DATE 5-25-06

LOCATION ID 1103A ACTIVITY TIME START ~~1210~~ 0830 END ~~1400~~ 0430 CONTAINER TIME –

FIELD SAMPLE ID SS-A27 QC SAMPLES COLLECTED n/a

SAMPLE DATA

DEPTH OF SAMPLE 1.-1.5 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES Core #2c

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [ ] GRAVEL [X] CLAY [X] OTHER silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI water

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.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X] (1)
[X]	RCRA Metals (TCLP)	EPA 900.0	Cool 4°C	1@ 8oz glass	[X] (2)
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

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

CABRERA SERVICES
RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0.5-1 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~1450777/591317~~ 478341.639/201248.837

TYPE OF SOIL: [ ] ORGANIC [X] SAND [X] GRAVEL [ ] CLAY [X] OTHER, silt

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION	AFTER SAMPLE COLLECTION	DETECTOR	METER
69,112 cpm	____ cpm	Type: 4420	Type: 2221
		Serial No.: PR215468	Serial No.: 218559

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

Greenish-grey silty, sandy soil with well-graded gravel.

SAMPLE ANALYSES

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES Subsurface sample associated with SO-G09.

SAMPLED BY: B. Clarke / D. Kateley

RECEIVED BY: M. Driscoll

CABRERA SERVICES
RADIOLOGICAL · ENVIRONMENTAL · REMEDIATION

FIELD DATA RECORD
SURFACE / SUBSURFACE SOIL SAMPLING

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

DEPTH OF SAMPLE 0.5 - 1 FT (BGS)

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES ~~1950697.2 / 541347.4~~ 478400.165 / 201279.831

TYPE OF SOIL: [ ] ORGANIC [ ] SAND [ ] GRAVEL [ ] CLAY [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED: [X] HAND CORER / AUGER [ ] S.S. SPOON [X] S.S. SHOVEL / TROWEL [ ] S.S. SPATULA [ ] GEOPROBE [ ] OTHER

DECON FLUIDS USED: [ ] DI WATER N2 PURGE [ ] POTABLE WATER [ ] LIQUINOX SOLUTION [X] OTHER DI Water

RINSATE BLANK ID

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

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

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

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	BOTTLE TYPE/ VOLUME REQUIRED	SAMPLE COLLECTED
[X]	DEPLETED URANIUM (GAMMA SPEC)	EPA 901.1M	None	1 @ 16 oz. plastic	[X]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]
[ ]					[ ]

NOTES Subsurface sample associated with SO-P11.

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: 5/25/06

LOCATION ID: 1103A | ACTIVITY TIME: START 1000 END 1100 | CONTAINER TIME: —

FIELD SAMPLE ID: WL-A05 | QC SAMPLES COLLECTED: n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: smear #171

MATERIAL:
- [ ] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [X] OTHER filtermat.

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [X] OTHER razor knife

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

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
[X]	ISOTOPIC URANIUM (ALPHA SPEC)	ASTM 3972-90M	None	1 @ 4 oz. plastic	[X]
[ ]	GROSS ALPHA / BETA (SMEARS)	EPA 900.0	None	1 plastic bag	[ ]
[ ]	RCRA METALS (TCLP)	EPA 1311/6010/7470	Cool 4°C	1 @ 8 oz. glass	[ ]
[ ]	PCBS	EPA 8082	Cool 4°C	1 @ 4 oz. glass	[ ]
[ ]	ASBESTOS	NIOSH 7400	None	1 @ 4 oz. plastic	[ ]

NOTES

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

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 0730 END 0830 | CONTAINER TIME: –

FIELD SAMPLE ID: WL-A09 | QC SAMPLES COLLECTED: n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES: wall 11a, smear #109

MATERIAL:
- [X] WALLBOARD (WL)
- [ ] CEILING TILE (CL)
- [ ] FLOOR TILE (FL)
- [ ] PAINT CHIP (PT)
- [ ] SMEAR (SM)
- [ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
- [ ] HAND CORER / AUGER
- [ ] S.S. SPOON
- [ ] S.S. SHOVEL / TROWEL
- [ ] S.S. SPATULA
- [ ] GEOPROBE
- [X] OTHER razor knife

DECON FLUIDS USED:
- [ ] DI WATER N2 PURGE
- [ ] POTABLE WATER
- [ ] LIQUINOX SOLUTION
- [X] OTHER DI Water

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.)

~2" x 3" x 0.5" chunk of sheetrock, relatively intact (not much crumbling), dark tan exterior w/ white & grey interior.

SAMPLE ANALYSES

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

NOTES

Two samples were collected from this location.

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 0730 END 0830 CONTAINER TIME —

FIELD SAMPLE ID WL-A11 (2) QC SAMPLES COLLECTED n/a

SAMPLE DATA

TYPE OF SAMPLE: [X] DISCRETE [ ] COMPOSITE

LOCATION COORDINATES
Wall 4, smear #118

MATERIAL:
[X] WALLBOARD (WL)
[ ] CEILING TILE (CL)
[ ] FLOOR TILE (FL)
[ ] PAINT CHIP (PT)
[ ] SMEAR (SM)
[ ] OTHER

EQUIPMENT INFORMATION

EQUIPMENT USED:
[ ] HAND CORER / AUGER
[ ] S.S. SPOON
[ ] S.S. SHOVEL / TROWEL
[ ] S.S. SPATULA
[ ] GEOPROBE
[X] OTHER razor knife

DECON FLUIDS USED:
[ ] DI WATER N2 PURGE
[ ] POTABLE WATER
[ ] LIQUINOX SOLUTION
[X] OTHER DI Water

RINSATE BLANK ID _____

RADIOLOGICAL MEASUREMENTS AT SAMPLE LOCATION

BEFORE SAMPLE COLLECTION _____ cpm

AFTER SAMPLE COLLECTION _____ cpm

DETECTOR Type: _____ Serial No.: _____

METER Type: _____ 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.

SAMPLE ANALYSES

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

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 Method	Matrix	Order Number
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 Method	Matrix	Order Number
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
CLPT-C04	**LEAD**	**21**	**MG/L**	0.03		**METALS**	**SW6010**	**LEACHATE**	**606029**
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 Method	Matrix	Order Number
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
NOTES:									
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
FL-A21	**U-234**	**11.1**	**+/-**	**2**	**pCi/g**	**0.1**	**Y2**	**714R9**	**SOLID**	**606044**
FL-A21	**U-235**	**1.24**	**+/-**	**0.32**	**pCi/g**	**0.08**	**Y2**	**714R9**	**SOLID**	**606044**
FL-A21	**U-238**	**85**	**+/-**	**15**	**pCi/g**	**0**	**Y2**	**714R9**	**SOLID**	**606044**
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
FL-R46- Top	**U-234**	**17**	**+/-**	**3**	**pCi/g**	**0.2**	**Y2,M3**	**714R9**	**SOLID**	**606044**
FL-R46- Top	**U-235**	**1.71**	**+/-**	**0.4**	**pCi/g**	**0.13**	**Y2,M3**	**714R9**	**SOLID**	**606044**
FL-R46- Top	**U-238**	**132**	**+/-**	**23**	**pCi/g**	**0**	**Y2,M3**	**714R9**	**SOLID**	**606044**
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
WL-A05	**U-234**	**13.7**	**+/-**	**2.6**	**pCi/g**	**0.1**	**Y2,M3**	**714R9**	**SOLID**	**606044**
WL-A05	**U-235**	**1.78**	**+/-**	**0.44**	**pCi/g**	**0.12**	**Y2,M3**	**714R9**	**SOLID**	**606044**

Building 1103A Area Characterization
Isotopic Uranium Results

Field ID	Parameter	Result		TPU	Units	MDC	Flag	Analytical Method	Matrix	Order Number
WL-A05	**U-238**	**99**	**+/-**	**18**	**pCi/g**	**0**	**Y2**	**714R9**	**SOLID**	**606044**
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
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.										
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

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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
SO-G07	**Th-234**	**156**	**+/-**	**22**	**pCi/g**	**14**	**M3,G**	**713R9**	**SOIL**	**606043**
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
SO-G08	**Th-234**	**405**	**+/-**	**48**	**pCi/g**	**7**	**G**	**713R9**	**SOIL**	**606043**
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
SO-G09	**Th-234**	**226**	**+/-**	**30**	**pCi/g**	**16**	**M3,G**	**713R9**	**SOIL**	**606043**
SO-G09	U-235	3.7	+/-	0.79	pCi/g	1.13	LT,G	713R9	SOIL	606043

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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
SO-G12	**Th-234**	**654**	**+/-**	**77**	**pCi/g**	**8**		**713R9**	**SOIL**	**606043**
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
SO-G40	**Th-234**	**84**	**+/-**	**12**	**pCi/g**	**9**	**M3,G**	**713R9**	**SOIL**	**606043**
SO-G40	U-235	1.36	+/-	0.4	pCi/g	0.69	LT,G	713R9	SOIL	606043

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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
SO-P11	**Th-234**	**1740**	**+/-**	**220**	**pCi/g**	**80**	**M3,G**	**713R9**	**SOIL**	**606043**
SO-P11	U-235	28.3	+/-	4	pCi/g	3.8	G	713R9	SOIL	606043

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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,TI	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
SS-G14	**Th-234**	**427**	**+/-**	**57**	**pCi/g**	**30**	**M3,G**	**713R9**	**SOIL**	**606043**
SS-G14	U-235	7.3	+/-	1.3	pCi/g	1.6	LT,G	713R9	SOIL	606043

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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
SM-A05	**Gross Alpha**	**31.4**	**+/-**	**5.7**	**pCi/sample**	**0.7**		**724R8**	**WIPE**	**606045**
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
SM-A125	**Gross Alpha**	**6.8**	**+/-**	**1.7**	**pCi/sample**	**0.8**		**724R8**	**WIPE**	**606045**
SM-A125	Gross Beta	32.6	+/-	5.7	pCi/sample	1.6		724R8	WIPE	606045
SM-A135	**Gross Alpha**	**4.5**	**+/-**	**1.3**	**pCi/sample**	**0.6**		**724R8**	**WIPE**	**606045**
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
SM-A155	**Gross Alpha**	**89**	**+/-**	**15**	**pCi/sample**	**1**		**724R8**	**WIPE**	**606045**
SM-A155	Gross Beta	327	+/-	53	pCi/sample	4		724R8	WIPE	606045
SM-A165	**Gross Alpha**	**12.1**	**+/-**	**2.5**	**pCi/sample**	**0.6**		**724R8**	**WIPE**	**606045**
SM-A165	Gross Beta	29.1	+/-	5.2	pCi/sample	1.8		724R8	WIPE	606045
SM-A25	**Gross Alpha**	**5.8**	**+/-**	**1.5**	**pCi/sample**	**0.7**		**724R8**	**WIPE**	**606045**
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
SM-A35	**Gross Alpha**	**44.5**	**+/-**	**7.7**	**pCi/sample**	**0.8**		**724R8**	**WIPE**	**606045**
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
SM-A95	**Gross Alpha**	**6**	**+/-**	**1.5**	**pCi/sample**	**0.6**		**724R8**	**WIPE**	**606045**
SM-A95	Gross Beta	20.4	+/-	3.8	pCi/sample	1.6		724R8	WIPE	606045
SM-B175	**Gross Alpha**	**12**	**+/-**	**2.5**	**pCi/sample**	**0.7**		**724R8**	**WIPE**	**606045**
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
SM-C205	**Gross Alpha**	**8.3**	**+/-**	**1.9**	**pCi/sample**	**0.7**		**724R8**	**WIPE**	**606045**
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

NOTES:

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^2.

1 pCi/sample is equivalent to 2.2 dpm/100 cm^2. 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^2)	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

Gordon Porter

Gordy Porter
Project Manager

CC: A. Marcum

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

ASBESTOS INSPECTION SAMPLING FORM

* (L.F. = Linear Feet)

Sample Number	Location	Type of Material	Description (Color/Size)	Friable (Yes/No)
S-1	Support Room	Mastic - beneath black baseboard	Black (~60 L.F.*)	No
S-2	Entry Area	Floor Tile	12"x12" - Cream w/ speck pattern	No
S-3	↓	Mastic - beneath S-2	Black	No
S-4	↓	Sheet Rock	Gray (painted white)	No
S-5	Entry Area	Mastic - beneath brown baseboard	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" woven 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.

Building 1103A

lg → L12

* Note: No Samples collected in seperate 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.

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

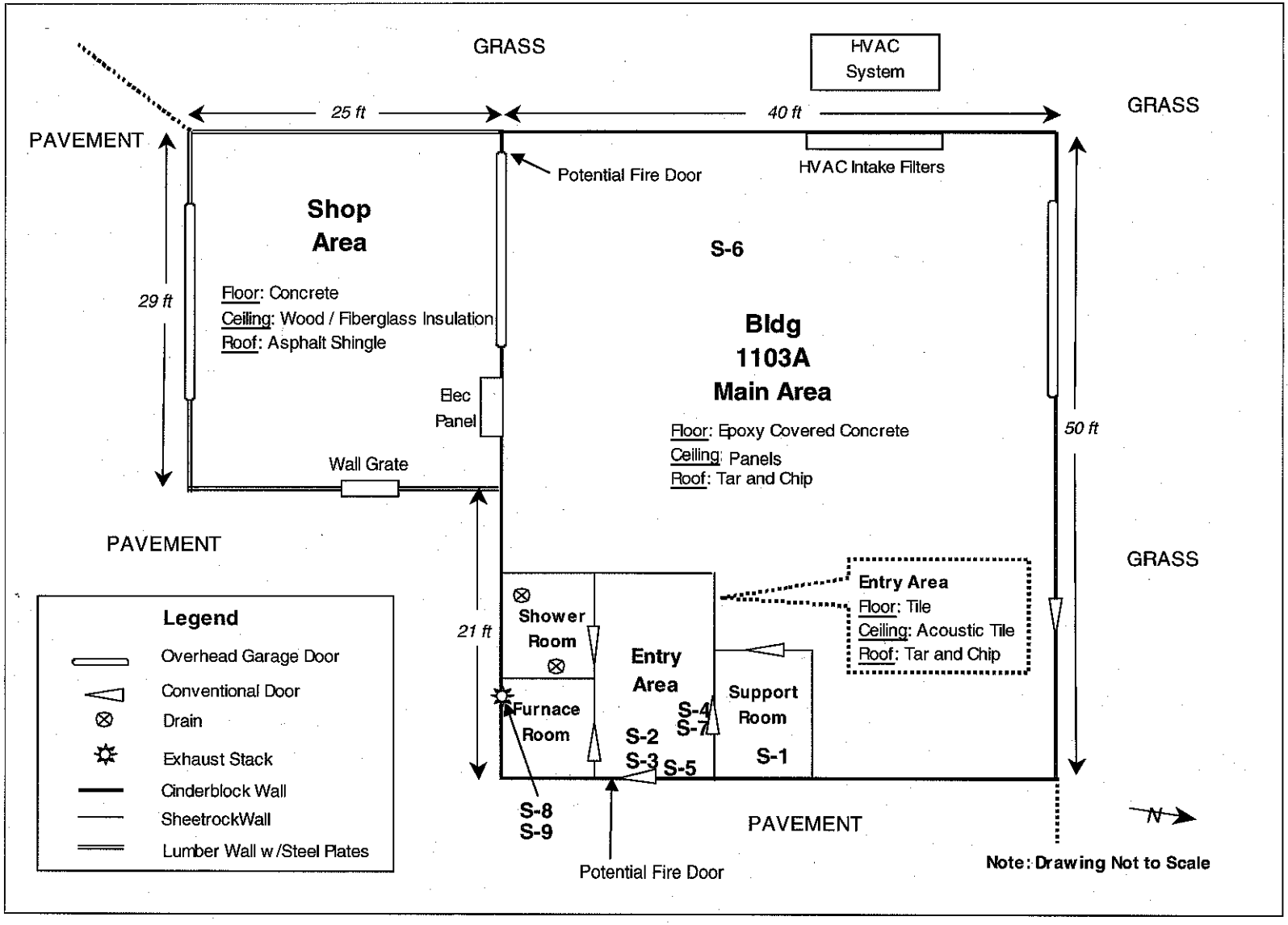
ASBESTOS INSPECTION SAMPLING FORM

Sample Number	Location	Type of Material	Description (Color/Size)	Friable (Yes/No)
S-11	Small Office Area	Mastic - Beneath S-10	Brown (~300 sq-ft)	No
S-12	Center Room	sheetrock	gray (paintedwhite)	No.

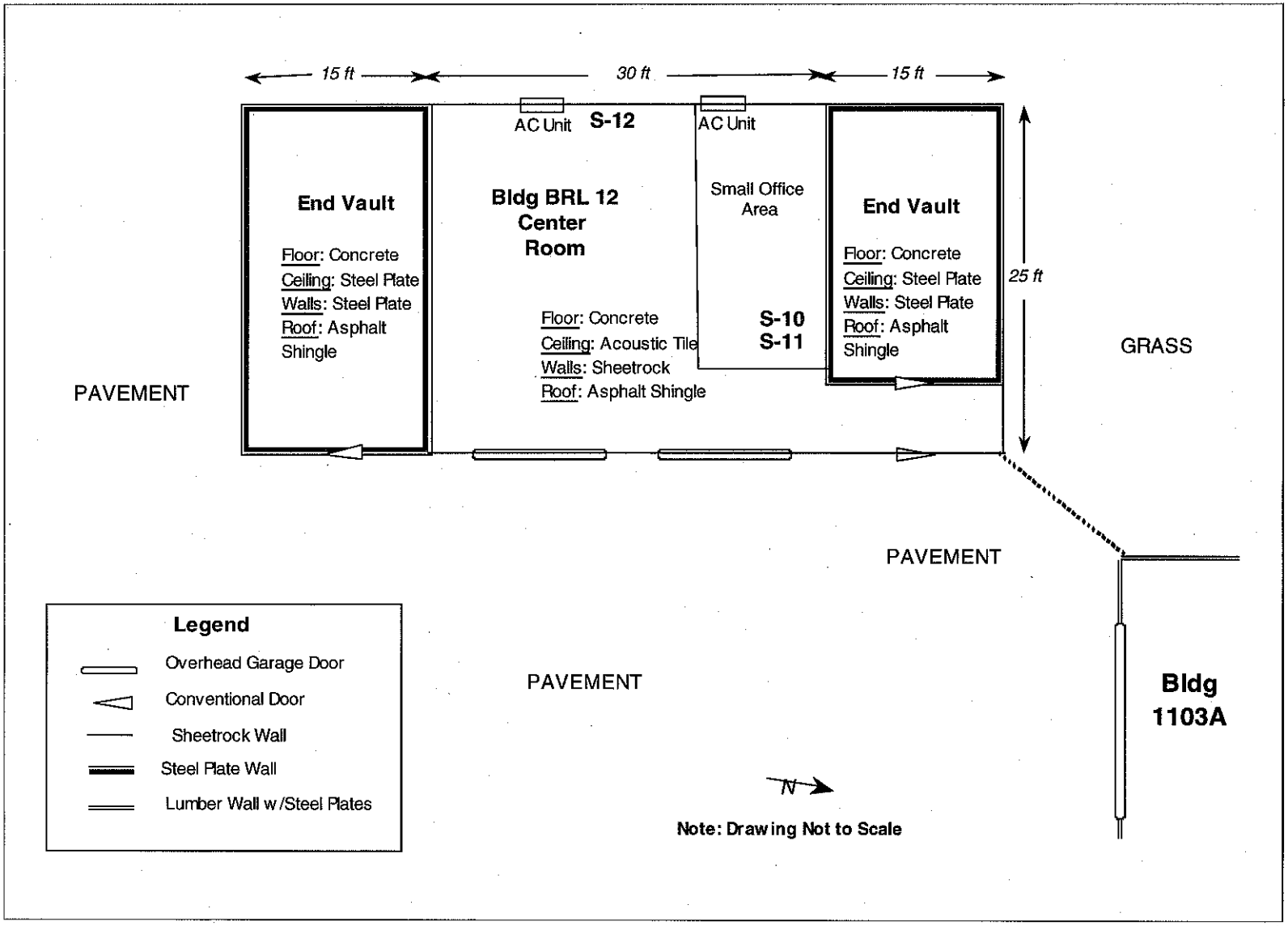
Bldg BRL 12

ATTACHEMNT II:

SAMPLING LOCATION DIAGRAMS



Sample Locations - Building 1103A
Spesutie Island, APG, Maryland



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

ATTACHMENT III:

LABORATORY ANALYTICAL RESULTS

AMA Analytical Services, Inc.
A Specialized Environmental Laboratory

CERTIFICATE OF ANALYSIS

NVLAP 101143-0
NY ELAP 10920
AIHA 100470

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

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	LB	
0651577	S-5	NAD	--	--	--	--	--	--	--	--	2	98	Black	Homogeneous	LB	
0651578	S-6	NAD	--	--	--	--	--	--	15	--	--	85	Multi	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	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	

AMA Analytical Services, Inc.

A Specialized Environmental Laboratory

CERTIFICATE OF ANALYSIS

NVLAP 101143-0
NY ELAP 10920
AIHA 100470

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

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

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

(* NOTE ; starred sample [illegible])

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

CHAIN OF CUSTODY

(Please Refer To This Number For Inquires) **153140**

Mailing/Billing Information:

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

Submittal Information:

1. Job Name: Spesutie Island - Bldg 1103A - APG
2. Job Location: Aberdeen, MD
3. Job #: / P.O. #: /
4. Contact Person: Anna-Lisa Marcum @ phone # 410-538-8202 ext. 109
5. Submitted by: Anna-Lisa Marcum Signature: Anna-Lisa Marcum

☐ Please include COC/field data sheets with results. **Reporting Information (Results will be provided as soon as technically feasible):**

Date & Time Results Required: 05/31/06 @ 12 pm ☐ Immed. ☐ 24hr ☐ 48hr ☒ 72hr ☐ 5 Day ☐ Immed. After-Hours* ☐ 24hr After-Hours* ☐ Late-Night* (*must be pre-scheduled)

☐ Verbals: @ cell # ☐ Fax Copy: @ fax # ☐ Email Copy: AMarcum @ ea-est.com

Asbestos Analysis

PCM Air – Please Indicate Filter Type:
PC MCE Porosity ____ in a 25mm 37mm
☐ NIOSH 7400 ____ (QTY)
☐ Fiberglass ____ (QTY)

TEM Air – Please Indicate Filter Type:
PC MCE Porosity ____ in a 25mm 37mm
☐ AHERA ____ (QTY)
☐ NIOSH 7402 ____ (QTY)
☐ Other (specify ____) ____ (QTY)

PLM Bulk
☒ EPA 600 – Visual Estimate 12 (QTY)
☐ EPA Point Count ____ (QTY)
☐ NY State Friable ____ (QTY)
☐ Grav. Reduction ELAP 198.1 ____ (QTY)
☐ Other (specify ____) ____ (QTY)

TEM Bulk
☐ ELAP 198.4/Chatfield ____ (QTY)
☐ NY State PLM/TEM ____ (QTY)
☐ Residual Ash ____ (QTY)

TEM Dust
☐ Qual. (pres/abs) Vacuum/Dust ____ (QTY)
☐ Quan. (s/area) Vacuum D5755-95 ____ (QTY)
☐ Quan. (s/area)Dust D6480-99 ____ (QTY)

TEM Water
☐ Qual. (pres/abs) ____ (QTY)
☐ ELAP 198.2/EPA 100.2 ____ (QTY)
☐ EPA 100.1 ____ (QTY)

☐ All samples received in good condition unless otherwise noted.
(TEM Water samples: ____ °C)

Lead Analysis
☐ Paint Chip ____ (QTY)
☐ Dust Wipe (wipe type ____) ____ (QTY)
☐ Air ____ (QTY)
☐ Soil/Solid ____ (QTY)
☐ TCLP ____ (QTY)
☐ Drinking Water ____ (QTY)
☐ Waste Water ____ (QTY)
☐ Dust Wipe Furnace (wipe type ____) ____ (QTY)

Mold – Direct Microscopic Analysis
☐ Spore-Trap ____ (QTY) ☐ Bulk ____ (QTY)
☐ Surface Swab ____ (QTY) ☐ Surface Vacuum Dust ____ (QTY)
☐ Surface Tape ____ (QTY) ☐ Other (Specify ____) ____ (QTY)

SAMPLE INFORMATION: CLIENT ID NUMBER	SAMPLE LOCATION/ IDENTIFICATION	DATE	VOLUME (LITERS)	WIPE AREA	ANALYSIS: TEM	PCM	PLM	LEAD	MOLD	AIR	BULK	MATRIX: DUST	WATER AND OTHER	SPORE TRAP	TAPE	SWAB	CLIENT CONTACT (LABORATORY STAFF ONLY)
S-1	Bldg 1103A	05/24/06					X				X						Date/Time: Contact: By:
S-2							X				X						
S-3							X				X						
S-4							X				X						
S-5							X				X						Date/Time: Contact: By:
S-6							X				X						
S-7							X				X						
S-8							X				X						
S-9	Bldg 1103A						X				X						Date/Time: Contact: By:
S-10	Bldg BR12						X				X						
S-11	Bldg BR12						X				X						
S-12	Bldg BR12	05/24/06					X				X						

LABORATORY STAFF ONLY: (CUSTODY)

1. Date/Time RCVD: / / @ Via: By (Print): Sign:
2. Date/Time Analyzed: / / @ By (Print): Sign:
3. Results Reported To: Via: Date: / / Time: Initials:
4. Comments:

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.

2/10/2006	*2/10/2006*	*2/10/2007*	*DAVID TRUMAN*	*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

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: √YES NO MDA/Cross Talk Evaluation: √YES 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: [signature] Reviewed By: [signature] Date: 5/11/06

Certification Date: 5/11/2006 Certification Due: 5/11/2007

Detector 43-37 #092765 Raw Data (Counts)										
	Background		Th-230		Tc-99		N/A		N/A	
Voltage	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1600	1	355	269	423	0	806				
1625	1	418	301	517	1	923				
1650	**2**	**520**	**332**	**598**	**5**	**1021**				
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														
	MDA/Cross-Talk			Beta Eff.	Alpha Eff.	Th-230		Tc-99		N/A		N/A	
Voltage	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
1650	**568.1**	**68.7**	**0.5%**	**19.15%**	**13.5%**	**330**	**78**	**3**	**501**	-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

Reveiwed By: _____ Date: 5/11/06

Duratek

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: 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	
Calibrated By:	**Reviewed By:** **Date:** 5/11/06
Calibration Date: 5/11/2006	**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 Calibrated By:	Reviewed By: Date: 5/11/06
Calibration Date: 5/11/2006	Calibration Due: 5/11/2007

Duratek

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		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: √YES NO Statistical Evaluation: YES √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: M. Paul Reviewed By: Thomas E. Scott Date: 10-31-05

Certification Date: 10/31/05 Certification Due: 10/31/06

ORIGINAL

Detector 43-89 #199359 Raw Data (Counts)										
	Background		Th-230		Tc-99		N/A		N/A	
Voltage	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				
575	**1**	**254**	**378**	**413**	**0**	**646**				
600	2	273	393	572	1	682				
625	3	346	392	857	1	775				
650	2	523	390	2092	2	1027				

Source Info

Nuclide	**Th-230**	**Tc-99**	**N/A**	**N/A**
ID	119739	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	105.83	105.83
Half-Life (Years)	7.70E+04	2.13E+05		
Corrected Activity	2442	2616	#DIV/0!	#DIV/0!

Net CPM													
	MDA/Cross-Talk			Beta Eff. (%)	Alpha Eff. (%)	Th-230		Tc-99		N/A		N/A	
Voltage	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
575	**512.9**	**47.7**	**0.0%**	**14.99%**	**15.4%**	**377**	**159**	**-1**	**392**	-1	-254	-1	-254
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: ____________ Date: 10/31/05

Reveiwed By: ____________ Date: 10-31-05

ORIGINAL

Duratek

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: 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: M Pauli **Reviewed By:** Thomas F Scott **Date:** 10-31-05

Calibration Date: 10/31/05 **Calibration Due:** 10/31/06

ORIGINAL

Model: 2224 Serial Number: 118241

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: M. Paul

Reviewed By: Thomas Hall Date: 10-31-05

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: √YES NO

MDA/Cross Talk Evaluation: √YES 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: [signature] Reviewed By: [signature] Date: 5/10/06

Certification Date: 5/10/2006 Certification Due: 5/10/2007

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

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	5/10/2006	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!

Net CPM														
	MDA/Cross-Talk			Beta Eff.	Alpha Eff.	Th-230		Tc-99		N/A		N/A	
Voltage	Beta MDA	Alpha MDA	Beta-Alpha	(%)	(%)	Alpha	Beta	Alpha	Beta	Alpha	Beta	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
850	**599.6**	**59.7**	**0.0%**	**12.84%**	**15.6%**	**380**	**71**	**-2**	**336**	-2	-255	-2	-255
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

Reveiwed By: _____ Date: 5/10/06

Duratek™

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: 2224**	**Serial Number: 163737**
Contact Name: Thomas F. Scott		**Probe: 43-89**	**Serial Number: 469**
Customer Purchase Order Number: N/A	**Work Order Number: 2005-03486** 3471	**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. Paoli **Reviewed By:** Thomas F. Scott **Date:** 1-17-06

Calibration Date: 01/17/06 **Calibration Due:** 01/17/07

Model: 2224 **Serial Number:** 163737

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

		As Found	As Left
Geotropism	Sat (√) Unsat ( )	Alpha Sensitivity = 130mv	Alpha Sensitivity = 120mv
Audio Check	Sat (√) Unsat ( )	Beta Sensitivity = 3.5mv	Beta Sensitivity = 3.5mv
Mechanical Zero	Sat (√) Unsat ( )	Beta Window = 32mv	Beta Window = 30mv
Reset	Sat (√) Unsat ( )	Overload Not Set	Overload Not Set
HV Analog Display	Sat (√) Unsat ( )	See detector calibration certificate for HV setting	
Batt. Ck. (Min. Volt 2.2VDC)	Sat (√) Unsat ( )	H.V. Set With Detector Not Connected	

High Voltage Calibration

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: M. Pauli

Calibration Date: 01/17/06

Reviewed By: [signature] Date: 1-17-06

Calibration Due: 01/17/07

Duratek

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^{230}	119737	18,720	10/20/97	18,720
Pu^{239}	019442	13,613	06/01/92	13,613
Tc^{99}	119718	20,520	10/01/92	20,520
SrY^{90}	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_b	6	6	1375	1213
Time, T_b (min)	20	20	20	20
Rate, R_b (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: [signature]

Reviewed By: [signature] 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^{239} #019442

Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, C_s	27,770	27,770	852	852
Time, T_s (min)	5	5	5	5
Rate, R_s (cpm)	$R_{s[\alpha]} = 5554$	$R_{s[\alpha]} = 5554$	$R_{s[\beta]} = 170.4$	$R_{s[\beta]} = 170.4$
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^{99} #119718

Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, C_s	2	2	21,322	21,322
Time, T_s (min)	5	5	5	5
Rate, R_s (cpm)	$R_{s[\alpha]} = 0.4$	$R_{s[\alpha]} = 0.4$	$R_{s[\beta]} = 4264.4$	$R_{s[\beta]} = 4264.4$
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: [signature]

Reviewed By: [signature] **Date:** 10-6-05

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: Th^{230} #119737

Paramter 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)	$R_{s[\alpha]} = 6405.6$	$R_{s[\alpha]} = 6405.6$	$R_{s[\beta]} = N/A$	$R_{s[\beta]} = N/A$
EFF (% c/d) (>25%)	34.2%	34.2%	N/A	N/A
%Crosstalk [α to β] (< 10%)	$\frac{R_{s[\beta]} - R_{b[\beta]}}{R_{s[\alpha]} - R_{b[\alpha]}} = \frac{N/A}{N/A} =$ 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: SrY^{90} #129676

Paramter 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)	$R_{s[\alpha]} = N/A$	$R_{s[\alpha]} = N/A$	$R_{s[\beta]} = 5633.6$	$R_{s[\beta]} = 5633.6$
EFF (% c/d) (>10%)	N/A	N/A	40.0%	40.0%
%Crosstalk [β to α] (< 1%)	$\frac{R_{s[\alpha]} - R_{b[\alpha]}}{R_{s[\beta]} - R_{b[\beta]}} = \frac{N/A}{N/A} =$ 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: [signature]

Reviewed By: [signature] **Date:** 10-6-05

Calibration Date: 10/6/2005

Calibration Due: 10/6/2006

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.

CERTIFICATE OF CALIBRATION

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 ≈ 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 ± 10% C.F. within ± 20% ALL Range(s) Calibrated Electronically

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	400kcpm	39981(0)	39981(0)
	40kcpm	3998	3998
	4kcpm	400	400
	400cpm	40	40
	40cpm	4	4

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING
Log Scale	500kcpm	450K	450K
	50kcpm	50K	50K
	5kcpm	5K	5K
	500cpm	500	500
	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 o 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 Am241≈0.83 µCi

☑ m 500 S/N 81084 ☐ Oscilloscope S/N ☑ Multimeter S/N 78401030

Calibrated By: Sebastian Cabrera Date 10-Apr-06

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

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.

Bench Test Data For Detector

Detector 44-20 Serial No. PR-183465

Customer CABRERA SERVICES Order #. 253450 / 301183

Counter 2221 Serial No. 176952 Counter Input Sensitivity 10 mV

Count Time 6 sec. Distance Source to Detector Surface

Other

High Voltage	Background	Isotope Am241 Size ≈0.83 μC	Isotope Size	Isotope Size	Isotope Size
900V	1,237	16,074			
950	1,285	16,977			
1000	1,296	20,184			
1050	1,365	20,652			
1100	1,300	21,086			
* 1150	1,355	21,059			
1200	1,383	21,015			
1250	1,441	21,049			
1300	1,491	21,406			
1350	1,477	21,203			
1400	1,814	21,759			

Signature Sebastian Caballero Date 10-Apr-06

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

CUSTOMER CABRERA SERVICES ORDER NO. 239988, 239982

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

Mfg. Ludlum Measurements, Inc. Model 44-20 Serial No. PR215488

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. (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
High Voltage:	670V.	1000V.
Threshold dial:	642	100 (10mv)
Window dial:	40	n/a
Window Position:	"IN"	"OUT"
Resolution for Cs137:	≈ 8.76 %	n/a

Calibrated using 39" cable.

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*
Digital Readout	400kcpm		39987 (c)
	40kcpm		3998
	4kcpm		400
	400cpm		40
	40cpm		4

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Log Scale	500kcpm		450K
	50kcpm		50K
	5kcpm		5.1K
	500cpm		505
	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 other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. Calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ 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: Gloria Arzola Date 25 Aug 05

FORM C22A 11/26/2003

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

Designer and Manufacturer
of
Scientific and Industrial
Instruments

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

Bench Test Data For Detector

239985
293982

Detector 44-20 Serial No. PR215468

Customer CABRERA SERVICES Order #. 239988

Counter 2221 Serial No. 218559 Counter Input Sensitivity 10 mV

Count Time 60 SEC. Distance Source to Detector 12cm.

Other

High Voltage	Background	Isotope Am241 Size 10.87µCi	Isotope Size	Isotope Size	Isotope Size
750	1263	12250			
800	1218	13396			
850	1297	14534			
900	1319	15721			
950	1236	15639			
1000	1293	15878			
1050	1278	15983			
1100	1357	15770			
1150	1332	16064			
1200	1508	16001			
1250	1486	15875			
1300	1813	16976			

Signature Elvis Chavez Date 25-AUG-05

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**

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

Log Scale	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 o 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: [signature] Date 3-MAY-06

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

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, I162, E552 High Voltage 900 V

Input Sensitivity 3.4 mV

Reference Point	"As Found" Readings (CPM): Meter Reading	Range/Scale	After Adjustment Readings (CPM): Meter Reading	Range/Scale
150 mR/hr	4.2K	x100	4.2K	x100
50 mR/hr	2K	x100	2K	x100
15 mR/hr	0.7K	x100	0.7K	x100
5 mR/hr	2.1K	x10	2.1K	x10
1.5 mR/hr	0.55K	x10	0.55K	x10
1.0 mR/hr	3K	x1	3K	x1

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. C853F

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.

nstrument 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	160	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

Digital Readout: REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale: 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 o 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 _____ ☐ Oscilloscope S/N _____ ☐ Multimeter S/N _____

Calibrated By: Duane Jackson Date 22-Dec-05

Reviewed By: [signature] Date 23 Dec 05

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

Duratek

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: [signature]	Reviewed By: [signature] 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 μCi)

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: Steven Landsberger

Calibration Technician: Art Reust 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 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 μCi)

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: Steve Landry

Calibration Technician: Art Reust 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 μCi)

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: Deborah D. Garcia

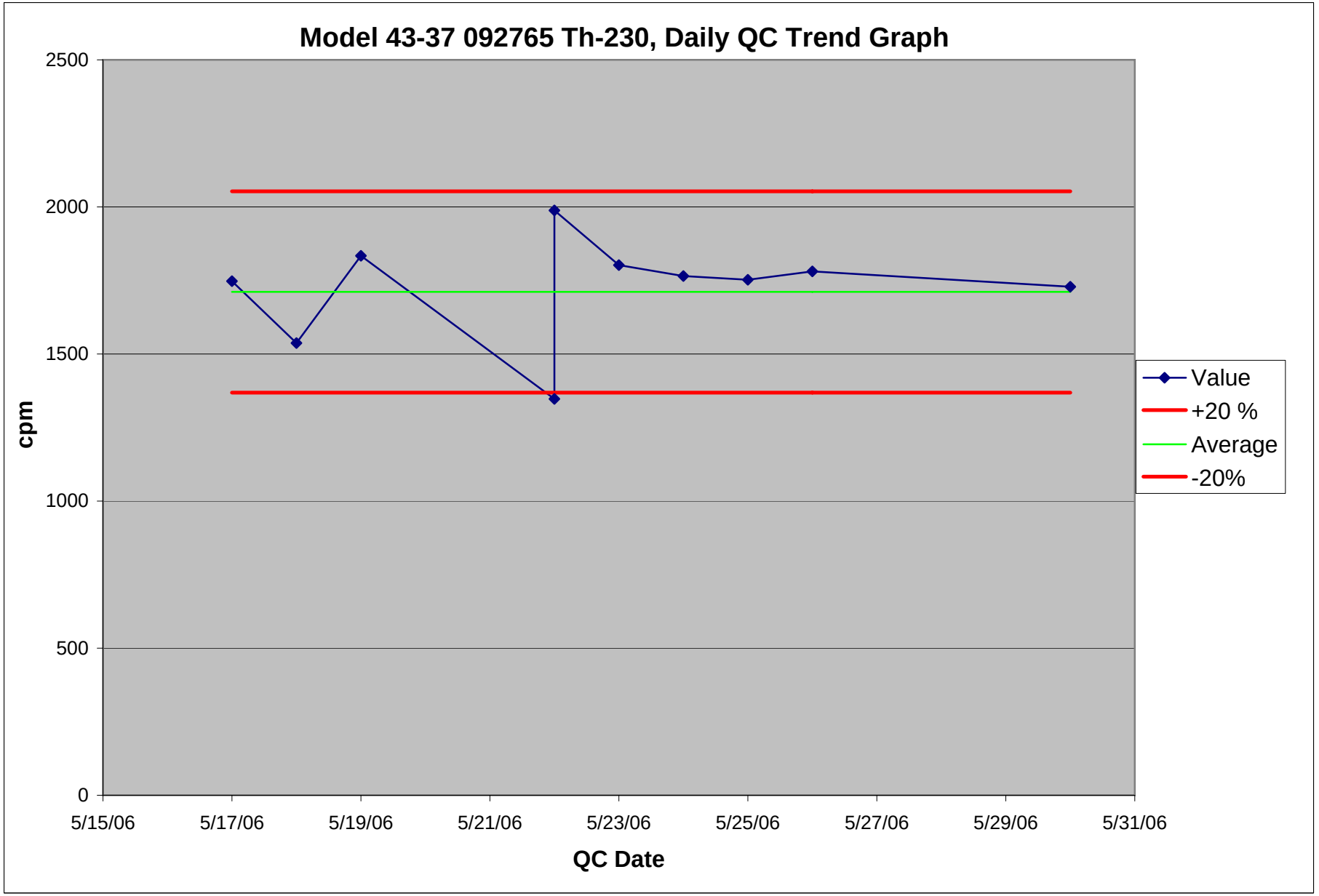
Calibration Technician: Art Reust Q.A. Representative:

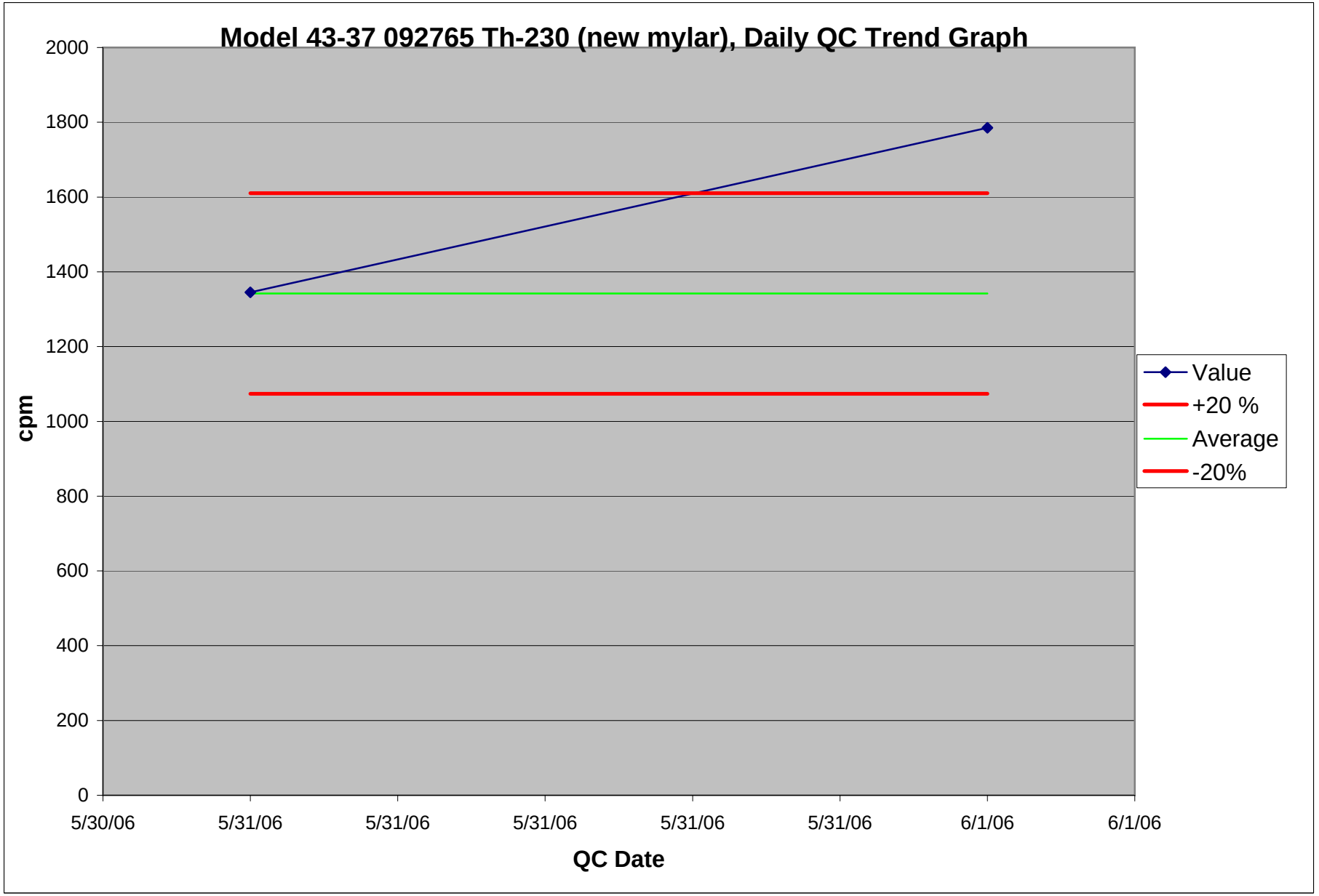
Calibration Date: 5-12-2004 Reviewed Date: 051204

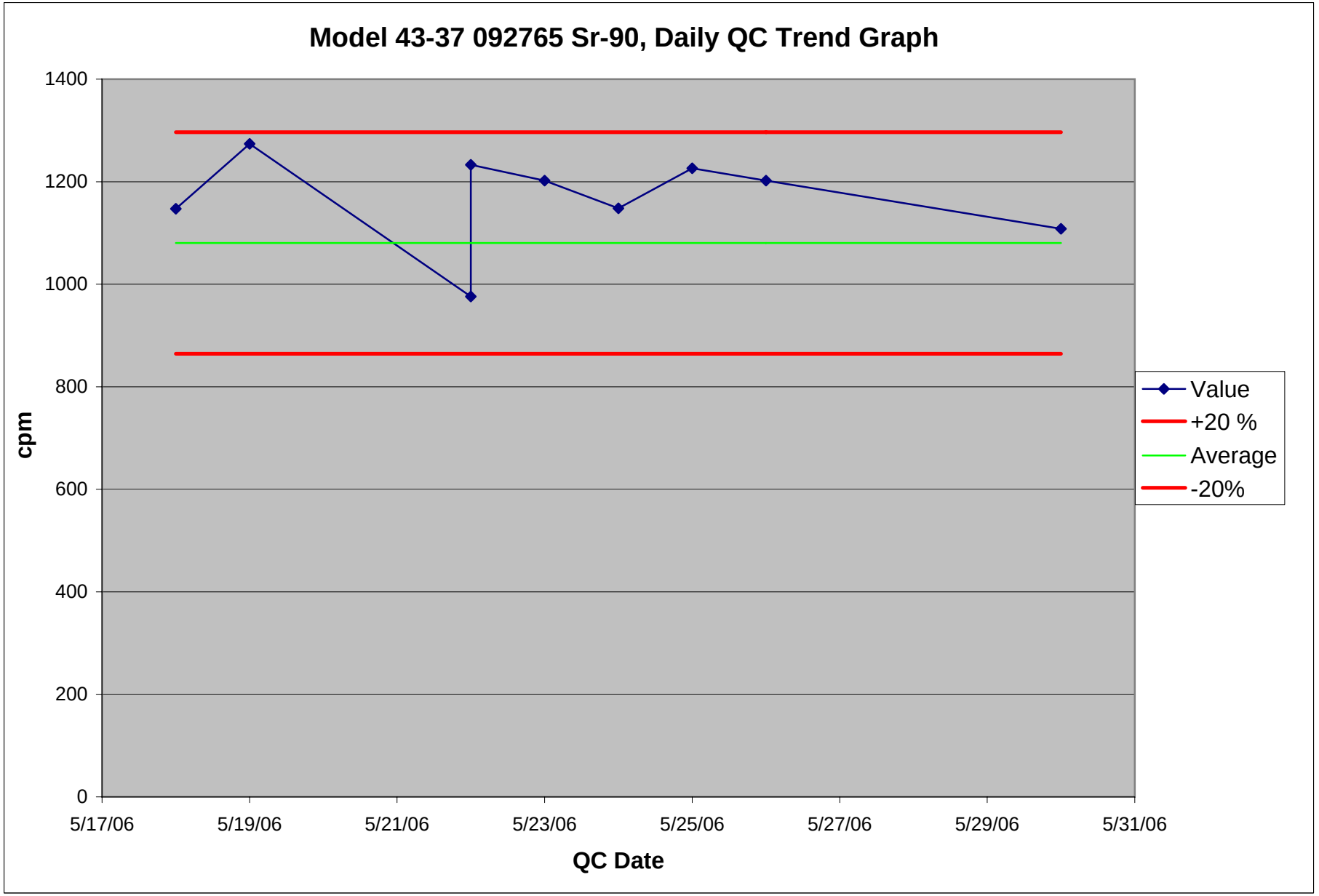
Analytical Services
7021 Pan American Freeway NE
Albuquerque, New Mexico 87109-4238
(505) 345-3461 Fax (505) 761-5416
Toll Free (866) RAD-LABS (723-5227)
www.eberlineservices.com

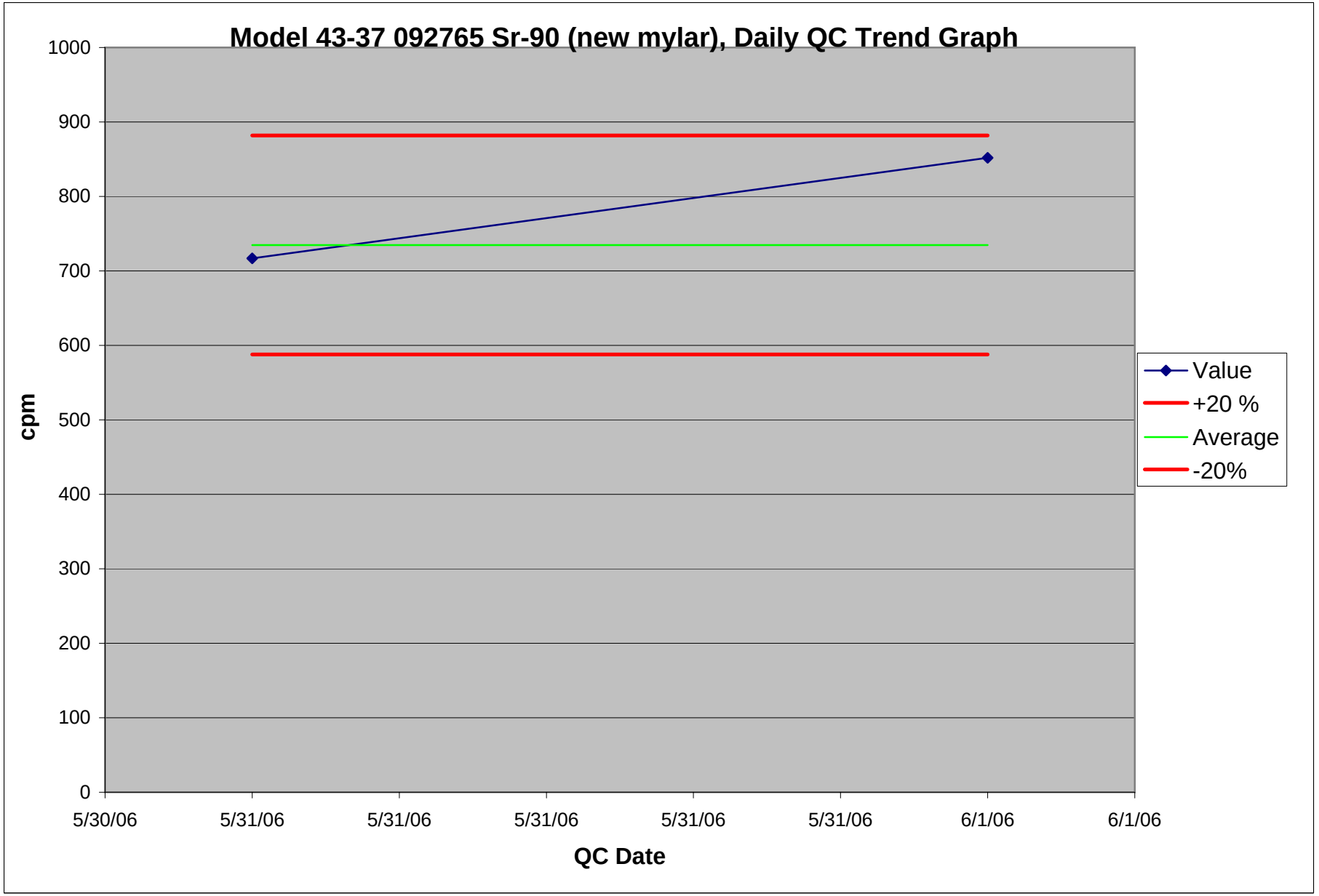
APPENDIX F-2

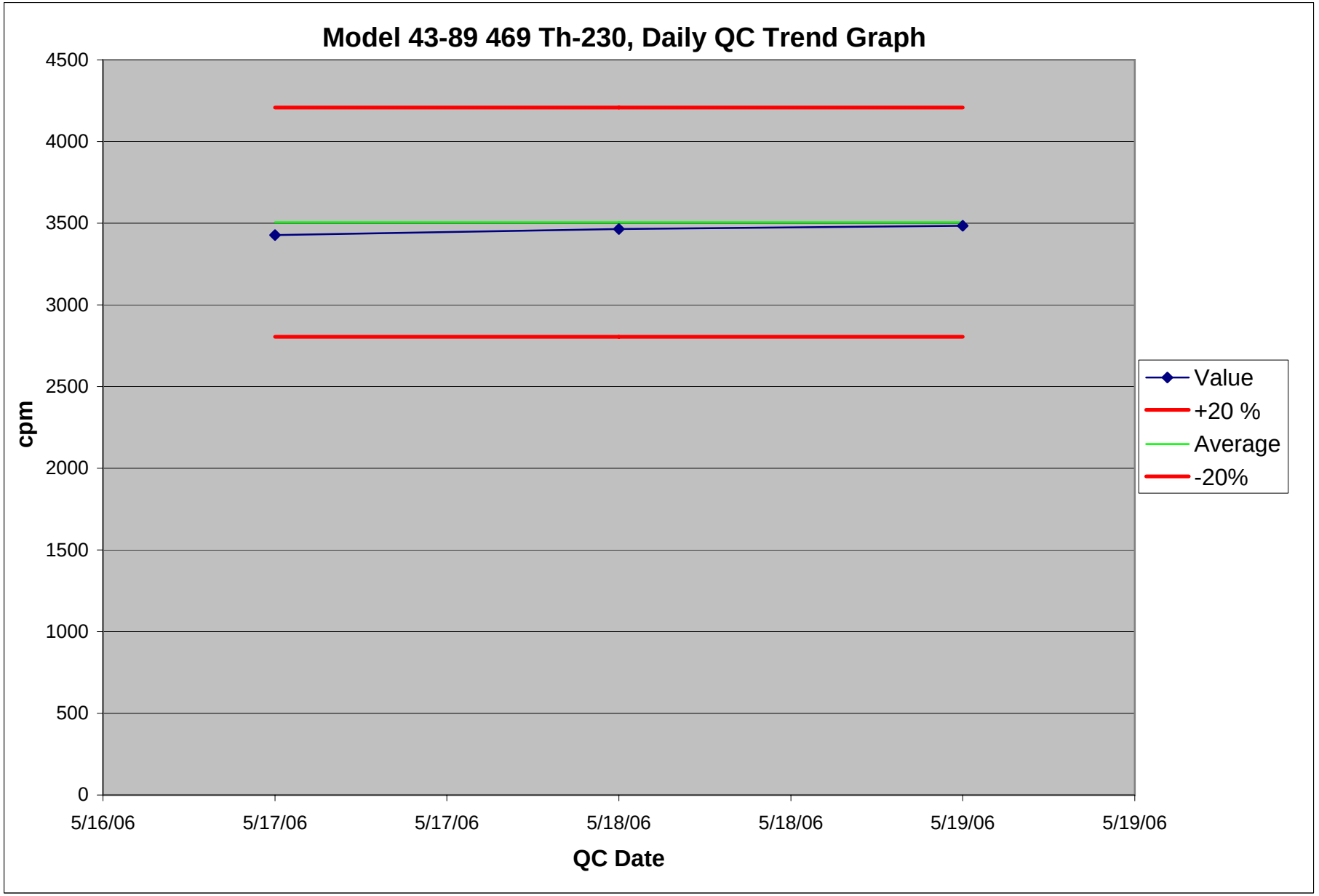
CONTROL CHART DATA

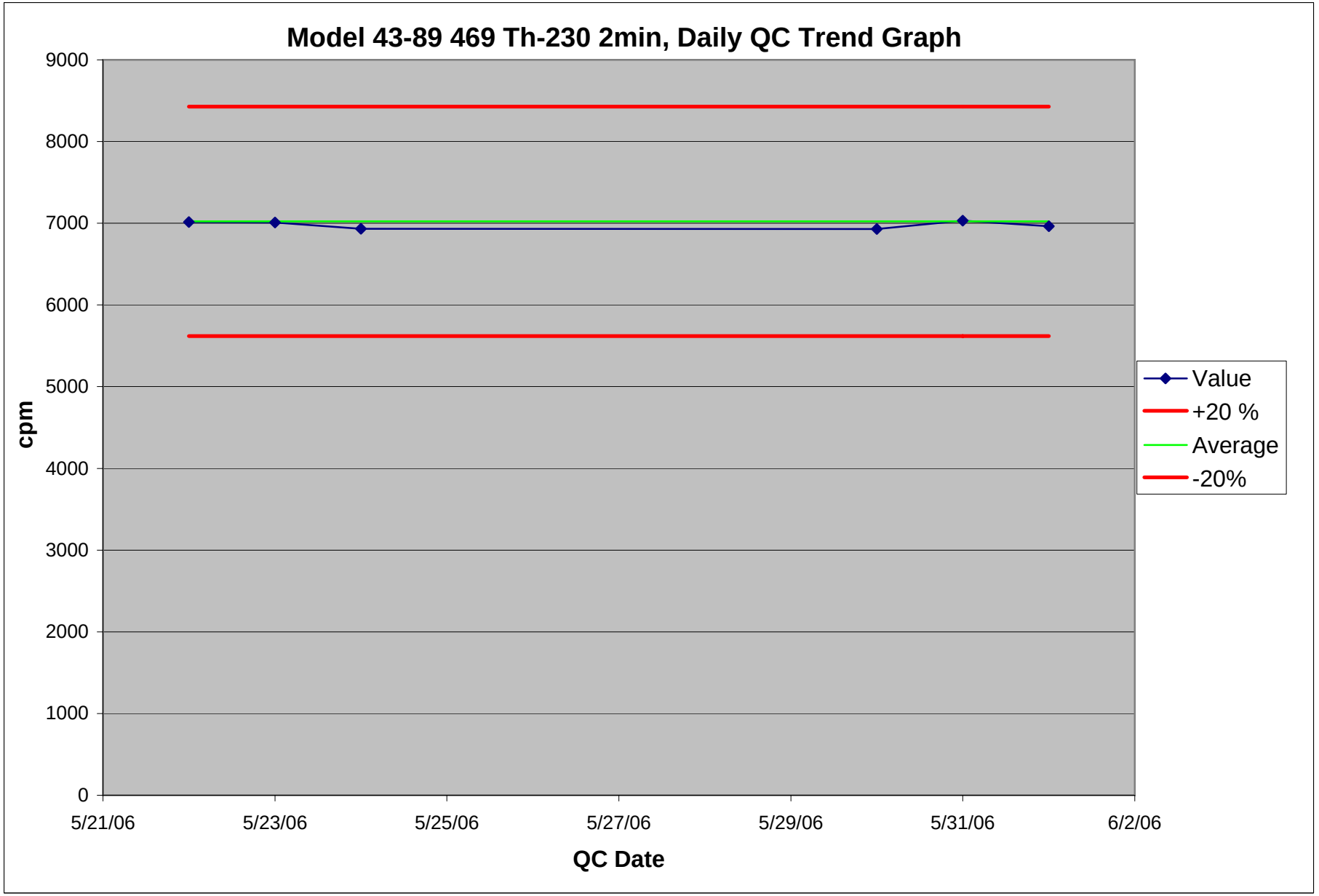

Model 43-37 092765 Th-230, Daily QC Trend Graph
2500
2000
1500
1000
500
0
cpm
5/15/06
5/17/06
5/19/06
5/21/06
5/23/06
5/25/06
5/27/06
5/29/06
5/31/06
QC Date
Value
+20 %
Average
-20%

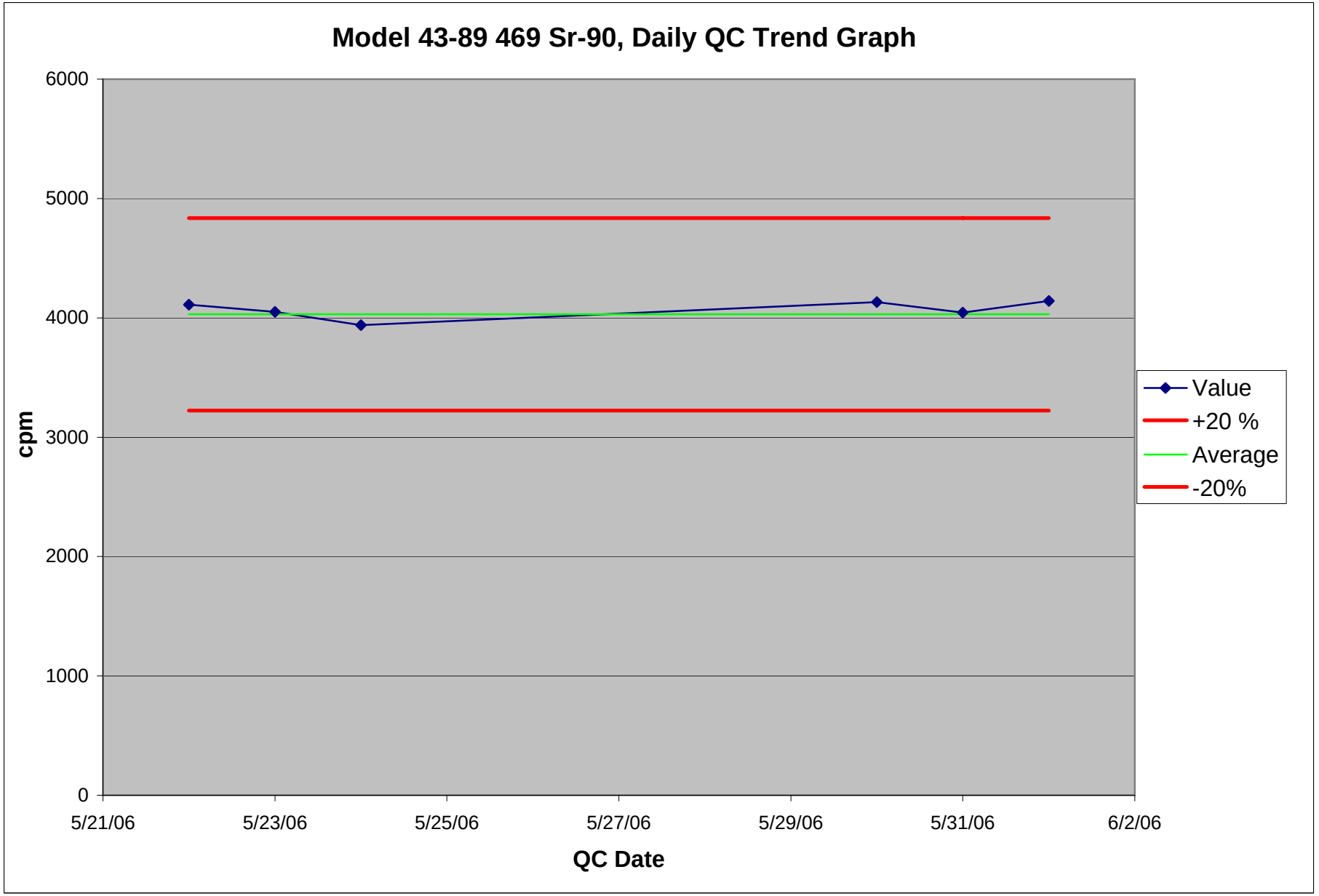

Model 43-37 092765 Th-230 (new mylar), Daily QC Trend Graph
2000
1800
1600
1400
1200
1000
800
600
400
200
0
cpm
5/30/06
5/31/06
5/31/06
5/31/06
5/31/06
5/31/06
6/1/06
6/1/06
QC Date
Value
+20 %
Average
-20%

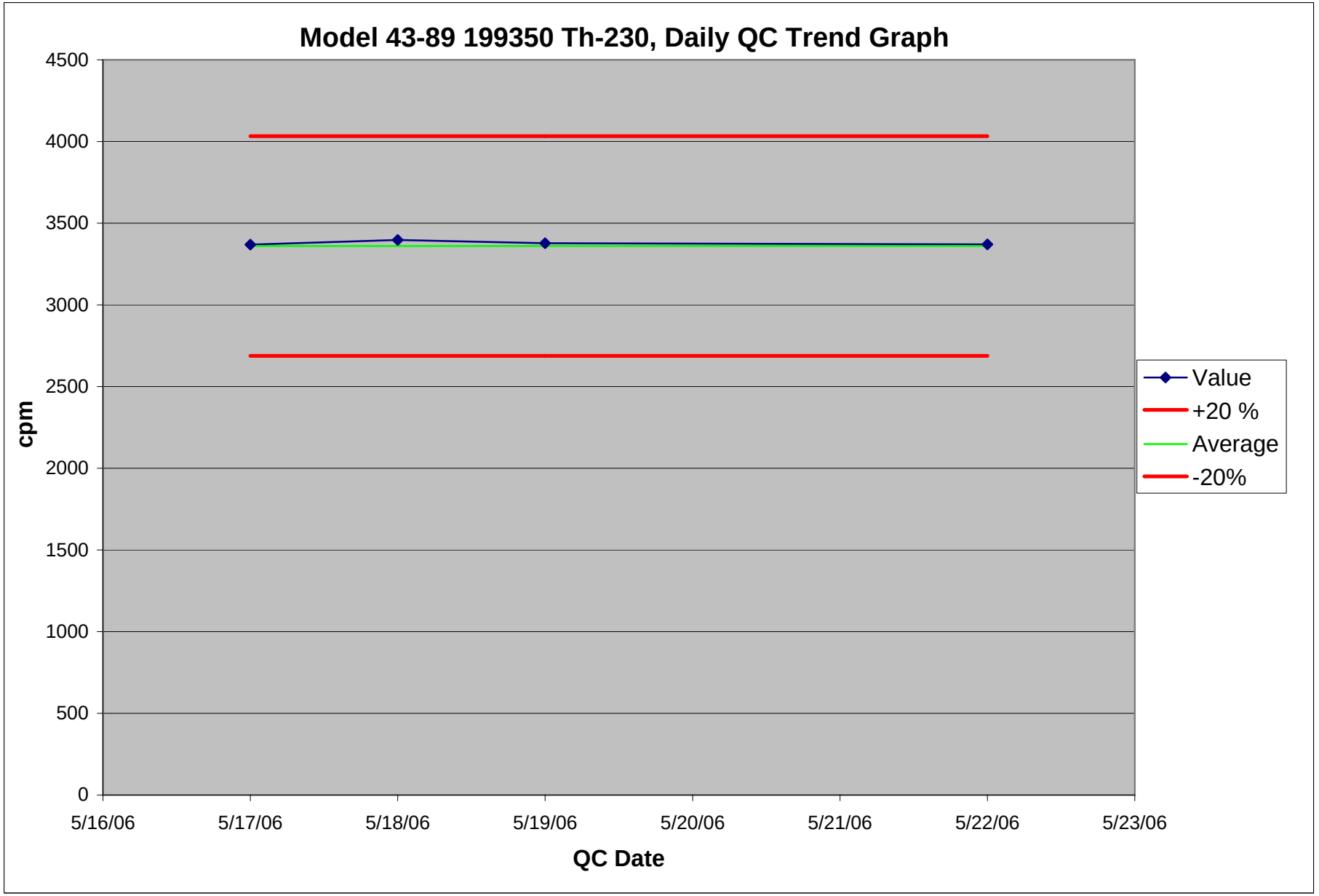

Model 43-37 092765 Sr-90, Daily QC Trend Graph
1400
1200
1000
800
600
400
200
0
cpm
5/17/06
5/19/06
5/21/06
5/23/06
5/25/06
5/27/06
5/29/06
5/31/06
QC Date
Value
+20 %
Average
-20%

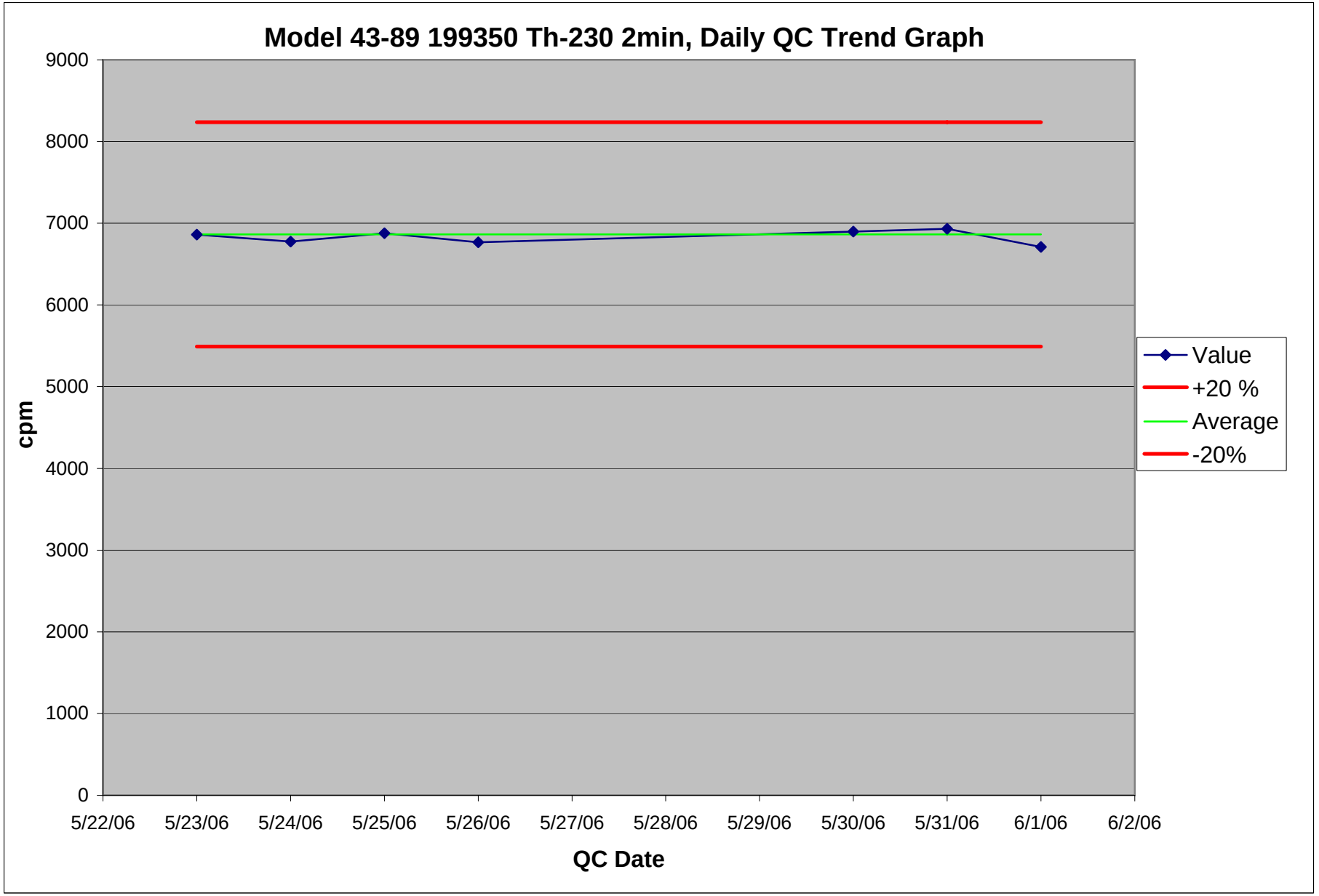

Model 43-37 092765 Sr-90 (new mylar), Daily QC Trend Graph
1000
900
800
700
600
500
400
300
200
100
0
cpm
5/30/06
5/31/06
5/31/06
5/31/06
5/31/06
5/31/06
6/1/06
6/1/06
QC Date
Value
+20 %
Average
-20%

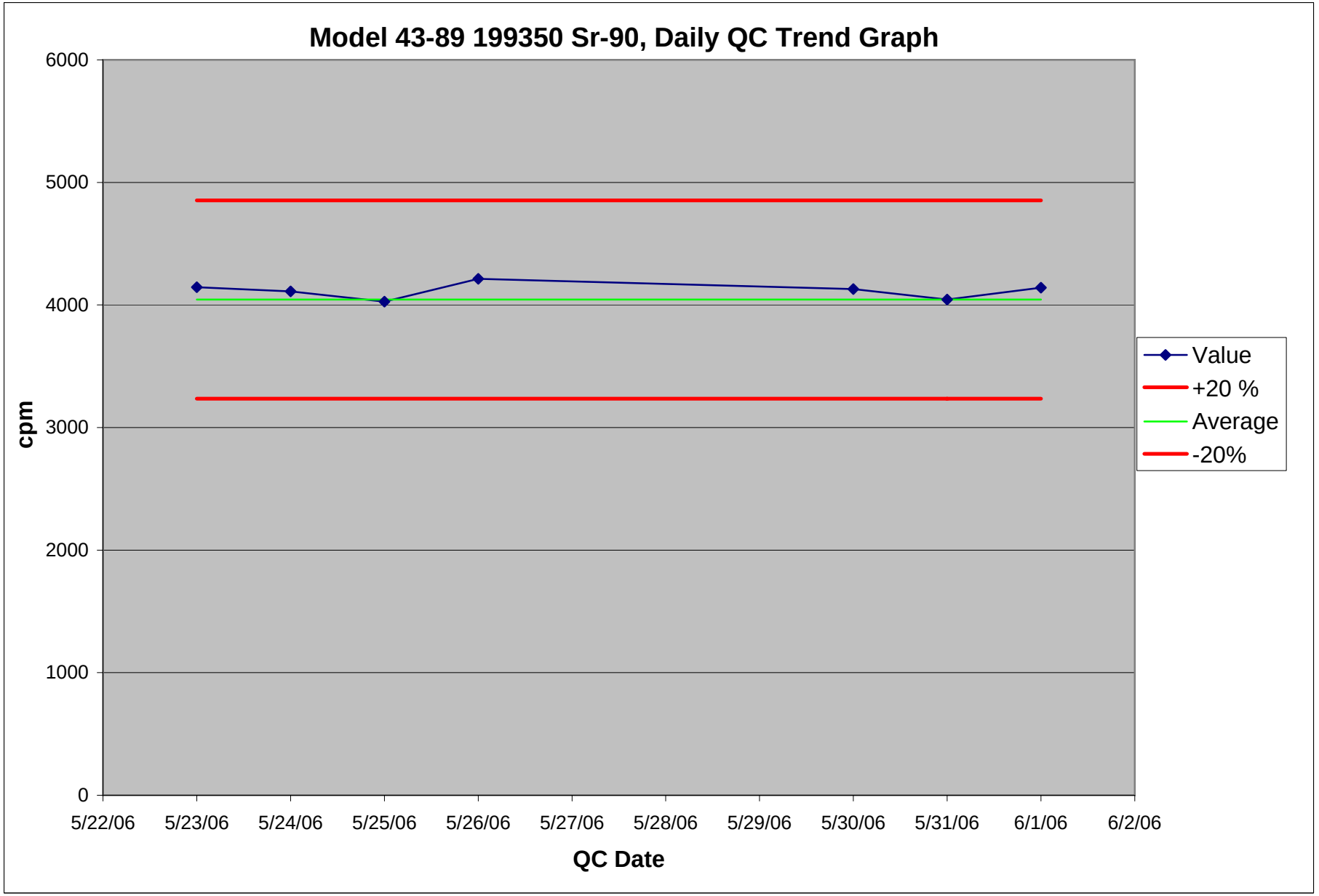

Model 43-89 469 Th-230, Daily QC Trend Graph
4500
4000
3500
3000
2500
2000
1500
1000
500
0
cpm
5/16/06
5/17/06
5/17/06
5/18/06
5/18/06
5/19/06
5/19/06
QC Date
Value
+20 %
Average
-20%

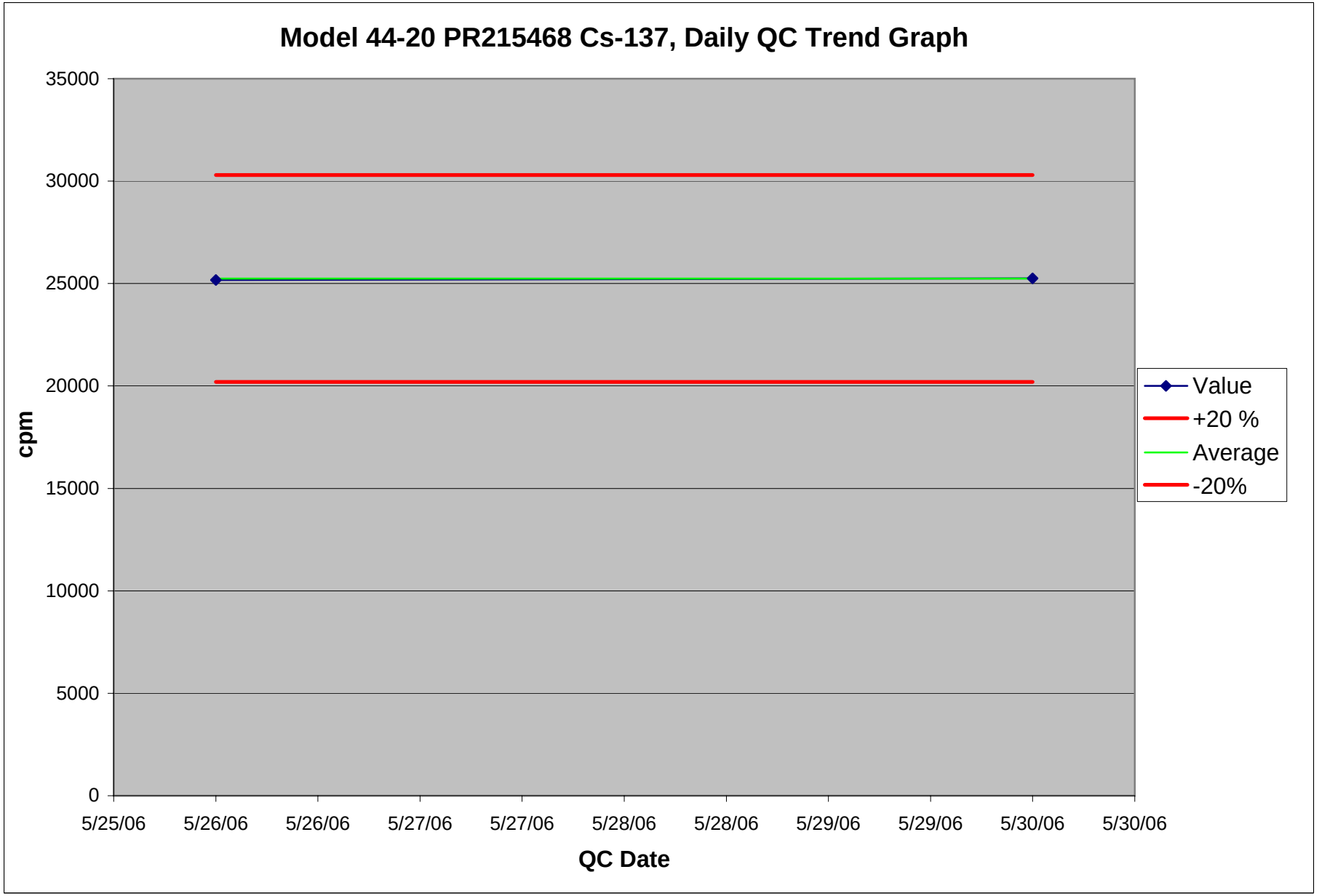

Model 43-89 469 Th-230 2min, Daily QC Trend Graph
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
cpm
5/21/06
5/23/06
5/25/06
5/27/06
5/29/06
5/31/06
6/2/06
QC Date
Value
+20 %
Average
-20%

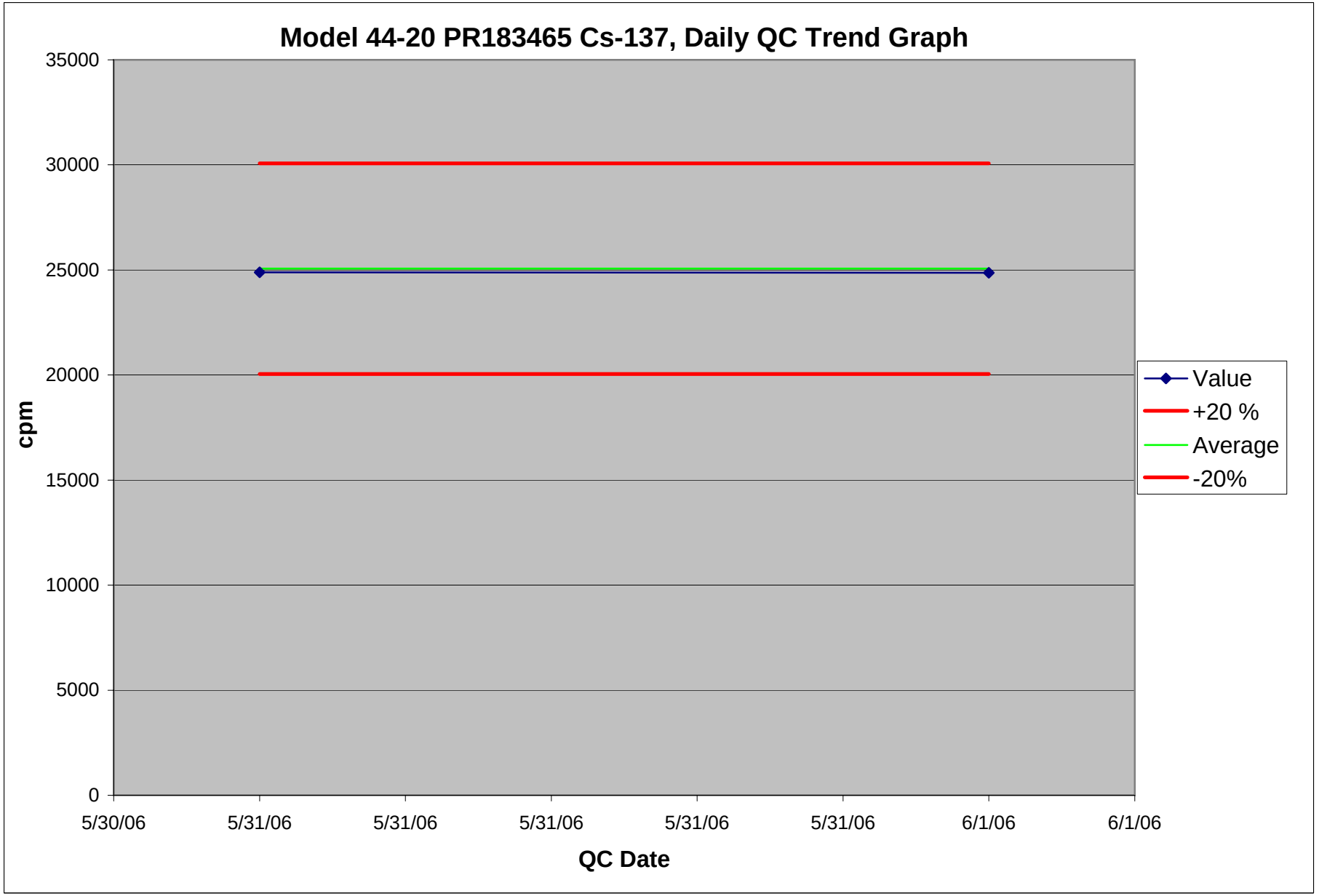

Model 43-89 469 Sr-90, Daily QC Trend Graph
6000
5000
4000
3000
2000
1000
0
cpm
5/21/06
5/23/06
5/25/06
5/27/06
5/29/06
5/31/06
6/2/06
QC Date
Value
+20 %
Average
-20%

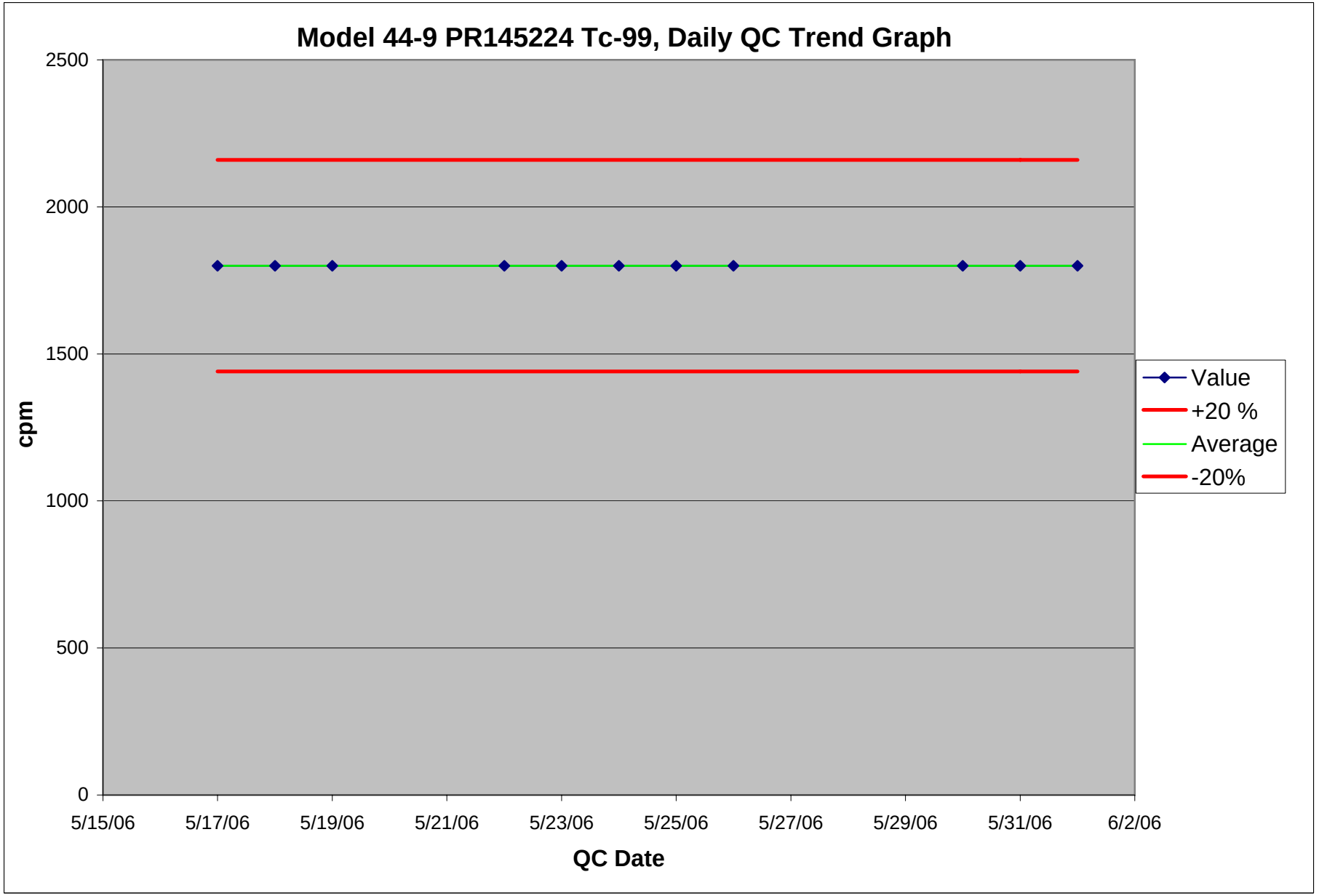

Model 43-89 199350 Th-230, Daily QC Trend Graph
4500
4000
3500
3000
2500
2000
1500
1000
500
0
cpm
5/16/06
5/17/06
5/18/06
5/19/06
5/20/06
5/21/06
5/22/06
5/23/06
QC Date
Value
+20 %
Average
-20%

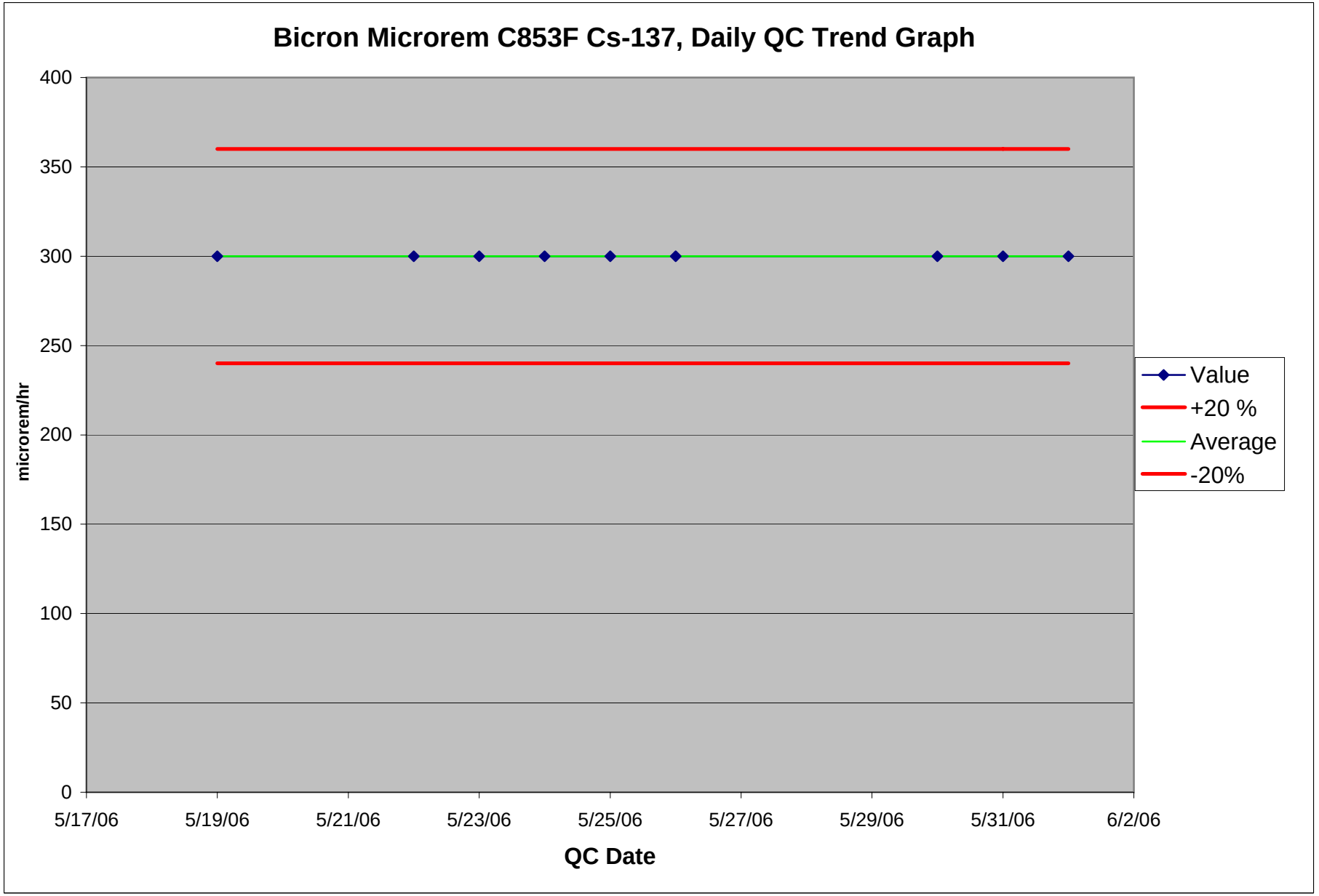

Model 43-89 199350 Th-230 2min, Daily QC Trend Graph
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
cpm
5/22/06
5/23/06
5/24/06
5/25/06
5/26/06
5/27/06
5/28/06
5/29/06
5/30/06
5/31/06
6/1/06
6/2/06
QC Date
Value
+20 %
Average
-20%


Model 43-89 199350 Sr-90, Daily QC Trend Graph
6000
5000
4000
3000
2000
1000
0
cpm
5/22/06
5/23/06
5/24/06
5/25/06
5/26/06
5/27/06
5/28/06
5/29/06
5/30/06
5/31/06
6/1/06
6/2/06
QC Date
Value
+20 %
Average
-20%


Model 44-20 PR215468 Cs-137, Daily QC Trend Graph
35000
30000
25000
20000
15000
10000
5000
0
cpm
5/25/06
5/26/06
5/26/06
5/27/06
5/27/06
5/28/06
5/28/06
5/29/06
5/29/06
5/30/06
5/30/06
QC Date
Value
+20 %
Average
-20%


Model 44-20 PR183465 Cs-137, Daily QC Trend Graph
35000
30000
25000
20000
15000
10000
5000
0
cpm
5/30/06
5/31/06
5/31/06
5/31/06
5/31/06
5/31/06
6/1/06
6/1/06
QC Date
Value
+20 %
Average
-20%


Model 44-9 PR145224 Tc-99, Daily QC Trend Graph
2500
2000
1500
1000
500
0
cpm
5/15/06
5/17/06
5/19/06
5/21/06
5/23/06
5/25/06
5/27/06
5/29/06
5/31/06
6/2/06
QC Date
Value
+20 %
Average
-20%


Bicron Microrem C853F Cs-137, Daily QC Trend Graph
400
350
300
250
200
150
100
50
0
microrem/hr
5/17/06
5/19/06
5/21/06
5/23/06
5/25/06
5/27/06
5/29/06
5/31/06
6/2/06
QC Date
Value
+20 %
Average
-20%

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^2):	100			NRC 6 Mo Cal. Due Date?	WARNING

	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	$T_{1/2}$ (yr)	Source Decayed Activity	Required MDA (DPM/100cm^2)	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
Alpha	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
Beta	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				α MDA OK?	β MDA OK?
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	MDA α (dpm)	MDA β (dpm)		
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^2):	100			NRC 6 Mo Cal. Due Date?	WARNING

	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	$T_{1/2}$ (yr)	Source Decayed Activity	Required MDA (DPM/100cm^2)	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
Alpha	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!
Beta	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^2):	100			NRC 6 Mo Cal. Due Date?	WARNING

	Efficiency (fraction)	Source Nuclide	Source Number	Original Source Activity (DPM)	Source Creation Date	$T_{1/2}$ (yr)	Source Decayed Activity	Required MDA (DPM/100cm^2)	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
Alpha	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
Beta	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				α MDA OK?	β MDA OK?
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	MDA α (dpm)	MDA β (dpm)		
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	**FAIL**	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)