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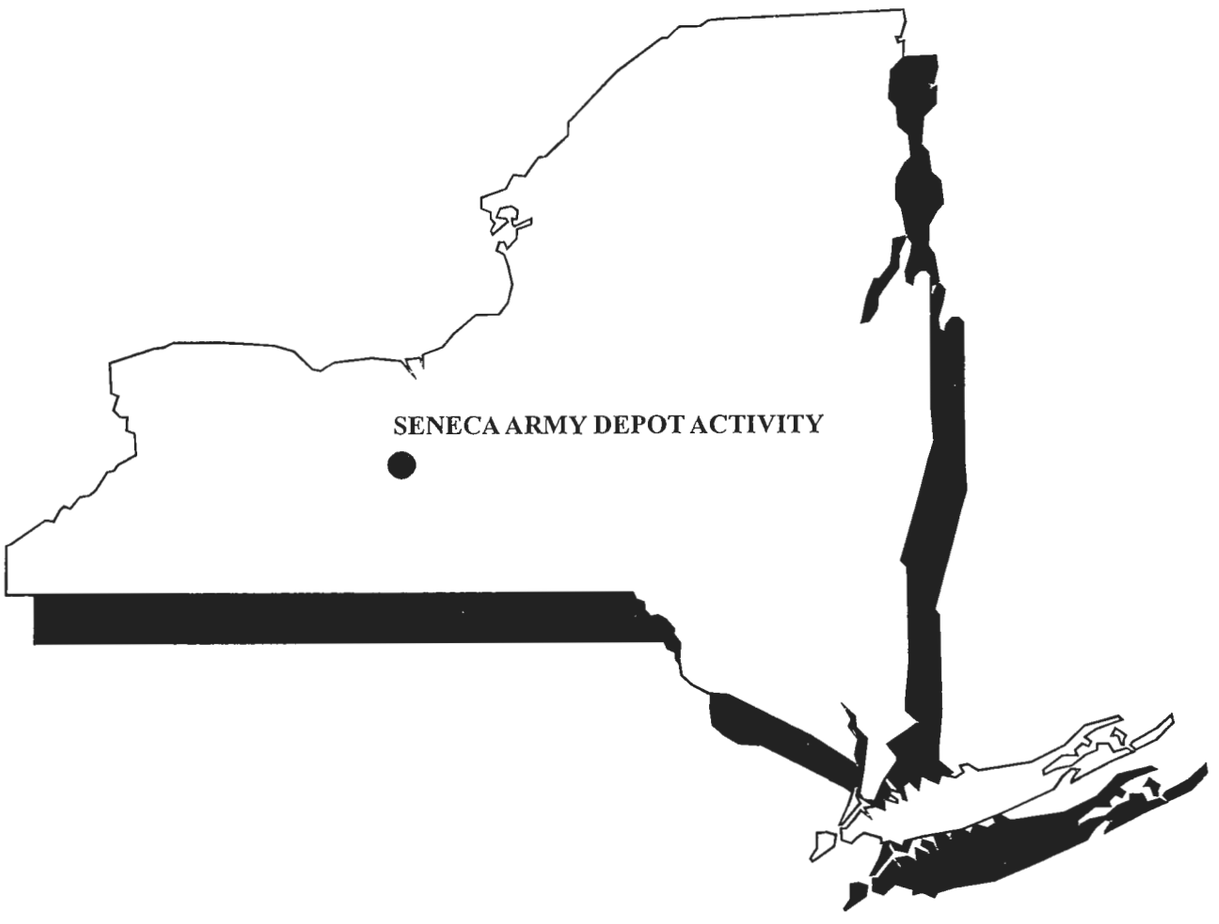

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PHASE I AND PHASE II SURVEYS
VOLUME IV - APPENDICES L THROUGH Q

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PARSONS

APPENDIX L

Guidance for Spectrum Analysis Process (Parsons, 2001)

Parsons

Guidance for Spectrum Analysis Process

August 31, 2001

Parsons
1955 Jadwin
Richland, Washington

APPROVALS AND CONCURRENCES

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Types: A = authorization for use/approval, C = Technical Concurrence
NA indicates not applicable

CHANGE HISTORY

Revision	Date	Change	Basis
0		Entire Document	Initial issuance.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABREVIATIONS

CF_i	Correction Factor for process "i"
cm	centimeters
cpm	counts per minute
DCGL	derived concentration guideline level
dpm	disintegrations per minute
DQO	Data Quality Objective
FWHM	full width half maximum
HP	health physicist
ICRP	International Commission on Radiation Projection
keV	1000 electron volts
LSR	Libraries Of Specific Radionuclides
MCA	multichannel analyzer
NCR	nonconformance report
NCRP	National Commission on Radiation Protection and Measurement
NIST	National Institute of Standards and Technology
PHP	project health physicist
PM	photomulitplier tube
QA	quality assurance
RIW	Radionuclide Identification worksheet
ROI	region of interest (URSA specific)
SOP	standard operating procedure
UNC	uncertainty
URSA	Universal Radiation Spectrum Analyzer manufactured by Radiation Safety Associates, Inc.
☒Ci	1×10^{-6} Curies

1.0 INTRODUCTION

The purpose of this document is to provide guidance to Health Physicists (HPs) or Nuclear Scientists in the process of selecting, using, and analyzing energy specific radiation emissions data using spectroscopy. This guidance is used in conjunction with standard operating procedures such as:

- SOP-R-MCA-02, *Gamma Spectroscopy Instrument Operation,* Parsons Infrastructure and Technology Group, Inc., Richland, Washington current version.

- SOP-R-MCA-02, *Gamma Spectroscopy Instrument Operation,* Parsons Infrastructure and Technology Group, Inc., Richland, Washington current version.

This document addresses the use of radiation spectroscopy for collection of radiological data use in Parsons' field activities to support various clients. Radiation spectroscopy allows the collection of radiation flux data as a function of energy for energetic photons (i.e., gamma rays and X-rays), alpha particles, beta particles, and neutrons. The sections of this document addressing the various types and methods of spectroscopy will be included in this document, as the equipment is obtained and the need is identified. The change history will only indicate sections actually containing information.

This document is written for the use of professional Health Physicists and Nuclear Scientists and is not intended for use by others. It assumes a significant level of background information. This document is intended to provide guidance for completion and ensure the consistency of these activities. Specifically it will assist in the generation of reproducible and accurate data of the highest quality. The information in this document is addresses professional scientific decision, for which proceduralization is not practicable.

The major sections of this document address:

- Gamma Rays/ X-rays Spectroscopy,
- Alpha Spectroscopy,
- Beta Spectroscopy,
- Neutron Spectroscopy,
- Modeling,
- Survey Techniques, and
- Uncertainty.

Each section is intended to provide the support information and the process for implementation of spectroscopy in these areas to provide the data required by Parsons' various projects.

1.1 Definitions

Geometry as used in this procedure refers to the relative configuration between:

- The radiation source and the detector (e.g., point source beneath detector centerline a 1 cm from the detector face) and the material,
- The distribution of the radioactive material in the radiation source.
- The type and amount of any materials between the source and the detector.

The materials associated with the radiation source and any associated container including back-scatter surfaces.

Health Physicist is professional with at least 2 years of experience in implementing health physicist (radiological safety activities and/or radiological laboratory analysis) activities as described by the National Health Physics Society.

Mutichannel Analyzer (MCA) is an instrument with the capability of collection of radiation flux data as a function of radiation energy when attached to a suitable detector. These instruments typically have associated hardware/software for the identification of radionuclides in addition to the assessment of detected flux.

Nuclear Scientist is an individual with a background in nuclear engineering or radiochemisty and at least 2 years of experience in the implementation of radiological analyses.

Photomultipler (PM) tube receives light pulses from a detector and produces a current pulse proportional to the energy of the photons received by the tube and this pulse can then be sorted and counted by equipment such as an MCA. The solid state equivalent is the photodiode.

Region of interest (ROI) is a set of spectral data peak typically associated with a radionuclide. This set of peaks is used when quantifying activity.

Resolution is a measure of the ability of the detector, photomultipler tube, and MCA system to include a discrete energy count in the appropriate MCA channel. In other words how uncertain (i.e., wide) the energy peak is. The resolution is the full width at half maximum of the full energy peak (FWHM) divided by the height of the energy peak (see Knoll, 1989).

1.2 Selection of Spectroscopy Types

To assess if spectroscopy is applicable and if applicable the appropriate types and methods to be used to collect the data it is essential to:

- review the projected radiological conditions at the site,
- identify the type of data necessary to meet the project objectives, and
- establish the appropriate data quality objectives (e.g., a method for establishing data quality objectives can be found in EPA, 2000 and EPA, 1987).

Then the determination of the viability of the process based on the projected DQOs can be evaluate using the following steps:

1. Identify the radionuclides that maybe present due to past activities at the site in the samples.
2. Project the credible range of activities and activity ratio for these radionuclides.
3. Identify the projected background radiation levels (i.e., radionuclides, ambient flux, and activity concentration) associated with the general environment and specific materials (e.g., uranium decay series, thorium decay series, K-20) including decay progeny.
4. Review the radiation emissions of the materials present and assess the feasibility of detection using the various methods based on this data.
5. Evaluate interferences related to background and potential material present.
6. Project system geometries for in situ measurements and collected samples, to assess required correction for flux attenuation and impact of source dispersion on detection capability, measurement accuracy, modeling costs, and regulatory acceptance.
7. Identify viable mechanism for radionuclide identification and quantification.
8. Identify interferences and limitations associated with the method that would limit the viability of an approach.
9. The feasibility of obtaining confirmatory data (e.g., 2 spectral peak, radiation flux of a specific type) to reduce the uncertainty in the results.
10. Identify potentially cost effective alternative methods (i.e., sampling and analysis, controlling various radiation fluxes based on a conservative upper bound).
11. Identify relationship that would allow extrapolation of radiation data for a radionuclide from other radionuclide data, including reliability, defensibility, and regulatory acceptance.
12. Assess equipment, procedures, standards, and trained personnel availability for the various approaches.
13. Assess the approaches cost, schedule, safety, and regulatory compliance impacts to implement and defend.
14. Based on this data identify approach for various radionuclides that provide the best solution for project success, with emphasis on schedule, cost, technical feasibility, and regulatory acceptance.

In assessing the approach it is helpful to sort types and energies of radiations based on range in materials, well as interference (i.e., spectral overlaps) associated with the suite of expected radiation emissions.

The survey/analysis approach is typically documented in the work plan for the activity. In all cases the basis for the decision should be formally documented. Note, as project conditions change the approaches may need to be modified to provide a cost effective and safe mechanism for meeting the project goals.

2.0 GAMMA RAYS/ X-RAYS SPECTROSCOPY

Gamma Ray/X-ray spectroscopy can be done with various types of detectors associated with a multichannel analyzer (MCA). Typically the MCA will use software to identify radionuclides and assess activity rather than permanently encode analysis routines. In some cases two software packages maybe involved one for use when the MCA is attached and the other for use with just the computer. This software package(s) is subject to the same requirements for verification and validation that is applicable to other types of software, under the applicable Parsons quality assurance (QA) program, such as QA-19.2.

2.1 NaI Based Spectroscopy

A typical NaI based Spectrometer consists of 6 pieces as shown in Figure 1 with associated cables and NaI crystal/PM-Tube packaging. Parsons currently has a Universal Radiation Spectrum Analyzer (URSA) which integrates the High Voltage supply, Pre-amplifier, and MCA into a single unit. The Fidler detector currently owned by Parsons has a beryllium window on the NaI crystal's integrated PM-Tube package.

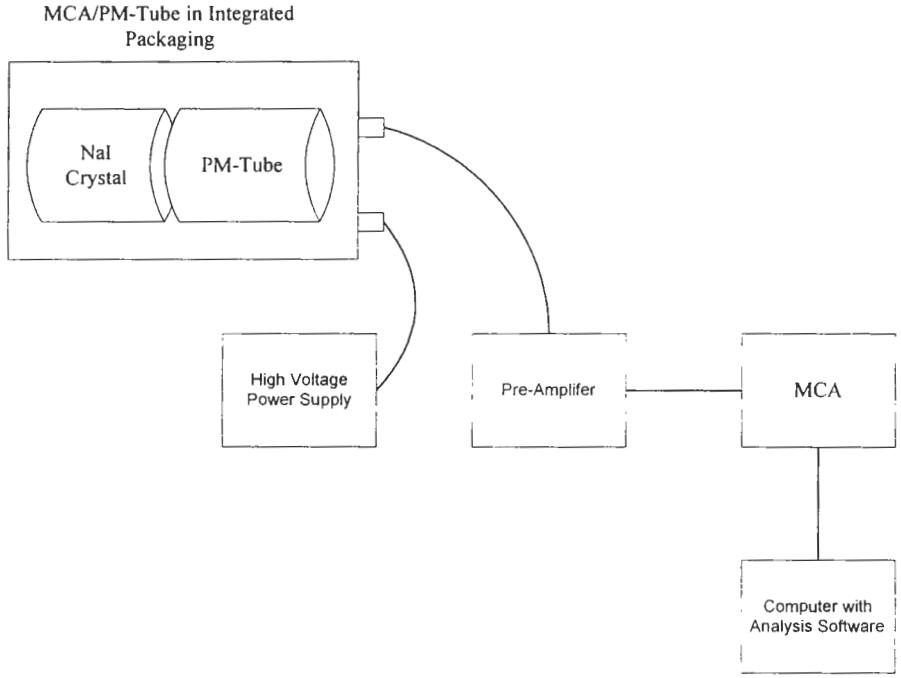
2.1.1 Detector Selection

In choosing a NaI based spectroscopy system it is important to consider the detector characteristics, particularly crystal size and window material. Thin crystal, such as the Fidler, tend to be more effective at characterizing low energy photon emissions while large crystals such as the 3 X 3 (i.e., a 3 inch diameter cylinder 3 inch high) crystal is more effective at characterizing the higher energy portions of photon spectra (i.e., gamma rays and X-rays). In addition, the lower the thickness and atomic number of the surface coatings (i.e., typically measured as density thickness) the more effective the detector is at measurement of lower energy emissions. Crystal size typically needs to increase as:

- the flux to be detected decreases,
- the speed of travel (i.e., for surveys) increases,
- or the counting times (i.e., for static counting and surveys) decreases

The exception to this is when the photons of interest are low energy and then large diameter thin crystal allow the large detection area but decrease the background associated with the higher energy photons that would be detected in the additional volume of a larger crystal. Crystals with a well within the crystal allow the detection efficiency based on crystal geometry to exceed 2Ø thus significantly increasing the detection efficiency. Very large and specialized crystal shapes and sizes are often cost prohibitive. Detector selection is often the balances of what is practicable with the technically ideal solution, with detector selection being controled by the data quality objectives and considerations of practicality. If the choice of crystal size and shape is not obvious or addressed by

Figure 1 Typical NaI Spectrometer Package



specific guidance then it is typically appropriate to select a detector based on simple Monte Carlo modeling (see Section 6.0) of the detector response to determine what detector will allow you to meet your DQOs and schedule, within the acceptable range of costs.

Parsons currently has a Fidler crystal (see technical information in the Technical Manual section of the Parsons SOP manual). 1 X 1 (i.e., a 1 inch diameter cylinder 1 inch high), 2 X 2, and 3 X 3 crystal are readily available for sale or rent.

2.1.2 MCA Setup

The setup of an MCA system is dependent on the equipment to be used. Each system currently used by Parsons will be addressed briefly. In all cases setup should be based on a through review of the manufacturer provided documents.

2.1.2.1 Universal Radiation Spectrum Analyzer (URSA) with NaI Detector

Most of the setup parameters for the URSA system are addressed in procedure SOP-R-MCA-01, Gamma Spectroscopy Instrument Operation (URSA) and SOP-R-MCA-02, Gamma Spectroscopy Instrument Calibration (URSA). As part of the setup process for the URSA (see

Figure 2) the Project Health Physicist (PHP) will need to provide some specific direction on the setup of the equipment. Sections 1.2, 2.0, 2.1, and 2.1.1 address the initial identification of the required equipment.

Smoothing factors are used to remove some of the spurious statistical fluctuations in the spectral data. A smoothing factor is basically some type of moving average. Smoothing is most important during the peak identification process of the spectral analysis and the analyst will typically look at various values to so that the most effective credible peak identification can be obtained. The smoothing factor for data collection is typically set so that the low energy peaks in the Cs-137 spectra can are just below the resolution of the instrumentation. The URSA peak smoothing scales are 1, 8, 16, 24, 36, and 48. Based on past experience and a review of resolution of the Cs-137 spectra the PHP will establish the appropriate smoothing factor.

During setup the PHP will need to provide the projected initial operating **High Voltage and Maximum High Voltage** for the detector. This information should be present in the detector's manual/literature or from the manufacturer, although the initial operating high voltage may be more effectively determined based on past experience with the detector once sufficient data is available. The PHP may elect to reduce the Maximum High Voltage recommended by the manufacturer to reduce the noise at low energies. This will typically result in the need to increase the pre-amplifier gain during the setup activities (see SOP-R-MCA-02).

The **recalibration period** for the equipment setup is typically based on manufacturer recommendations, although this should be modified in experience with the equipment or similar equipment for the intended usage indicates other values are more appropriate. For the activities associated with setup and calibration of the URSA (see SOP-R-MCA-02) the recalibration periods in Table 1 have been established pending better data.

Figure 2 URSA MCA General Operations Screen

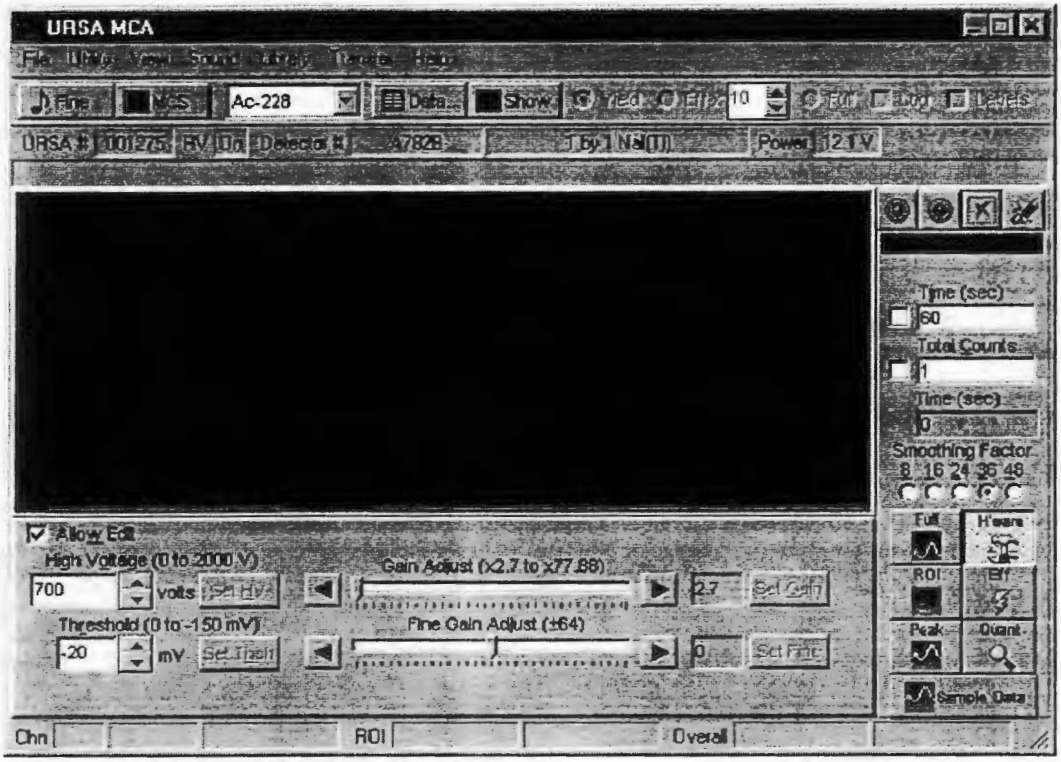


Table 1 Calibration Expiration Period	
Activity	**Typical Re-Setup/Calibration Period (choose less those listed) (months)**
Setup	12
Energy Calibration	12 or Setup expiration
ROI	12 or Energy Calibration expiration
Efficiency Calibration	6 or ROI expiration

Choice of the **calibration source** must be based on the projected radionuclides of interest and those potentially present in the background materials and the ambient environment. The selection of the calibration source(s) should be to span the energy range of interest as determined based on Sections 1.2 and 2.1.3. Where feasible a peak every 200 to 300 keV is preferred with a total activity of less

than 500,000 cpm in the detector corrected for the area and projected position of the source. In addition a 1 ☒Ci Cs-137 source is helpful for setup and calibration of the system. These sources must be traceable to the National Bureau of Standards and Technology (NIST) or an equivalent organization. If quantification is not required then, the source traceability need only address identification/purity of the radionuclides and a general indication of the radionuclides relative activity. When specifying **spectra lines** for radionuclide identification the specification of a primary and secondary line with a known relative activity ratio is preferred.

To establish the **count times** (or required number of counts) for spectral collection the PHP must consider:

- the established data quality objectives and how to effectively achieve them including the balancing of background data count times and location/sample count times.
- practicable limitations of cost, schedule, and personnel exposure.
- whether it is feasible to review results and then re-initiate data acquisition at a later time if further data is needed for a location/sample to meet the data quality objectives.
- the projected radioactivities of the various radionuclides that may be present.
- the level at which the activity can be treated as not requiring detailed quantification (i.e., the point at which only a less than number is required) for the limiting case radionuclides, and
- a typical count time is about 30 minutes for in situ measurements at environmental levels and about 5 to 10 minutes for sample counting but is dependent on source activity.

It is important to recognize that count time (or required number of counts) is always a balance between practicality and data accuracy, which must reflect the data quality objectives.

2.1.3 Analysis of NaI Spectra

The software associated with MCA provides an integrated system of peak analysis for the identification of radionuclides and peak height analysis to assess activity of the radionuclide. When interpreting NaI spectrometer results various effects, which may be dependent on crystal size and geometry, must be considered. These peaks are best characterized based on experimental data but can be projected using Monte Carlo analyses. The discussions in this section are based on Shafroth,1967; Knoll, 1989; and Crouthamel, 1970.

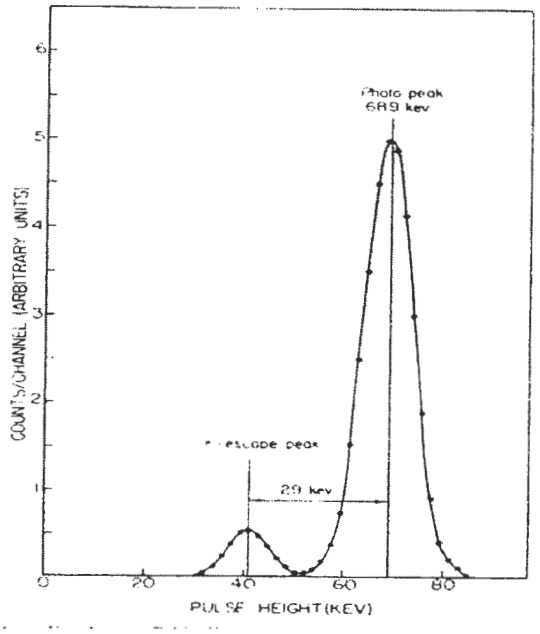
2.1.3.1 Peak Identification and Quantification Interferences

When attempting to identify and quantify radionuclides in the environment or a sample, the potential interferences associated with NaI spectroscopy will need to be considered. This includes the continuums and peaks produced that are not useful for the identification and quantification of the radionuclides present and the presence of ambient background radiation and radioactive material. These interferences result in peaks that do not support radionuclide identification and quantification and effect that significantly reduce the resolution of the peaks of interest. In some cases for low count rate peaks the peak may be totally obscured by these interferences. In addition, background or source material of interest may also produce peaks that totally obscure a peak of interest. Also a peak may result in the identification of several radionuclides most or all of which

are not present or not of interest. Thus the review of spectral data to identify radionuclides and quantify the activity present must involve a detailed analysis of the results with support information to provide an assessment of radionuclides present, their quantity, and the uncertainty associated with this determination. The sections that follow provide a brief introduction to some of the potential interferences.

The **characteristic X-ray escape** peaks are one effect (see Figure 3). In the photoelectric absorption process, the absorber (i.e., about 29 keV) emits a characteristic X-ray for NaI. If this X-ray escapes before absorption (i.e., many of the X-rays emitted near the detector surface may escape) this energy is not detected. Thus energy deposited in the detector is decreased by the energy of these X-rays, that escape; resulting in a second peak with energy equal to the photopeak minus the energy of the characteristic X-ray. This peak is generally called the X-ray escape peak and is most significant in low incident gamma ray energies and for detectors, like the Fidler, with high surface to volume ratios.

Figure 3 X-ray Escape Peak (Shafroth,1967)



The **compton continuum** is another characteristic of the interaction of radiation with the affects the spectra. Compton scattering produces a continuum of energies from the scattering of radiation (see Figure 4). At several hundred keV compton scatter becomes important. Since only a fraction of the incident energy is absorbed in compton scattering the variability of this fraction results in a continuous distribution of energies rather than a discreet peak. This continuum can interfere with peak identification.

Figure 4 Compton Continuum (Shafroth,1967)

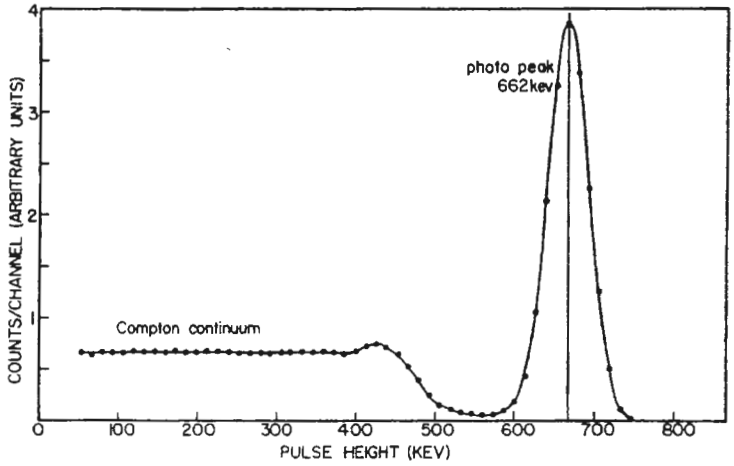
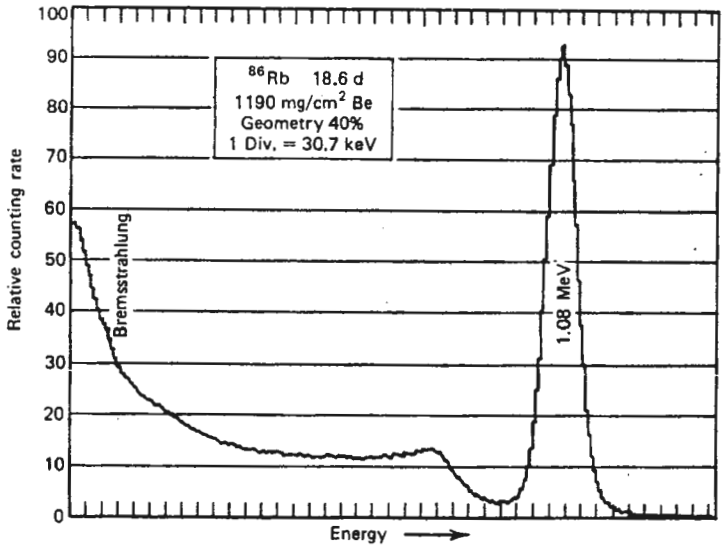


Figure 5 Bremsstrahlung Escape (Knoll, 1989)



The **bremsstrahlung escape** continuum (see Figure 5) is a source of interference with peak identification. This is caused by the escape of some of bremsstrahlung photons which decreases the energy absorbed in the detector based on the amount of energy lost. The fraction lost increases significantly as the energy of the incident photon increases.

A similar process involving the loss of the **secondary electrons** also occurs near the surface of the crystal and may cause an effect similar to characteristic X-ray escape or bremsstrahlung escape if the crystal is small (e.g., a Fidler crystal). This effect is more significant for higher energy photons since the secondary elections will have a higher energy and thus a longer range.

The **backscatter peak** (see Figure 6) may also be present in spectra. A peak in the vicinity of 0.2 to 0.25 MeV caused by gamma rays from the source that have interacted with the surrounding materials, including the detector wall, by compton scattering.

The **annihilation peak** if the source included positron emitters or the photon spectra has energies in excess of 1.2 MeV so pair creation can occur, then the photons associated with positron annihilation (i.e., 0.51 MeV) (see Figure 6) may occur in the spectra. If the 0.51 MeV is pronounced you may also multiples of this energy due to simultaneous detection of annihilation photons.

In addition **background material** and the **ambient environment** provides various sources of radiation with their own characteristic peaks that interfere with radionuclide identification based on peak identification. Typically this impact can be minimized by electronic subtracting out the applicable background spectra if it is available. Typically these are the naturally occurring radionuclides (e.g., see **Table 2**) and in some cases other isotopes maybe present due to commercial usage of radionuclides and possibly fallout. In addition to the natural environment ambient background, there are also various materials that may contain or have associated radioactive material (e.g., see Table 3) which will also produce interference in the data collected. Thus it is important to consider the impacts of background radiation and the approach for correcting for this impact (e.g., typically background subtraction).

These interferences result in false peak and peak broadening which must be considered during peak identification. In addition, any peak maybe be an indicator of several different radionuclides thus other consideration must be used to support peak identification. Whenever feasible radionuclide identification should be based on multiple peaks that occur in the correct relative ratios. Finally the credibility of the presence of the radionuclide must be considered.

2.1.4 Peak Identification/Quantification Library

Peak identification libraries are needed for the peak identification process and the activity quantification process. These libraries need to include both peak energy and yield data. The default libraries supplied by the URSA manufacturer are based on David Kocher's *Radioactive Decay Data Tables* (DOE/TIC-11026). All peak identification/quantification libraries must be based on a recognized source of spectral data. Currently the preference for the source of this data, in order of preference, is:

1. U.S. Department of *Energy 's National Nuclear Data Center (NNDC)* at Brookhaven National Laboratory (access is available through the internet),
2. David Kocher's *Radioactive Decay Data Tables* (DOE/TIC-11026), or
3. ICRP,s (International Commission on Radiation Protection) *Radionuclide Transformations Energy and Intensity of Emission*, Annals of the ICRP, ICRP Publication 38.

Use of library data sources is questionable and a specific justification of such a decision needs to be documented. Peak libraries should include all credible radionuclides including those associated with background. Any library used must be approved by the PHP and, if it is not an existing library, it must be documented and reviewed, as if it were a Parsons' calculation.

Figure 6 Annihilation Radiation Related Peaks (Crouthamel, 1970)

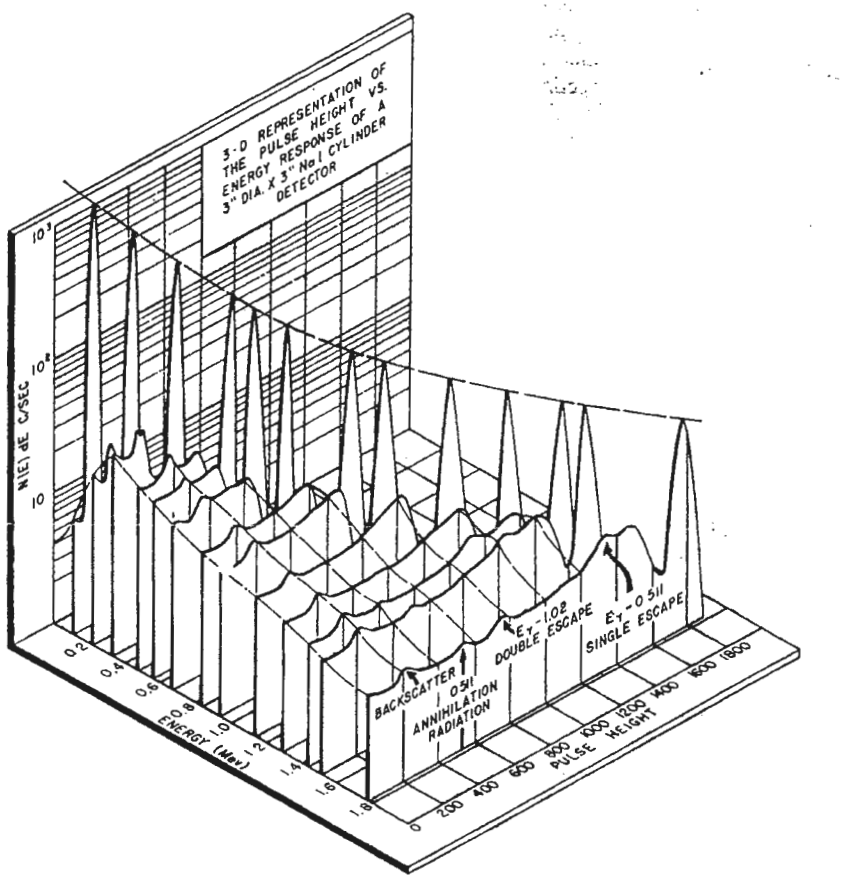


Table 2 Naturally Occurring Radionuclides (ICRP-38, NCRP-93 & NCRP-94)

Radionuclide	Parent	Source	Alpha	Beta	Gamma/ X-ray
			Emission Energies (MeV)		
H-3	cosmogenic	natural (very low abundance)		0.00568	
Be-7	cosmogenic	natural (very low abundance)			0.478
C-14	cosmogenic	natural		0.04945	
Na-22	cosmogenic	natural (very low abundance)		0.215	0.511, 1.28
K-40	primordial	natural (about 0.0118% of natural K, usually a small fraction compared to U in most soil/rock based materials)		0.585	1.46
Rb-87	primordial	natural (Rb abundance is less than 1% of K)		0.111	
Th-232	cosmogenic	natural (activity is typically 1 to 4 times the U-238 activity)	9.9 - 4.1		
Ra-228	Th-232	Th-232		0.055	
Ac-228	Ra-228	Th-232		1.2 – 2.1	0.34 – 0.96
Th-228	Ac-228	Th-232	5.3 – 5.4		0.08
Ra-224	Th-228	Th-232	5.4 – 5.7		0.24
Rn-220 (gas)	Ra-224	Th-232	6.3		
Po-218	Rn-220	Th-232	6.8		
Pb-212	Po-218	Th-232		0.35 - 0.59	0.24 – 0.3
Bi-212	Pb-212	Th-232	6.0 – 6.1	1.6 – 2.3	0.04 - 1.7
Po-212	Bi-212	Th-232	8.8		
Tl-208	Bi-212	Th-232		1.3 – 1.8	.5 – 2.6
U-235	cosmogenic	natural (in natural uranium about 4.5% to 5% of U-238 activity)	4.3 – 4.6		0.14 – 0.2
Th-231	U-235	U-235		0.14 – 0.31	0.03 – 0.08
Pa-231	Th-231	U-235	4.9 – 5.0		0.02 –0.08
Ac-227	Pa-231	U-235	4.8 – 5.0	0.4	0.02 – 0.09
Th-227	Ac-227	U-235	5.7 – 6.1		0.05 – 0.31
Fr-223	Ac-227	U-235		1.2	0.05 – 0.24
Ra-223	Th-227/ Fr-223	U-235	5.6 – 5.8		1.5 – 0.33
Rn-219 (gas)	Ra-223	U-235	6.4 – 6.8		0.27 - 0.4
Po-215	Rn-219	U-235	7.4		
Pb-211	Po-215	U-235		0.29 – 1.39	0.410 – 0.83
At-215	Po-215	U-235	8.0		
Bi-211	Pb-211/ At-215	U-235	6.2 – 6.6		0.35
Po-211	Bi-211	U-235	7.5		0.57 – 0.9
Tl-207	Bi-211	U-235		1.4	
U-238	cosmogenic	natural	4.15, 4.2		
Th-234	U-238	U-238		0/103, 0.193	0.063, 0.093
Pa-234m	Th-234	U-238		2.29	0.765(0.3%), 1.00 (0.6%)
U-234	Pa-234m	U-238	4.72, 4.77		0.053 (0.2%)
Th-230	U-234	U-238	4.62, 4.68		0.068(0.6%)

Table 2 Naturally Occurring Radionuclides (ICRP-38, NCRP-93 & NCRP-94)

Radionuclide	Parent	Source	Alpha	Beta	Gamma/ X-ray
			Emission Energies (MeV)		
Ra-226	Th-230	U-238	4.6, 4.78		0.186
Rn-222 (gas)	Ra-226	U-238	5.49		
Po-210	Rn-222	U-238	6.0		
Pb-214	Po-210	U-238		0.65, 0.71, 0.98	0.295, 0.352
Bi-214	Pb-214	U-238		1.0, 1.51, 3.26	0.609, 1.12, 1.76
Po-214	Bi-214	U-238	7.69		
Pb-210	Bi-214	U-238		0.016, 0.061	0.047
Bi-210	PB-210	U-238		1.16	
Po-210	Bi-210	U-238	5.31		

Table 3 Common Comsumer or Industrial Product Radionuclides

Radionuclide	Source	Alpha	Beta	Gamma/X-ray
		Emission Energies (MeV)		
Ra-226 & progeny	Instrumentation Dials (i.e., luminous materials), lighting rods	Various see **Table 2**.		
Th-232/U-238/U-235 & progeny	Building materials, ceramics, counter weight, or high density weights, ceramic glazes, fly ash	Various see **Table 2**.		
Th-232	Welding Rods, Lantern Mantels, special glass (e.g., lenses)	Various see **Table 2**.		
Am-241	Smoke Detectors, Pace Makers, density gauges	5.49, 5.44		0.060, numerous lines below this region
H-3	Lights/lighting, luminous materials		0.00568	
K-40	Fertilizers, dental products		0.585	1.46
Co-60	Various Irradiation and gauging sources, Spark gap irradiators, spark tubes & glow lamps (i.e., fluorescent tube starters)		0.0958, 0.626	1.17, 1.33
Ni-63	Voltage regulators, surge protectors, spark tubes & glow lamps (i.e., fluorescent tube starters)		.0171	
Kr-85	Lighting, electronic tubes, spark tubes & glow lamps (i.e., fluorescent tube starters)		0.251	0.514
Cs-137	Various Irradiation and gauging sources, Voltage regulators, surge protectors		0.173, 0.425	0.662
Pm-147	Luminous materials, spark tubes & glow lamps (i.e., fluorescent tube starters)		.062	
Po-210	Static eliminators	5.31		
Pb-210	Voltage regulators, surge protectors	Various see **Table 2**.		
Pu-239	Density gauges	5.1, 5.2		numerous lines in the less than 0.03 region
Pu-238	Pacemakers	5.46, 5.5,		numerous lines in the less than 0.03 region

2.1.4.1 Libraries Of Specific Radionuclides (LSR)

Typically MCA radionuclide/isotope identification/quantification software allow development of libraries of specific radionuclides (LSR). These LSRs reduce the number of false identification of peaks that may have multiple attributions. However, they may also result in the failure to appropriately identify and/or quantify radionuclides, if the LSR is not complete. When establishing an LSR it is important to include all radionuclides that may be present associated with the location, sample, material background, and/or ambient environment. In addition, all peaks that are significant contributors to the flux (i.e., 1%) need to be identified, even if they will not be used for identification and quantification of the radionuclide, they may represent an interference to another radionuclide. This becomes particularly important when a more common radionuclide has a peak that may interfere (i.e., cause false identification or quantification) of another radionuclide because it has a minor peak in the same region. These interferences complicate the interpretation of spectra significantly particularly for radionuclides with very low action levels/DQOs.

The LSRs developed must meet the criteria for a library, as specified in Section 2.1.4. As long as the library from which the LSR is generated is appropriately documented, the documentation of the LSR can be limited to the working datasheets and project specific documentation. However, it should to added to the LSR Listing datasheet in the SOP Manual and verified by a Health Physicist.

2.2 Analysis of NaI Spectra

Spectrum analysis is initiated by setting up the URSA or running the URSA software on a computer. Select the appropriate ROI for the spectra being analyzed. Identify the spectra to be analyzed and associated background(s) spectra, then initiate a Radionuclide Identification worksheet (see Appendix A) (RIW). The analysis number on the RIW is sample/location spectrum file name proceeded by "RIW-". If quantification is required page 2 of the RIW will be completed.

2.2.1 Radionuclide Identification

The background spectrum for the sample/location spectrum of interest should be loaded as the background spectra and the sample/location spectra as the active spectrum. Document the background spectra's file name(s) on the RIW and assign it an identification (which is unique for this datasheet). Where multiple background files maybe applicable the sample/location spectrum maybe analyzed with each and the results used to select the background most appropriate to the sample/location. Background subtraction should improve the resolution on the peaks of interest.

Once the spectra are active, use the URSA software to find the various peaks and repeat this process with the various smoothing factors, as needed, to eliminate noise based peak identification but not eliminating real peaks. If several smoothing factors appear appropriate treat each one as a separate case and assign it the existing analysis number followed by a lower case Greek letter with first letter assigned to the smallest smoothing factor to be evaluated and then increasing both as needed. If multiple smoothing factors are used in the analysis, the smoothing factor analysis must include all available smoothing factors between the smallest and largest smoothing factors used. Review the

peak identification visually and eliminate inappropriate peak identification and add any peaks that may have been missed. Have the software conduct a peak identification analysis and print out a copy of the peak identification report. Record the RIW number, a dash (i.e., "-"), "P", a dash (i.e., "-"), the background filename identifier from the datasheet, and if necessary a dash (i.e., "-") followed by the smoothing factor lower case Greek identifier. Review the outputs of this peak identification process against the projected interferences discussed in this document and identify any peak may be inappropriately identified. Then review of the radionuclides identified for confirming peaks and credible radionuclides that maybe present. Identify the peaks that appear to be clearly appropriately identified and those that are clearly misidentified and annotate this on the record.

If a peak is identified several times be sure to resolve, which multiple identifications may be valid. The determination maybe based on determining if the relative fraction of the peak that should be assigned to each identification is appropriately apportioned for the confirmatory peak and other information (i.e., known relative ratios of radionuclides based on known relationships, such as progeny or natural relative isotopic ratios). If there are peaks that have multiple identifications note this on the report for later followup. Also clear identify any unidentified peaks for followup. Sign and date this report near the identification number on this report. This gives real time results of the radionuclides identified and activity present and may lead to additional steps being performed. The radionuclide identification should be completed initially through peak centroid +/- 10 keV (or a value specified by the PHP and noted in the comment section of datasheet GD-R-MCA-1-2, Appendix A) comparison and confirmed through comparison of the full width at half maximum (FWHM) of the software library and the results. Through the use of these two techniques the potential for misidentification can be limited.

Repeat the process described above based on peak identification for an analysis based on FWHM. The "P" in the identification number will be an "F" for the FWHM analysis. Repeat this process to address all applicable smoothing factors and background data sets.

Use these reports and any available support data to complete the analysis and the Radionuclide Identification worksheet (see Appendix A) (RIW). Identify these reports on the RIW and attach them to the RIW. Radionuclide identification should use both sets of data and where applicable any data reports based on alternative backgrounds and smoothing factor data to attempt to eliminate multiple identification of peaks and unidentified peaks documenting this on the radionuclide identification worksheet. The analyst will document the basis for radionuclide identification on the RIW. Where there is multiple identification of peaks that cannot be resolved based on other data the HP may show alternatives for the radionuclides identification, then the limit case (i.e., limiting case for the specific analysis or evaluation being made) radionuclide will be used in subsequent analysis. Note, when several alternative radionuclides are identified use of these radionuclides in the analysis should not exceed an applicable fraction greater than one. Laboratory based analysis may also be used to resolve peaks with multiple identification or unidentified peaks if determined to be justified by the PHP and Project Manager.

2.2.2 Radionuclide Quantification

Quantification of the activity is based on the ROI and associated peak identification. For the radionuclide identification the URSA should be calibrated for the specific or span the range of the radionuclide of interest in the ROI being addressed. This should include consideration of confirmatory peaks. Note, quantification can only be done based on traceable sources. The activity projected by the URSA using the quantification results will be based on the specific geometry of the calibration sources used in quantification. The sources are typically point or small area sources. However, the material being characterized is often in a different relative geometry with attenuation of the flux occurring from the source and intervening materials. To defend quantification of the activity present it will be necessary to model the impact of the geometry including potential variability in the geometry and correct the difference from the calibration source geometry.

Often in situ quantification provide a more accurate assessment of true conditions where the material is not uniformly distributed at the location or located on the surface at the location. Laboratory sample for non-uniform contamination generate inconsistent (i.e., randomly providing ultra-conservative or non-conservative results in some cases) results depending on:

- Whether the random sampling process collected the locations of high contamination and
- Whether the material collected contained large amounts of contaminated material.

If the sample is high localized (e.g., surface contamination) the amount of matrix required to meet the minimum analytical requirements typically results in significant dilution of the sample and significant under estimation of the surface activity concentration. In addition, in situ quantification can provide a more practicable solution.

To correct for geometry effects it is necessary to accurately model (i.e., assess) relative flux associated with:

- The detector-source geometry to provide the calibration baseline,
- The credible detector-source geometries to provide an assessment of the potential correction for the difference between the calibration geometry and the potential conditions, and
- Model the credible detector-source geometries to include consideration in the variability of material thickness, composition, and density in assessing these differences.

Once the data has been modeled, the geometry correction factor(s) (GCF) can be calculated for each credible geometry (including consideration of material thickness, composition, and density) using:

GCF = (credible detector-source geometry flux based on modeling)
/(detector-source geometry to provide the calibration baseline flux modeling).

Once the range of GCF (with their associated uncertainties are established) the range of and a typical GCF for a measure can be established. The typical GCF is a probability weighted average for the various credible GCFs. The projected activities measured by the URSA are multiplied by

the GCF or the range of GCFs to assess the range of activity that maybe present for a specific measurement. In making these assessments it is essential to consider the propagation of error in the results and provide the associated uncertainties. (see Section 9.0)

These results should be documented consistent with the applicable Parsons and project calculation documentation procedure/requirements.

2.3 Intrinsic Germanium Spectroscopy

Reserved for later use.

3.0 ALPHA SPECTROSCOPY

Reserved for later use.

4.0 BETA SPECTROSCOPY

Reserved for later use.

5.0 NEUTRON SPECTROSCOPY

Reserved for later use.

6.0 MODELING

The purpose of modeling is to determine the relationship between the calibration geometry and the field geometry to allow quantification of the measured activity. Typically the intent is to assess the difference in the detected flux in the detector for the two conditions so a correction factor based on the relative ratio for assessment of activity can be developed. Such modeling would involve the assessment of the relative changes in the detected flux between the calibrated conditions and the field conditions. Often the field conditions must be projected based on a range of conditions that might exist. When assessing the calibration and field conditions it is import to address:

- Relative distance and position of the source relative to the detector,
- The materials and geometry of the detector,
- The materials present between the source and the detector,
- The source geometry, materials, and the activity distribution within the materials,
- Potential back-scatter surfaces (location and material),
- When assessing material properties the type of material and its density will need to be addressed, and
- The probability of the various variable field conditions existing.

The acceptable uncertainty and level of detail associated with this data and the selection of the software used to model the relative relationships is based on the requirements of the DQOs. In all cases the uncertainties in the modeling and the propagation of these uncertainties in results must be considered.

Currently Parsons typically uses MCNP software for this modeling. All modeling activities must be clearly documented consistent with Parsons and the project requirements for the documentation of calculations. Further, the software used must be validated and verified for this use consistent with the Parsons and project procedures and requirements.

The results of the modeling are normally an assessment of the Correction Factor (CF_i) between the field geometry detected flux (FGFi) and the calibration geometry's detected flux (CGF_i) for field geometry "i". Specifically:

$$CF_i = FGF_i / CGF_i.$$

Where defensible, probabilities can be assigned to the various field configurations (P_i) then a typical Correction Factor (CF_t) can be provided where:

$$CF_t = \sum_i P_i * CF_i .$$

When calculating CF_is and CF_t ensure that the propagation of error is considered to provide an assessment of uncertainty. The CF data will normally include the range of applicable CF_is, and CF_t

with 95% confidence level uncertainties. The workplan, sampling and analysis plan, and/or the DQOs will establish:

- What modeling is required,
- The acceptable uncertainties (i.e., typically 95% confidence level two tailed),
- Which CFs are calculated and how they are used.

All CF determination shall be clearly documented in a calculation consistent with Parsons' and the project's requirements and procedures.

7.0 SURVEY TECHNIQUES

The survey techniques used by Parsons should be consistent with:

- MARSSIM,
- NMSS Decommissioning Standard Review Plan (NUREG-1727)
- Manual for Conducting Radiological Surveys in Support of License Termination (NUREG/CR-5849),
- Analysis of the Ability of Current Health Physics Instruments to Predict Dose in Exposed Individuals (NUREG/CR-4239),
- Human Performance in Radiological Survey Scanning (NUREG/CR-6364),
- A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys (NUREG-1505),
- Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria (NUREG-1506),
- Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions (NUREG-1507),
- applicable Parsons SOPs,
- applicable project requirements and procedures,
- the project DQOs, and
- good health physics practices

In selecting survey techniques it is important to consider:

- DCGLs and associated DQOs for the project,
- the type, energy, and projected flux of the radiation to be detected,
- possible inference/confounding-factors in interpretation of the data based on the projected radionuclides of interest in the background environment,
- the detection limitations for the instrumentation based on survey height and scanning rate,
- scanning heights should be consistent with projected averaging areas/volumes for contamination based on the DQOs and field conditions,
- the human factor limitations for personnel (e.g., detection of change, such as meter movement versus sound, easy of repetitive handling of the equipment),
- when scanning versus static counts will be used,
- when energy based radionuclide identification maybe appropriate,
- where direct survey versus smears/material-sampling should be used,
- the environmental conditions at the site,
- practicability limitations in the selection of equipment,
- regulatory acceptance of the equipment,
- availability of established procedures and protocols, and
- availability of the instrumentation and personnel required.

The basis of the selection of survey instrumentation types and techniques will be fully documented in the DQO and SAP documentation.

8.0 DATA VALIDATION AND VERIFICATION

The data validation and verification process consists of several components, such as:

- Project's DQO or equivalent based data validation and verification process as addressed in Section 8.1 of this document.
- Project's or Parsons' process for the investigation of apparent data errors during collection as addressed in Section 8.2 of this document,
- Validation and verification of the software used in support of radiological survey and analysis activities that are addressed by applicable project or Parsons procedures, such as QA-19.2, *Quality Assurance Procedure, Computer Software Verification and Validation*, *l*, *Quality Assurance Manual,* Parsons, Richland, Washington,
- Validation and verification of modeling and other calculations that are addressed by applicable project or Parsons procedures such as, *Preparation of Calculations*, *Project Procedures Manua*l, Parsons, Richland, Washington,
- Resolution of nonconformance reports (NCRs) associated with data that are addressed by applicable project or Parsons procedures such as, QA-15.0, *Quality Assurance Procedure, Nonconformance Control*, *Quality Assurance Manual,* Parsons, Richland, Washington.

8.1 General Data Validation and Verification Process for Verified Field Data

The general data validation and verification activities discussed in this document are intended to support the data validation and verification process associated with the specific project. When ever discrepancies are identified the appropriate project and QA procedures (e.g., NCR process) should be implemented, as needed. The first step in the data validation and verification process is to review the data documentation and ensure that it meets the requirements of the applicable procedures and requirements. Verify that the appropriate paperwork is in place and signed by the data collector and verifier.

Once it has been established that the appropriate documentation is available the analysts and data collectors should review the data for the following technical considerations, prior to its release to the customer:

- Are the data technical consistent,

  - Is the behavior of the data consistent with known scientific principles,
  - Are the changes in the data discontinuous or the rate of change incongruous, such that the data suggests that a recording or collection error may have occurred.
  - Do the results fall below background at a frequency or in an amount that would suggest a recording or collection error beyond the normal fluctuations of background.
  - Does the data imply the unexplained creation or loss of flux or material beyond the variability expected in the statistical fluctuation of the data.

- Is the activity and the associated units consistent with the credible range of data values.
- Review the specific activity of the source materials to verify that the mass, density, and activity have credible values.
- Are there any non-credible radionuclides identified based on the data.
- Are the radionuclides that should be present represented in the data at credible levels.
- Are the relative ratio of activity and hazards consistent with known scientific information.

- Were appropriate and current calibration sources used,

  - Are all the sources used in the calibration of the instrument traceable with current calibrations.
  - Do the sources used in the calibration span the energy range of interest.
  - Are the activity levels of the sources consistent with the capability of the instrumentation and at a level and accuracy to meet the quantification required in the DQOs.
  - Is there evidence that the source have been damaged so that the calibration may not be valid.
  - Is the source geometry consistent with that needed to meet the DQOs or has justified modeling been performed to address the impact of the source geometry.
  - Is the energy response behavior consistent with expected energy response and/or scientific principles.
  - Are there coatings on the source that may degrade the energy of the emitted photons.

- Is there appropriate documentation for all calibrations sources in the records,

- Were appropriate peaks selected for radionuclide/isotope identification and quantification of activity,
  - Are the peaks selected for radionuclide identification part of the designated radionuclide/progeny spectra.
  - Are there interferences from background, detector/instrument response, or other radionuclides that may have resulted in an incorrect interpretation of this data.
  - Were confirmatory peaks selected and evaluated to verify the interpretation of the primary peaks.
  - Are the relative activity ratio between the primary and other peak associated with radionuclide consistent with the yields for each peak.
  - Does the peak analysis and FWHM produce consistent results.
  - Are there peaks with duplicate identifications that can be separated.
  - Are the unidentified peaks and how will their identification be resolved.
  - Is it feasible to quantify the activity based on the activity level of the peak and the interference from other sources of spectral data.

- Are the background values credible and are the background data consistent with the statistical variability expected,
- Are the expected progeny present and in the appropriate ratios (Note, when making this assessment the variation in solubility of the progeny and presence of gaseous progeny may affect these ratios significantly),
- Are the expected background radionuclides present,

- Are there any radionuclides identified or present in concentrations that are not credible or at least require followup,
- Have appropriate background data sets been obtained,
- Is there consistency between these values and the other survey data,
- Are the radionuclides present in credible relative ratios,
- Is additional count time required to resolve spectra appropriately,
- Are there unidentified peaks that require resolution,
- Are there potential mis-identified peaks (e.g, impact of interferences),
- Does the equipment appear to be functioning properly,
- Were any technical concerns/inconsistencies appropriately followed up on and resolved,
- Has the appropriate quality control/verification samples been taken,
- Are there any other outstanding technical, operational, or quality issues associated with the data. (Carefully review any comments on the datasheets as an indication of such impacts.)

Review the survey results using other techniques to verify that they are consistent with the results from these calculations. Consider progeny and other radiation emissions. If there are inconsistencies issue an NCR to document resolution of this potential inconsistency. The explanation or justification of any inconsistencies should be documented in a manner consistent with Parsons or the project's procedures and requirements addressing calculations.

If samples are sent for analysis then review these sample results and compare them with the in situ measurements for this activity. If the values are not consistent (i.e., with the projected uncertainties of the two results) review the data for potential problems and issue and NCR to document resolution of this potential inconsistency. The explanation or justification of any inconsistencies should be documented in a manner consistent with Parsons or the project's procedures and requirements addressing calculations.

It is recommended that appropriate statistical tests be applied to the various data sets to verify that statistical anomalies are not present in the data. Statistical anomalies in the data shall be treated like any other data discrepancy and handled accordingly.

8.2 Resolution of Field Data Verification Problems

Until the data quality and associated uncertainty are resolved the data should be labeled as suspect and not used for safety or environmental protection determination, unless the data is assumed to be the most conservative value. If there is an apparent problem associated with data collection the HP or Project Manager should initiate an NCR documenting the apparent problem. The HP shall review the apparent problem to determine its impact on data quality. If the data is determined to be suspect and thus not usable this should be documented on the NCR form and the process resolved under the NCR process. If the HP determines that the data is usable then in addition to the implementation of the NCR process the HP shall provide a technical justification of the data validity in the form of a Parsons calculation which must be prepared, reviewed and issued in a manner consistent with applicable project and Parsons procedures and requirements.

In establishing the potential validity of impacted or suspect data the HP should review the source and probability of occurrence of the event or condition that cause the impact. Determine the additional uncertainty this condition may have on the resulting data. Then the HP should determine if the data has any functional value based on this uncertainty.

9.0 UNCERTAINTY

Uncertainty in the results for these measurements must always be determined and justified based on sound scientific/engineering data and practice. This uncertainty may come from many sources including:

- Statistical variability in the nuclear decay and counting process.
- Measurement error inherent in the equipment.
- Visual uncertainties resulting from interpolating a scale.
- Variability of the natural environment and the materials being measured.
- Uncertainty in the calibration of the equipment.
- Inherent bias in the measurement or measure data set.
- Statistical variability or inhomogeneity in the item or area being measured.
- Human observation and recording errors or intentional misrecordings.

With the exception of **human observation and recording errors or intentional misrecordings** the process will attempt to minimize and quantify these errors. The procedural and guidance process used in this activity is intended to minimize the potential human observation and recording errors or intentional misrecordings errors.

The **statistical variability** associated with the various process (e.g., the **nuclear decay and counting process**) is addressed using counting statistics and increasing the count times and number of counts/sample taken. Typically most thing in nature have lognormal distributions with the exception of basic natural process like radioactive decay, which is normal (i.e., pure guasian distribution). As the activity levels (i.e., count rates) decrease poisson statistics should be applied to the evaluation of this data. Whenever a statistical distribution other than those described above is used to characterize data associated with this activity a clear justification for the choice must be provided as a basis for this alternative distribution based on the physical characteristics of the process and not just on the apparent statistical behavior of a very limited data set. The confidence level to which uncertainties are to be established should be based on the DQO process with a default assumption that all uncertainties in data should be established at the 95% confidence level.

The **measurement error inherent in the equipment** are quantified by the calibration and accuracy check process for the instrumentation. Further, potential failure can be projected by the control charting process. The upper and lower bounds of the acceptable uncertainties are established based on the DQO process. The accuracy check boundary and the calibration uncertainty maybe used to assess the uncertainty associated with the equipment, although use of the actual calibration and accuracy check uncertainty maybe used. Data like the fine tuning results from the MCA can be used to assess instrument variability in addition to the calibration error. The preference in establishing the uncertainty of the data is to do a detailed analysis of all the data and propagate the error as appropriate or model it with monte carlo analysis. In addition **visual uncertainties resulting from interpolating a scale** must be considered in this uncertainty as discussed below. However, a default solution for equipment uncertainty (UNC) is:

$$UNC = SQRT (UNC_{calS}^2 + UNC_{calF}^2 + UNC_{act}^2 + UNCvis^2 + UMDA^2) + MDA$$

where:

UNC_{calS} is the specified uncertainty of the calibration source and/or the outside calibration. If there is more than one value involved this value is the square root of the sum of the squares of the values (Bevenington, 1969).

UNC_{calF} this is the uncertainty based on the field calibration ignoring the uncertainty in the calibration sources based on statistical variability and background. This should determined based on good health physics practices and the information in NUREG/CR-5849, NUREG-1575, and NUREG-1507). If a modeling correction factor is use then the uncertainty of UNC_{calF} and correction factor should be consolidated using the square root of the sum of the squares of the values (Bevenington, 1969).

UNC_{act} is the uncertainty in the accuracy or tuning checks, which can be estimated as the 95% confidence level for the entire set of values generated.

UNCvis this is 50% of the smallest marked subdivision for an analog readout. For a digital readout it is the smallest value record by the read out (e.g., if the readout is 95.6 then the uncertainty is 0.1). (Typically can be ignore for most MCAs.)

MDA is the minimum detectable amount (a.k.a., minimum detectable activity) value for the measurement system. This can be computed as described in NUREG-CR-5849, NUREG-1506, or in a specifically reference technical document included in with the calculation. If the MDA is assigned a distribution of values based on a technical defensible scientific approach this value should be set to zero in the calculation of UNC.

UMDA is the 95% confidence level uncertainty in the MDA value if calculated.

Variability of the natural environment and the materials being measured is based on characterization by multiple measurement of the environment, either background or sample/location variability for the area of interest. (Note, in counting statistic count for extended times is the same as making multiple counts in this extended time.) The 95% confidence level uncertainty for the entire set of values generated

If there is a known **inherent bias in the measurement or measure data set** this value should be subtracted out of the result. If the bias is not known then it is presumed to be adequately addressed in the **measurement error inherent in the equipment.** If there is a known bias it should be removed prior to determining the **measurement error inherent in the equipment.**

The **statistical variability or inhomogeneity in the item or area being measured** is extremely difficult to assess accept as partially quantified in the **variability of the natural environment and the materials.** Typically the balance of this uncertainty can only be addressed qualitatively.

9.1 Minimum Detectable Amount (MDA)

It is important to quantify the Minimum Detectable Amount (MDA) that the in-situ spectroscopy is capable of detecting to determine if the DCGLs can be met using this technology. To do this one must consider that the in-situ equipment is used to count a specific location for longer times than the 1 minute scalar static count that is used with survey instrumentation. The MDA is estimated using the following equation from NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination".

$$MDA = \frac{2.71 + 4.65 * \sqrt{B_R * t}}{t * E * \frac{A}{100}}$$

- Where:MDA is the minimum detectable amount in dpm/100 cm^2
- B_R is the background count rate in cpm
- t is the count time in minutes
- E is the efficiency of the detector in cpm/dpm
- A is the active area of the detector in cm^2

Using this equation with the detector information the MDA values for various count times and detectors can be estimated. The use of the ROI has the net effect of lowering the background count rate for that specific region. Radionuclide specific efficiencies and associated MDAs can be developed for other radionuclides as needed. Other formulas such as those in NUREG-1506 can be used to estimate the MDA. The basis used for assessing the MDA should be clearly documented. In addition, it is equally important to document how the MDA is used in subsequent analyses.

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Parsons Procedures

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SOP-R-MCA-02, *Gamma Spectroscopy Instrument Operation,* Parsons Infrastructure and Technology Group, Inc., Richland, Washington current version.

QA-15.0, *Quality Assurance Procedure, Nonconformance Control*, Parsons Infrastructure and Technology Group, Inc., Richland, Washington, current version or equivalent Project specific nonconformance procedure..

QA-19.2, *Quality Assurance Procedure, Computer Software Verification and Validation*, Parsons Infrastructure and Technology Group, Inc., Richland, Washington, current version or equivalent Project specific nonconformance procedure..

APPENDIX A

Datasheets

Parsons	LSR Listing	GD-R-MCA-1-1-_____
Initiated By (print)	Signature / Date	Sheet _____ of _____

Name	Radionuclide followed by energies in MeV in parenthesis	Radiation Type	Source of Information	Established by: Developed By: Print	Developed By: Signature	Developed By: Date	Verified: Print Initials	Verified: Initial	Verified: Date

Source Reference

ID.	Description
1	U.S. Department of *Energy 's National Nuclear Data Center (NNDC)* at Brookhaven National Laboratory (access is available through the internet)
2	David Kocher's *Radioactive Decay Data Tables* (DOE/TIC-11026)
3	ICRP,s (International Commission on Radiation Protection) *Radionuclide Transformations Energy and Intensity of Emission*, Annals of the ICRP, ICRP Publication 38

Parsons	Radionuclide Identification Worksheet					GD-R-MCA-1-2-_____			
Quantification Required	Yes		No		If "Yes" include a page 2 for each sheet			Sheet _____ of _____	Page 1

Peak		Sample Filename	LSR:		Radionuclide		
Channel	Energy (keV)		Background Filename	Basis	Primary		Alternative (in order)
					Id.	Fraction	Id.

Comments:

Completed by (print)		Completed by (signature)		Date	
Authorized For Use					
PHP (Print)		PHP Signature		Date:	
Data Verified					
HP (Print)		HP Signature		Date:	

Parsons	Radionuclide Identification Worksheet	GD-R-MCA-1-2-_____

Quantification Required	Yes		No		Mass of sample (g) (if applicable): _____	New LSR (optional):	Sheet _____ of _____	Page 2

Peak Energy (keV) used			ROI (Optional)	Radionuclide	Correction Factor (if applicable)				Activity	
1st	2nd	3rd			CF_g (units?) _____	Source (cal. #)	CF_v (units?) _____	Source (doc. # or cal. #)	URSA (units?)	Net (units?).

Comments:

Completed by (print)		Completed by (signature)		Date	

Authorized For Use

PHP (Print)		PHP Signature		Date:	

Data Verified

HP (Print)		HP Signature		Date:	

APPENDIX M

Instrument Calibration Sheets- Phase II

Use of Instruments in the Field- Phase II
SEAD-12 Building Radiological Survey
Seneca Army Depot Activity

Instrument Type	Serial Number	Use in Field	
		Start Date	End Date
FIDLER	A945P	6/5/2001	8/28/2001
FIDLER	A954P	6/5/2001	6/18/2001
FIDLER	A968P	6/19/2001	6/27/2001
FIDLER	A951P	6/20/2001	7/24/2001
FIDLER	A983P	6/27/2001	7/29/2001
Phoswich	119815	6/7/2001	7/28/2001
Phoswich	119803	6/7/2001	8/29/2001
Floor Monitor	138256	6/6/2001	7/14/2001
Micro Rem	C252A	6/6/2001	6/11/2001
Micro Rem	C251A	6/6/2001	8/28/2001
Pancake	61457	6/5/2001	8/28/2001
Pancake	61390	6/6/2001	7/29/2001

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Bicron Analyst	Serial No.:	A945P
Bicron G5 Detector	Serial No.:	A378Q

Submitted by:..... W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters. The measurements were performed under ambient conditions of approximately 20 degrees Celcius and 40 percent relative humidity. Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

The reference standard(s) for this calibration:
(1) AN/UDM-11 Calibration Set, Americium 241, (Am-241) source serial number EN468.
(2) Eberline Model MP2 mini Pulser, serial number 434.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

T. E. DAVIS
LRSO
USATSC-Tobyhanna

CRAIG A. GREDLEIN
Chief, ACL
USATSC-Tobyhanna

Report Number W0MG4G-7020D
Calibration Date 25-May-01
Calibration Due 21-Nov-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Bicron Analyst	Serial No.: A945P
Bicron G5 Detector	Serial No.: A378Q

Unless otherwise noted, all listed test results were obtained with the Analyzer switch set to "Ch 1".

1. Basic performance data:

High Voltage (kV): ... 1.10	Lower Level Discriminator (mV): .. 51
Sensitivity (mV): 100	Upper Level Discriminator (mV): .. 63
Batteries: replaced 1 ea 9 V	

2. Meter Accuracy when electronically pulsed (scaler reading are 1 minute counts)

Range	Applied (cpm)	Initial Readings Meter	Initial Readings Scaler	Adjusted? (Y/N)	Final Readings Meter	Final Readings Scaler
x1000	100,000 400,000	95,000 412,000	99,949 399,313	N	95,000 412,000	99,949 399,313
x100	10,000 40,000	9,700 40,000	10,001 39,987	N	9,700 40,000	10,001 39,987
x10	1,000 4,000	980 4,000	999 3,994	N	980 4,000	999 3,994
x1	100 400	98 405	100 399	N	98 405	100 399

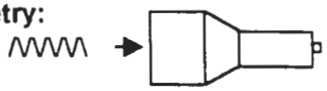
3. Probe checked with Americium-241 (See notes, below)

Analyzer Switch position	Approx. source-to-detector distance (in)	Applied 2-Pi emission rate (cpm)	Back-ground reading (cpm)	Average reading (cpm)	Average detection efficiency
Ch-1	6	70,100	400	10,600	0.15
Out	6	70,100	7,200	20,000	0.29
Ch-1	12	70,100	400	35,600	0.51
Out	12	70,100	7,200	65,300	0.93

4. Notes:

1. Source to Detector distance is the approximate distance from the test source to the center of the detector.
2. Applied rate is the sum of the certified 17keV and 60 keV emission rates from the AM-241 test source.
3. Background reading as observed on the unit under test at time of test.
4. Average reading is (average of one minute scaler count plus the analog meter reading) minus the local background at time of test

5. Geometry:



Report Number W0MG4G-7020D
Calibration Date 25-May-01
Calibration Due 21-Nov-01

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Bicron Analyst	Serial No.:	A954P
Bicron G5 Detector	Serial No.:	A402Q

Submitted by:..... W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters. The measurements were performed under ambient conditions of approximately 20 degrees Celcius and 40 percent relative humidity. Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

The reference standard(s) for this calibration:
(1) AN/UDM-11 Calibration Set, Americium 241, (Am-241) source serial number EN468.
(2) Eberline Model MP2 mini Pulser, serial number 434.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

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Report Number W0MG4G-7011D
Calibration Date 25-May-01
Calibration Due 21-Nov-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Bicron Analyst	**Serial No.: A954P**
Bicron G5 Detector	**Serial No.: A402Q**

Unless otherwise noted, all listed test results were obtained with the Analyzer switch set to "Ch 1".

1. Basic performance data:

High Voltage (kV): ... 1.04	Lower Level Discriminator (mV): .. 50
Sensitivity (mV): 100	Upper Level Discriminator (mV): .. 65
Batteries: replaced 1 ea 9 V	

2. Meter Accuracy when electronically pulsed (scaler reading are 1 minute counts)

Range	Applied (cpm)	Initial Readings Meter	Initial Readings Scaler	Adjusted? (Y/N)	Final Readings Meter	Final Readings Scaler
x1000	100,000 400,000	95,000 432,000	99,886 399,692	N	95,000 432,000	99,886 399,692
x100	10,000 40,000	9,300 40,300	9,994 39,998	N	9,300 40,300	9,994 39,998
x10	1,000 4,000	970 4,150	998 3,995	N	970 4,150	998 3,995
x1	100 400	95 405	100 400	N	95 405	100 400

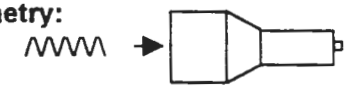
3. Probe checked with Americium-241 (See notes, below)

Analyzer Switch position	Approx. source-to-detector distance (in)	Applied 2-Pi emission rate (cpm)	Back-ground reading (cpm)	Average reading (cpm)	Average detection efficiency
Ch-1	6	70,100	400	10,400	0.15
Out	6	70,100	7,500	21,700	0.31
Ch-1	12	70,100	400	36,300	0.52
Out	12	70,100	7,500	70,500	1.01

4. Notes:

1. Source to Detector distance is the approximate distance from the test source to the center of the detector.
2. Applied rate is the sum of the certified 17keV and 60 keV emission rates from the AM-241 test source.
3. Background reading as observed on the unit under test at time of test.
4. Average reading is (average of one minute scaler count plus the analog meter reading) minus the local background at time of test

5. Geometry:



Report Number W0MG4G-7011D
Calibration Date 25-May-01
Calibration Due 21-Nov-01

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Bicron Analyst	Serial No.:	A968P
Bicron G5 Detector	Serial No.:	A367Q

Submitted by:..... W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters.

The reference standard(s) for this calibration:
(1) AN/UDM-11 Calibration Set, Amerricium 241, (Am-241) source serial number EN468.
(2) Eberline Model MP2 mini Pulser, serial number 434.

The measurements were performed under ambient conditions of approximately 21 degrees Celcius and 40 percent relative humidity.

Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

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Report Number W0MG4G-7026D
Calibration Date 25-Jan-01
Calibration Due 24-Jul-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Bicron Analyst	Serial No. A968P
Bicron G5 Detector	Serial No. A367Q

Unless otherwise noted, all listed test results were obtained with the Analyzer switch set to "Ch 1".

1. Basic performance data:

High Voltage (kV): ... 1.25	Lower Level Discriminator (mV): ..
Sensitivity (mV): 100	Upper Level Discriminator (mV): ..
Batteries: ..... replaced 1 each 9 volt battery	

2. Meter Accuracy when electronically pulsed (scaler reading are 1 minute counts)

Range	Applied (cpm)	Initial Readings Meter	Initial Readings Scaler	Adjusted? (Y/N)	Final Readings Meter	Final Readings Scaler
x1000	100,000	100,000	100,005	N	100,000	100,005
	400,000	422,000	399,625		422,000	399,625
x100	10,000	10,000	9,981	N	10,000	9,981
	40,000	40,800	39,992		40,800	39,992
x10	1,000	1,000	998	N	1,000	998
	4,000	4,000	3,998		4,000	3,998
x1	100	100	100	N	100	100
	400	400	399		400	399

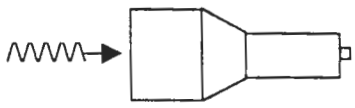
3. Probe checked with Americium-241 (See notes, below)

Analyzer Switch position	Approx. source-to-detector distance (in)	Applied 2-Pi emission rate (cpm)	Back-ground reading (cpm)	Average reading (cpm)	Average detection efficiency (%)
Ch-1	12	70,100	3,200	31,800	45
Out	12	70,100	7,000	31,000	44

4. Notes:

1. Source to Detector distance is the approximate distance from the surface of the test source to the surface of the detector's protective shield.
2. Applied rate is the sum of the certified 17keV and 60 keV emission rates from the AM-241 test source.
3. Background reading as observed on the unit under test at time of test.
4. Average reading is (average of one minute scaler count plus the analog meter reading) minus the local background at time of test

5. Geometry:



Report Number W0MG4G-7026D
Calibration Date 25-Jan-01
Calibration Due 24-Jul-01

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Bicron Analyst	Serial No.:	A951P
Bicron G5 Detector	Serial No.:	A365Q

Submitted by:..... W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters.

The reference standard(s) for this calibration:
(1) AN/UDM-11 Calibration Set, Amerricium 241, (Am-241) source serial number EN468.
(2) Eberline Model MP2 mini Pulser, serial number 434.

The measurements were performed under ambient conditions of approximately 21 degrees Celcius and 40 percent relative humidity.

Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

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Report Number W0MG4G-7027D
Calibration Date 25-Jan-01
Calibration Due 24-Jul-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Bicron Analyst		Serial No.	A951P
Bicron G5 Detector		Serial No.	A365Q

Unless otherwise noted, all listed test results were obtained with the Analyzer switch set to "Ch 1".

1. Basic performance data:

High Voltage (kV): ... 1.24	Lower Level Discriminator (mV): .. 50
Sensitivity (mV): 98	Upper Level Discriminator (mV): .. 149
Batteries: ..... Replaced 1 ea. 9 volt battery	

2. Meter Accuracy when electronically pulsed (scaler reading are 1 minute counts)

Range	Applied (cpm)	Initial Readings Meter	Initial Readings Scaler	Adjusted? (Y/N)	Final Readings Meter	Final Readings Scaler
x1000	100,000 400,000	95,000 422,000	99,869 399,740	N	95,000 422,000	99,869 399,740
x100	10,000 40,000	9,500 40,500	9,985 39,933	N	9,500 40,500	9,985 39,933
x10	1,000 4,000	980 4,100	998 3,994	N	980 4,100	998 3,994
x1	100 400	95 400	100 400	N	95 400	100 400

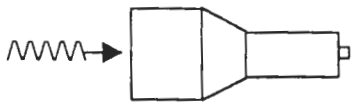
3. Probe checked with Americium-241 (See notes, below)

Analyzer Switch position	Approx. source-to-detector distance (in)	Applied 2-Pi emission rate (cpm)	Back-ground reading (cpm)	Average reading (cpm)	Average detection efficiency (%)
Ch-1	12	70,100	1,800	58,200	83
Out	12	70,100	9,000	66,000	94

4. Notes:

1. Source to Detector distance is the approximate distance from the surface of the test source to the surface of the detector's protective shield.
2. Applied rate is the sum of the certified 17keV and 60 keV emission rates from the AM-241 test source.
3. Background reading as observed on the unit under test at time of test.
4. Average reading is (average of one minute scaler count plus the analog meter reading) minus the local background at time of test

5. Geometry:



Report Number W0MG4G-7027D
Calibration Date 25-Jan-01
Calibration Due 24-Jul-01

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Bicron Analyst	Serial No.:	A983P
Bicron G5 Detector	Serial No.:	A394Q

Submitted by:..... W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters. The measurements were performed under ambient conditions of approximately 20 degrees Celcius and 40 percent relative humidity. Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

The reference standard(s) for this calibration:
(1) AN/UDM-11 Calibration Set, Amerricium 241, (Am-241) source serial number EN468.
(2) Eberline Model MP2 mini Pulser, serial number 434.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

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CRAIG A. GREDLEIN
Chief, ACL
USATSC-Tobyhanna

Report Number WOMG4G-7021D
Calibration Date 20-Mar-01
Calibration Due 16-Sep-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Bicron Analyst	**Serial No.**	**A983P**
Bicron G5 Detector	**Serial No.**	**A394Q**

Unless otherwise noted, all listed test results were obtained with the Analyzer switch set to "Ch 1".

1. Basic performance data:

High Voltage (kV): ... 1.24	Lower Level Discriminator (mV): .. 51
Sensitivity (mV): 100	Upper Level Discriminator (mV): .. 194
Batteries: ..... replaced 1 ea 9V	

2. Meter Accuracy when electronically pulsed (scaler reading are 1 minute counts)

Range	Applied (cpm)	Initial Readings Meter	Initial Readings Scaler	Adjusted? (Y/N)	Final Readings Meter	Final Readings Scaler
x1000	100,000 400,000	98,000 420,000	99,971 399,615	N	98,000 420,000	99,971 399,615
x100	10,000 40,000	9,500 39,900	9,980 39,900	N	9,500 39,900	9,980 39,900
x10	1,000 4,000	950 4,000	999 3,999	N	950 4,000	999 3,999
x1	100 400	98 400	100 400	N	98 400	100 400

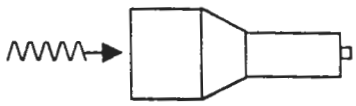
3. Probe checked with Americium-241 (See notes, below)

Analyzer Switch position	Approx. source-to-detector distance (in)	Applied 2-Pi emission rate (cpm)	Back-ground reading (cpm)	Average reading (cpm)	Average detection efficiency
Ch-1	12	70,100	3,400	69,400	0.99
Out	12	70,100	9,800	70,000	1.00

4. Notes:

1. Source to Detector distance is the approximate distance from the surface of the test source to the surface of the detector's protective shield.
2. Applied rate is the sum of the certified 17keV and 60 keV emission rates from the AM-241 test source.
3. Background reading as observed on the unit under test at time of test.
4. Average reading is (average of one minute scaler count plus the analog meter reading) minus the local background at time of test

5. Geometry:



Report Number WOMG4G-7021D
Calibration Date 20-Mar-01
Calibration Due 16-Sep-01

CERTIFICATE OF CALIBRATION
(COUNT-RATE INSTRUMENT)

RSA Laboratories, Inc.
21 Pendleton Drive, P.O. Box 61
Hebron, Connecticut 06248
(860) 228-0721 Fax (860) 228-4402

Customer and Contact: **Radiation Safety Associates, Inc. Attn: K. Paul Steinmeyer (860) 228-0487**
Customer Address: **P.O. Box 107, 19 Pendleton Drive, Hebron, CT 06248**

Inst. Mfr. & Model **Ludlum Model 2224**	Inst. Type **Scaler/Ratemeter**	Inst. s/n **119815**
Det. Mfr. & Model **Ludlum Model 43-1-1**	Det. Type **Alpha/Beta Phoswich**	Det. s/n **155183**
Cal. Date **30 May 2001**	Due Date **30 November 2001**	Cal. Interval **6 months**

Environmental conditions: Temperature: **71°F** Relative Humidity **38%** Atmospheric Pressure **29.22** inches Hg
Pre-calibration Checks:

■ Contamination survey	■ Battery check	□ Slow response check	
■ Mechanical check	■ Audio check	□ Window operation	■ Det. volts **775** Vdc
■ Meter zero	■ Reset check	■ Plateau check	
■ Geotropism check	□ Fast response check	□ Alarm set	■ Input sens. *See comments

■ Pulse generator s/n 94926 □ Oscilloscope s/n 171-04928 ■ Voltmeter s/n 57410002
■ HV Readout (2 points) Ref./Inst. **900** V/ **900** V Ref./Inst. **1700** V/ **1700** V

Comments: * **Alpha threshold = 120 mV; Beta threshold = 4 mV; Beta window = 4 mV to 30 mV.**
Local background ≈ 1 cpm alpha, 316 cpm beta.

S/N of source used for precision check **0210** Isotope **Th-230** Dedicated Source? □Yes ■No
Reading #1 **5,484 cpm** Reading #2 **5,401 cpm** Reading #3 **5,454 cpm** Mean **5,446 cpm**
Precision: ■± <10% □±10-20% □Out of tolerance

Range Multiplier	Reference Calibration Point	Instrument Indication
x 1000	400,000 cpm	400,000 cpm
x 1000	100,000 cpm	100,000 cpm
x 100	40,000 cpm	40,000 cpm
x 100	10,000 cpm	10,000 cpm
x 10	4000 cpm	4000 cpm
x 10	1000 cpm	1000 cpm
x 1	400 cpm	400 cpm
x 1	100 cpm	100 cpm
1 min count	100,000 cpm	100,042 cpm

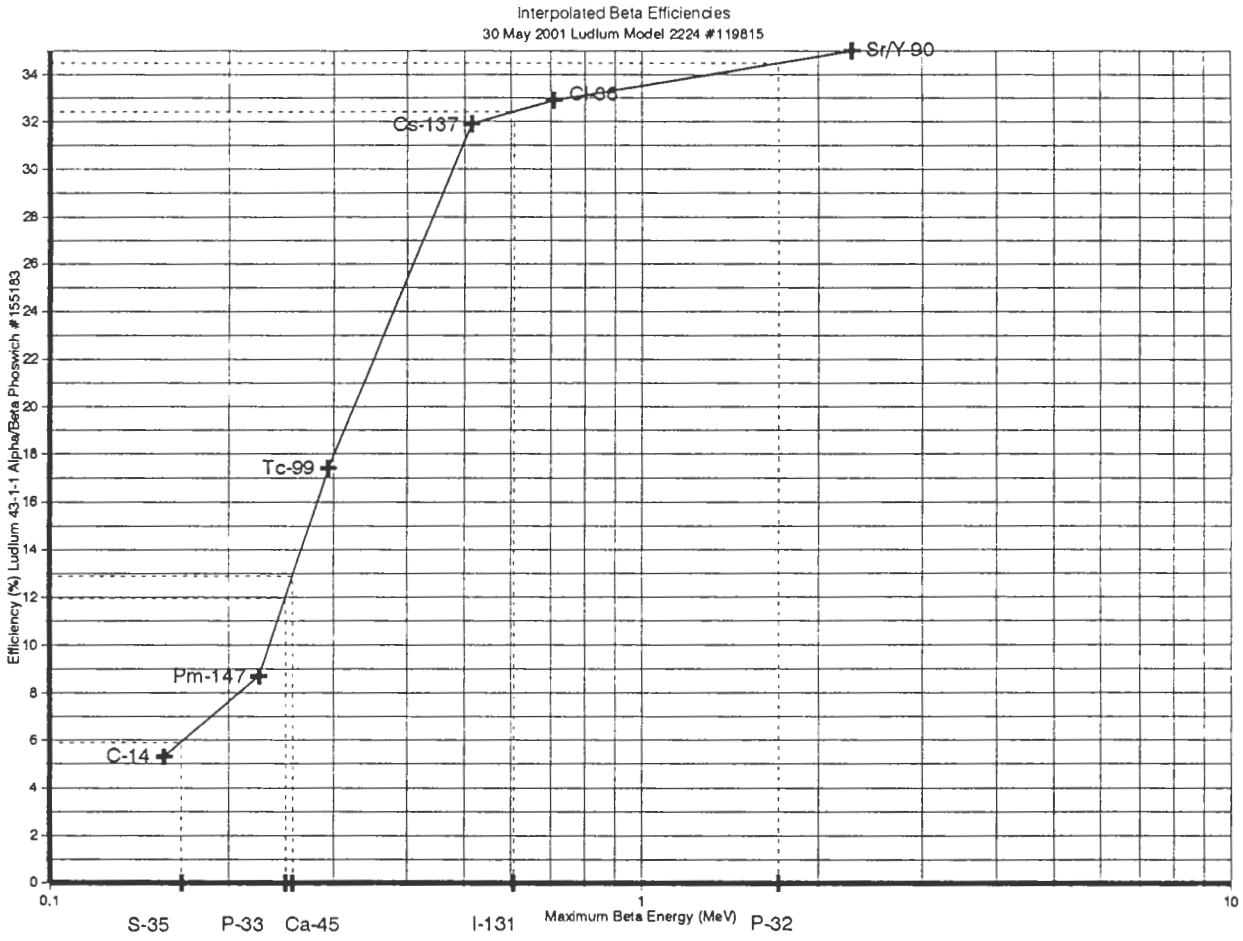
All ranges calibrated electronically.

Range Multiplier	Cal. Source Used (Isotope and S/N)	Source Activity (dpm)	Instrument Reading (cpm)	4π Instrument Efficiency (%)
1 min. count	C-14 #4456	202,100	1 (α) 11,093 (ß)	0.00% 5.3%
1 min. count	Pm-147 #5381	20,382	1 (α) 2,098 (ß)	0.00% 8.7%
1 min. count	Tc-99 #D702	23,064	1 (α) 4,319 (ß)	0.00% 17.4%
1 min. count	Cs-137 #2886	19,191	1 (α) 6,453 (ß)	0.00% 31.9%
1 min. count	Cl-36 #D700	23,598	1 (α) 8,101 (ß)	0.00% 32.9%
1 min. count	Sr/Y-90 #D711	48,238	1 (α) 17,220 (ß)	0.00% 35.0%
1 min. count	Th-230 #91TH2200210	38,900	5,489 (α) 1,105 (ß)	14.1% 2.0%

RSA Laboratories ID# **4956**. Instrument indicates within ±10% of calibration points unless otherwise indicated. Source-to-detector entry window distance for efficiency determinations is 1 cm unless otherwise specified. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: **Paul R. Steinmeyer** Date 30 May 2001

Reviewed by: **David L. Judd** Date 30 MAY 2001



RSA Laboratories ID# 4956.

Calibrated by: **Paul R. Steinmeyer** Paul R. Steinmeyer Date 30 May 2001

Reviewed by: **David L. Judd** David L. Judd Date 30 MAY 2001

CERTIFICATE OF CALIBRATION
(COUNTER/SCALER)

RSA Laboratories, Inc.
19 Pendleton Drive, P.O. Box 61
Hebron, Connecticut 06248
(203) 228-0721 Fax (203) 228-4402

Customer and Contact: **Radiation Safety Associates, Inc. Attn: K. Paul Steinmeyer (860) 228-0487**
Customer Address: **P.O. Box 107, 19 Pendleton Drive, Hebron, CT 06248**

Inst. Mfr. & Model **Ludlum Model 2224**	Inst. Type **Scaler Ratemeter**	Inst. s/n **119803**
Det. Mfr. & Model **Ludlum Model 43-1-1**	Det. Type **Alpha/Beta Phoswich**	Det. s/n **166008**
Cal. Date **30 May 2001**	Due Date **30 November 2001**	Cal. Interval **6 months**

Environmental conditions: Temperature: **66°F** Relative Humidity **42%** Atmospheric Pressure **29.23** inches Hg
Pre-calibration Checks:

☒ Contamination survey	☒ Battery check	☐ Slow response check	
☒ Mechanical check	☒ Audio check	☒ Window operation	☒ Det. volts **675** Vdc
☒ Meter zero	☒ Reset check	☒ Plateau check	
☒ Geotropism check	☐ Fast response check	☐ Alarm set	☒ Input sens. *See comments

☒ Pulse generator s/n 94926 ☐ Oscilloscope s/n 171-04928 ☒ Voltmeter s/n 57410002
☒ HV Readout (2 points) Ref./Inst. **500** V/**500** V Ref./Inst. **1000** V/ **1000** V

Comments: *Alpha threshold =120 mV; Beta threshold = 4 mV; Beta window = 4 mV to 30 mV. Local background ≈ 1 cpm α, 261 cpm β.

S/N of source used for precision check **0210** Isotope **Th-230** Dedicated Source? ☐Yes ☒No
Reading #1 **5,413 cpm** Reading #2 **5,355 cpm** Reading #3 **5,451 cpm** Mean **5,406 cpm**
Precision: ☒ ± < 10% ☐ ± 10-20% ☐ Out of tolerance

Range Multiplier	Reference Calibration Point	Instrument Indication
x 1K	400,000 cpm	400,000 cpm
x 1K	100,000 cpm	100,000 cpm
x 100	40,000 cpm	40,000 cpm
x 100	10,000 cpm	10,000 cpm
x 10	4,000 cpm	4,000 cpm
x 10	1,000 cpm	1,000 cpm
x 1	400 cpm	400 cpm
x 1	100 cpm	100 cpm
1 min. x 1	5,000 cpm (5,000 counts)	5,003 counts

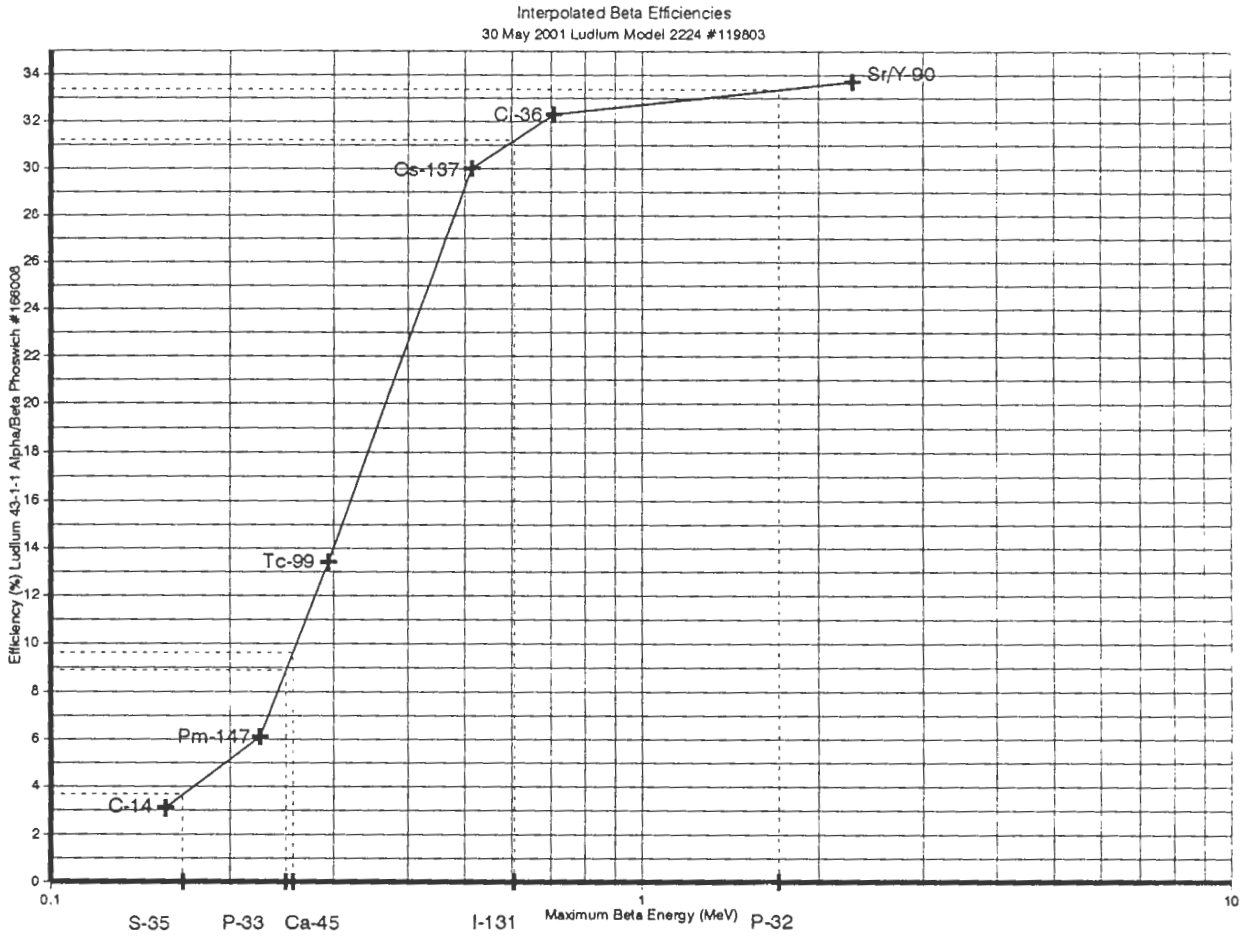
All ranges calibrated electronically.

Range Multiplier	Cal. Source Used (Isotope and S/N)	Source Activity (dpm)	Instrument Reading (cpm)	4π Instrument Efficiency (%)
1 min. count	C-14 #4456	202,100	1 (α) 6,611 (β)	0.00% 3.1%
1 min. count	Pm-147 #5381	20,382	1 (α) 1,495 (β)	0.00% 6.1%
1 min. count	Tc-99 #D702	23,064	1 (α) 3,357 (β)	0.00% 13.4%
1 min. count	Cs-137 #2886	19,191	1 (α) 6,021 (β)	0.00% 30.0%
1 min. count	Cl-36 #D700	23,598	1 (α) 7,884 (β)	0.00% 32.3%
1 min. count	Sr/Y-90 #D711	48,238	2 (α) 16,532 (β)	0.00% 33.7%
1 min. count	Th-230 #91TH2200210	38,900	5,211 (α) 1405 (β)	13.3% 2.9%

RSA Laboratories ID# 4955. Instrument indicates within ±10% of calibration points unless otherwise indicated. Source-to-detector entry window distance for efficiency determinations is 1 cm unless otherwise specified. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Paul R. Steinmeyer Paul R. Steinmeyer Date 30 May 2001

Reviewed by: David L. Judd David L. Judd Date 30 May 2001



RSA Laboratories ID# 4955.

Calibrated by: **Paul R. Steinmeyer** Paul R. S Date 30 May 2001

Reviewed by: **David L. Judd** Date 30 MAY 2001

Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER SENECA ARMY DEPOT ORDER NO. 249050/248464

Mfg. Ludlum Measurements, Inc. Model 2360 Serial No. 138256

Mfg. Ludlum Measurements, Inc. Model 43-37 Serial No. PR136498

Cal. Date 14-Nov-00 Cal Due Date 14-Nov-01 Cal. Interval 1 Year Meterface 202-855

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 76 °F RH 40 % Alt 692.8 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) _____ VDC

☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set 1675 V Input Sens. Comments mV Det. Oper. 1675 V at Comments mV Threshold Dial Ratio _____ = _____ mV

☑ HV Readout (2 points) Ref./Inst. 503 / 500 V Ref./Inst. 1500 / 1500 V

COMMENTS:

Firmware Version: 390105
Alpha Threshold: 100mV
Beta Threshold: 4mV
Beta Window: 40mV
Overload checked, but not set
Instrument calibrated with a 4' cable.
High voltage set with detector disconnected.

(EEPROM Settings:)
User Time: 002.5 min.
Alpha Alarms: 999999cpm
Beta Alarms: 999999cpm
A/B Alarms: 999999cpm
M2360 Date: 15/11/2000
Calibration Date: 15/11/2001

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	400kcpm	400	400
X1000	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*		REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	400kcpm	4040 (0)	4040 (0)	Log Scale			
	40kcpm	4005	4005				
	4kcpm	400	400				
	400cpm	40	40				
	40cpm	4	4				

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-196

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-3

☑ Alpha S/N Pu239#8743 ☑ Beta S/N Tc99#Ni-EV,Sr90Y90#4016 ☐ Other _____

☑ m 500 S/N 70648 ☐ Oscilloscope S/N _____ ☑ Multimeter S/N 61730074

Calibrated By: Louis M Martinez Date 15-Nov-00

Reviewed By: Brook Hanis Date 15Nov00

FORM C22A 12/29/1999

☐ Passed Dielectric (Hi-Pot) and Continuity Test

Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-37 Serial No. PR136498 Order #. 249050/248464

Customer SENECA ARMY DEPOT Alpha Input Sensitivity 100 mV

Counter 2360 Serial No. 138256 Beta Input Sensitivity 4 mV

Count Time 1Minute Beta Window 40 mV

Other _____ Distance Source to Detector surface

High Voltage	Background		Isotope Pu239 Size 128Kcpm		Isotope Tc99 Size 14.1Kcpm		Isotope Sr90/Y90 Size 47,426cpm	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
1625	3	444	4224	783	4	6720	7	15118
1650	1	543	4618	887	5	7611	4	18106
1675 ~~1670~~ (Em)	2	691	4877	993	12	7886	15	20758
1700	4	792	5033	1230	24	7578	82	22554

☐ Gas Proportional detector count rate decreased ≤ 10% after 15 hour static test using 39" cable.

☑ Gas proportional detector count rate decreased ≤ 10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature Louis M Martinez Date 15-Nov-00

FORM C48 12/09/97

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Bicron Micro-Rem, ser. No.: ... C252A
Submitted by: W0MGAA

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters. The measurements were performed under ambient conditions of approximately 20 degrees Celcius and 40 percent relative humidity. Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

The reference standard(s) for this calibration:
(1) J.L. Shepherd model 89-400 Self containied Gamma calibration range, Cs-137, 0.662 meV Gamma
(2) Eberline Model MP2 mini Pulser, serial number 434.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

T. E. DAVIS
LRSO
USATSC-Tobyhanna

CRAIG A. GREDLEIN
Chief, ACL
USATSC-Tobyhanna

Report Number W0MGAA-7011D
Calibration Date 20-Mar-01
Calibration Due 16-Sep-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Bicron Micro-Rem, Serial Number: C252A

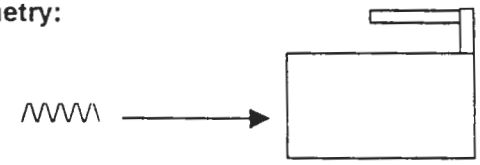
1. Basic performance data:

High Voltage (kV): ...	Window: ..... N/A
Sensitivity (mV):	Check Source:..... N/A
Batteries: ..... OK	

2. Gamma Detection - Radio Isotope: Cesium-137 (Cs-137)

Range	Applied (uR)	Pulser?	Initial Reading (uR)	Adjust (Y/N)	Final Reading (uR)	Efficiency	Avg. Efficiency
x0.1	4	Y	3.70	Y	3.8	0.95	0.98
	16	Y	15.5		16.0	1.00	
x1	40	Y	38.0	Y	40.0	1.00	1.00
	160	N	152		160	1.00	
x10	500	N	500	N	500	1.00	1.02
	1,500	N	1,550		1,550	1.03	
x100	5,000	N	4,700	N	4,700	0.94	0.97
	15,000	N	15,000		15,000	1.00	
x1000	50,000	N	49,000	N	49,000	0.98	0.99
	150,000	N	150,000		150,000	1.00	

3. Geometry:



Report Number W0MGAA-7011D
Calibration Date 20-Mar-01
Calibration Due 16-Sep-01

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Bicron Micro-Rem, ser. No.: ... C251A
Submitted by: W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters. The measurements were performed under ambient conditions of approximately 20 degrees Celcius and 40 percent relative humidity. Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

The reference standard(s) for this calibration:
(1) J.L. Shepherd model 89-400 Self containied Gamma calibration range, Cs-137, 0.662 meV Gamma
(2) Eberline Model MP2 mini Pulser, serial number 434.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

T. E. DAVIS
LRSO
USATSC-Tobyhanna

CRAIG A. GREDLEIN
Chief, ACL
USATSC-Tobyhanna

Report Number W9MG4G-7024D
Calibration Date 20-Mar-01
Calibration Due 16-Sep-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Bicron Micro-Rem, Serial Number: C251A

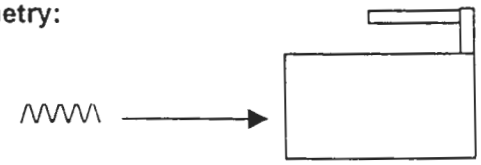
1. Basic performance data:

High Voltage (kV): ...	Window: ..... N/A
Sensitivity (mV):	Check Source:..... N/A
Batteries: ..... OK	

2. Gamma Detection - Radio Isotope: Cesium-137 (Cs-137)

Range	Applied (uR)	Pulser?	Initial Reading (uR)	Adjust (Y/N)	Final Reading (uR)	Efficiency	Avg. Efficiency
x0.1	4	Y	3.40	Y	3.6	0.90	0.98
	16	Y	16.1		16.8	1.05	
x1	40	Y	39.0	N	39.0	0.98	1.02
	160	N	169		169	1.06	
x10	500	N	440	Y	480	0.96	1.01
	1,500	N	1,450		1,580	1.05	
x100	5,000	N	4,300	Y	4,800	0.96	1.01
	15,000	N	14,300		15,800	1.05	
x1000	50,000	N	47,000	N	47,000	0.94	0.99
	150,000	N	156,000		156,000	1.04	

3. Geometry:



Report Number W9MG4G-7024D
Calibration Date 20-Mar-01
Calibration Due 16-Sep-01

Pancake

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Ludlum model 3, serial number: 61457
with 44-9 G-M detector, s/n: PR026657

Submitted by W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters.

The reference standard(s) for this calibration:
(1) J.L. Shepherd model 89-400 Self containied Gamma calibration range, Cs-137, 0.662 meV Gamma
(2) AN/UDM-6 Radiac Calibrator, Pu-239, 5.16 MeV Alpha.
(3) Ludlum model 500 Pulser, serial number 87219.

The measurements were performed under ambient conditions of approximately 20 degrees Celcius and 40 percent relative humidity.

Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

T. E. DAVIS
LRSO
USATSC-Tobyhanna

CRAIG A. GREDLEIN
Chief, ACL
USATSC-Tobyhanna

Report Number W0MG4G-7015D
Calibration Date 03-Apr-01
Calibration Due 30-Sep-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Ludlum model 3, serial number: 61457

Instrument Parameters:

High Voltage (kV) =	0.72	Batteries:	OK
Sensitivity (mV) =	26	Window:	fixed open
Check Source =	n/a		

Gamma Detection - Radio Isotope: Cesium-137 (Cs-137)

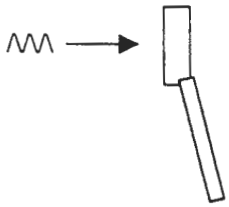
Range	Applied (mR)	Pulser?	Initial Reading (mR)	Adjust (Y/N)	Final Reading (mR)	Efficiency	Avg.Eff.
x 0.1	0.05	Y	0.058	Y	0.050	1.00	1.00
	0.15	Y	0.165		0.150	1.00	
x 1.0	0.5	N	0.600	Y	0.500	1.00	1.00
	1.5	N	1.70		1.50	1.00	
x 10	5	N	5.20	Y	5.10	1.02	1.01
	15	N	15.8		15.0	1.00	
x 100	50	N	60.0	Y	50.0	1.00	1.00
	150	N	170		150	1.00	

Alpha Detection - Radio Isotope: Plutonium-239 (Pu-239)

Range	Applied (cpm)	Pulser?	Initial Reading (cpm)	Adjust (Y/N)	Final Reading (cpm)	Efficiency	Avg.Eff.
x 0.1	516	N	110	N	110	0.21	0.20
	1,359	N	250		250	0.18	
x 1.0	5,900	N	1,000	N	1,000	0.17	0.17
	15,527	N	2,600		2,600	0.17	
x 10	62,342	N	13,000	N	13,000	0.21	0.20
	164,058	N	31,000		31,000	0.19	
x 100	564,099	N	95,000	N	95,000	0.17	0.14
	1,484,472	N	175,000		175,000	0.12	

NOTE: Do not use for quantitive Alpha measurements.

Geometry:



Report Number W0MG4G-7015D
Calibration Date ... 03-Apr-01
Calibration Due 30-Sep-01

U. S. ARMY TMDE SUPPORT CENTER
ATTN: AMSAM-TMD-A-T
11 HAP ARNOLD BLVD
TOBYHANNA, PA 18466-5104

Area Secondary Nucleonics Laboratory
Report of Calibration for
Radiac Set/Survey Meter

Ludlum model 3, ser. no.: 61390
with 44-9 detector, ser. no.: PR019247

Submitted by W0MG4G

This instrument was calibrated in accordance with TB9-6665-285-15, Army Calibration Program for Radiac Meters.

The reference standards for this calibration are:
(1) J.L. Shepherd model 89-400 Self containied Gamma calibration range, Cs-137, 0.662 meV Gamma
(2) AN/UDM-6 Radiac Calibrator, Pu-239, 5.16 MeV Alpha.
(3) Ludlum model 500 Pulser, serial number 87219.

The measurements were performed under ambient conditions of approximately 20 degrees Celcius and 40 percent relative humidity.

Calibration uncertainty, including measurement errors and accuracy of reference standards, is estimated to be +/- 10%.

This calibration is traceable to and compatible with National Institute of Standards and Technology (NIST) measurements.

T. E. DAVIS
LRSO
USATSC-Tobyhanna

CRAIG A. GREDLEIN
Chief, ACL
USATSC-Tobyhanna

Report Number W0MG4G-7017D
Calibration Date 30-Jan-01
Calibration Due 29-Jul-01

Phone numbers:
DSN 795-7820/7255
Comm (570) 895-7820/7255

Ludlum model 3, serial number: 61390

Instrument Parameters:

High Voltage = 0.90 kV	Batteries: ok
Sensitivity = 24 mV	Window: fixed open
Check Source = n/a	

Gamma Detection - Radio Isotope: Cesium-137 (Cs-137)

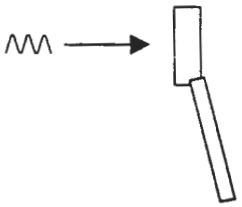
Range	Applied (mR)	Pulser?	Initial Reading	Adjust (Y/N)	Final Reading	Corr. Factor	Avg C.F.
x 0.1	0.05	Y	0.052	N	0.052	0.96	0.98
	0.15	Y	0.150		0.150	1.00	
x 1.0	0.5	N	0.52	N	0.52	0.96	0.98
	1.5	N	1.50		1.50	1.00	
x 10	5	N	5.2	N	5.2	0.96	0.99
	15	N	14.7		14.7	1.02	
x 100	50	N	50	N	50	1.00	0.94
	150	N	170		170	0.88	

Alpha Detection - Radio Isotope: Plutonium-239 (Pu-239)

Range	Applied (cpm)	Pulser?	Initial Reading (cpm)	Adjust (Y/N)	Final Reading (cpm)	Alpha Efficiency (%)	Avg. Efficiency (%)
x 0.1	516	N	110	N	110	21	19
	1,359	N	240		240	18	
x 1.0	5,900	N	1,100	N	1,100	19	17
	15,527	N	2,500		2,500	16	
x 10	62,342	N	12,000	N	12,000	19	18
	164,058	N	28,000		28,000	17	
x 100	564,099	N	90,000	N	90,000	16	13
	1,484,472	N	150,000		150,000	10	

NOTE: Do not use for quantitive Alpha measurements.

Geometry:



Report Number W0MG4G-7017D
Calibration Date 30-Jan-01
Calibration Due 29-Jul-01

APPENDIX N

Instrument Source Check Sheets(by Instrument)- Phase II

Instrument Type	***Serial Number***
FIDLER	*A945P*
FIDLER	*A954P*
FIDLER	*A968P*
FIDLER	*A951P*
FIDLER	*A983P*
Phoswich	*119815*
Phoswich	*119803*
Floor Monitor	*138256*
Micro Rem	*C252A*
Micro Rem	*C251A*
Pancake	*61457*
Pancake	*61390*

SENECA ARMY DEPOT
SEAD-12 RI/FS
6/5/01

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 1 of 59	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A945P	A945P
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Probe:	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A365Q	A365Q
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	8920
Source emission rate	254925 dpm	~~254925~~ 710400 dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.20%	~~0.50%~~
2 Sigma Range	766-879	4650-7721
3 Sigma Range	738-907	3882-8488

710400
R mm
7/27/01

PARSONS MAIN, INC.

A945 P – Ch. 1

PARSONS

CLIENT _____ JOB NO. _____ SHEET 2 OF 59

SUBJECT INITIAL FUNCTION CHECKS BY JRH/AMC DATE 06/04/01

06/05/01

CKD. _____ REVISION _____

Erin

INSTRUMENT: A945P FIDLER 2:45 PM

S/N: A945P – SET w/ SMALL WINDOW

Ch. 1

BACKGROUND

1	338	
2	344	
3	299	
4	298	Floor
5	393	
6	392	
7	386	
8	354	
9	287	
10	332	
11	519	
12	409	
13	236	
14	311	
15	301	

Avg = 346.6

σ = 18.6

SOURCE 6/5/01 0910

TYPE: Am-241

S/N: 8920

1	505
2	518
3	528
4	537
5	524
6	544
7	551
8	530
9	538
10	533
11	499
12	536
13	512
14	537
15	497

Bat = OK

HV = OK

Avg. = 526

σ = 23

- source upside down - no good. redo 6/6/01

JIG Background 6/5/01 08:40

1	272	9	284
2	312	10	305
3	301	11	354
4	306	12	325
5	308	13	318
6	291	14	296
7	324	15	293
8	302		

Avg = 306

σ = 17

PARSONS MAIN, INC.

A945P- OUT

PARSONS

CLIENT _____ JOB NO. _____ SHEET 3 OF 59

SUBJECT INITIAL FUNCTION CHECKS BY JRH/AHL DATE 6/4/01 6/5/01

CKD. _____ REVISION _____

ERH

INSTRUMENT: FIDLER
S/N: A945P

3:00 PM
BATTERY: OK

BACKGROUND - OUT CH.

1	5640	
2	5213	
3	5965	
4	5836	FLOOR
5	6531	
6	7671	
7	6432	
8	6082	
9	4536	
10	5838	
11	8148	
12	5656	
13	4552	
14	8271	
15	4949	

Avg = 6088

σ = 78.03

SOURCE TYPE: Am-241
6/5/01 0910 S/N: 8926

1	5336
2	5577
3	5440
4	5683
5	5515
6	5445
7	5480
8	5504
9	5225
10	5473
11	5437
12	5462
13	5496
14	5439
15	5543

Bat = OK
HV = OK

Avg = 5466 - no good.
σ = 74
source ups. Redown
redo 6/6/01

JIG Background 06/05/01 08:40

1	5020	9	5126
2	4981	10	5179
3	4972	11	5198
4	4988	12	5108
5	4947	13	4998
6	4970	14	4958
7	5070	15	5018
8	4863		

Avg = 5026
σ = 71

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET 4 OF 59

SUBJECT Initial Function Check BY AMC DATE 6/6/01

Weather: Sunny ~50°F CKD. _____ REVISION 0800-0830

Instrument: FIDLER A945P Source Am-241

② Redo on source check with type-side down S/N: 8920

Ch. 1		Ch. 1 Out	
1	839	1	6091
2	838	2	6143
3	832	3	6094
4	800	4	6037
5	797	5	5841
6	850	6	5944
7	829	7	5967
8	849	8	5944
9	836	9	5881
10	804	10	5954
11	860	11	5939
12	789	12	5946
13	837	13	5937
14	827	14	5994
15	755	15	6060
Avg =	823	Avg =	5985
σ =	29	σ =	77

FIDLER Serial Number A945P/A378Q

DATE: 6/5/01	PAGE 5 OF 59		
Source	~~Am-241~~		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	~~8920~~		
Source emission rate	254925 dpm		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage	1.08	1.08	
Battery Check	initial fx check done in morning		
Source Check Reading (1)			KLK
Source Check Reading (2)			
Source Check Reading (3)		KLK collected	
Source Check Reading (4)			
Source Check Reading (5)			
Source Check Reading (AVERAGE)			
Direct Background reading (1)	initial fx check	done in morning	
Direct Background reading (2)			
Direct Background reading (3)			KLK
Direct Background reading (4)		KLK collected	
Direct Background reading (5)			
Direct Background reading (AVERAGE)			
Efficiency = (CPM-Background) / DPM			KLK
MID-DAY SOURCE READING	not used in morning		KLK
MID-DAY BACKGROUND READING	not used in morning		
EVENING SOURCE READING	524		Not used in afternoon
EVENING BACKGROUND READING	296	5068	
Morning check performed by			
Mid-day check performed by			KLK
Evening check performed by	JRH	JRH	MA

FIDLER Serial Number A945P/A378Q

DATE: 6/6/01 0855	PAGE 6 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.1	1.1	
Battery Check	OK	OK	
Source Check Reading (1)			
Source Check Reading (2)			
Source Check Reading (3)			
Source Check Reading (4)			
Source Check Reading (5)			
Source Check Reading (AVERAGE)			
Direct Background reading (1)	319	5049	
Direct Background reading (2)	312	5044	
Direct Background reading (3)	330	5038	
Direct Background reading (4)	267	5065	
Direct Background reading (5)	318	5055	
Direct Background reading (AVERAGE)	309	5050	
Efficiency = (CPM-Background) / DPM			
MID-DAY SOURCE READING	766	5988	
MID-DAY BACKGROUND READING	295	4981	
EVENING SOURCE READING	EM ~~817~~	EM ~~5856~~	
EVENING BACKGROUND READING	292	5112	
Morning check performed by	ALove	ALove	
Mid-day check performed by	ALove	ALove	
Evening check performed by	EKM	EKM	

1250

if ipd fx check done in morning FK

FK

FK

BAT-OK HV = 1.1

FIDLER Serial Number A945P/A378Q

DATE: 6-7-01	PAGE 7 OF 59		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for Ch 1		710400 dpm for out
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.0 EM	1.0	
Battery Check	OK	OK	
Source Check Reading (1)	872	6239	
Source Check Reading (2)	832	6153	
Source Check Reading (3)	794	6019	
Source Check Reading (4)	865	6284	
Source Check Reading (5)	811	6130	
Source Check Reading (AVERAGE)	835	6165	
Direct Background reading (1)	267	5313	
Direct Background reading (2)	330	5195	
Direct Background reading (3)	286	5176	
Direct Background reading (4)	333	5252	
Direct Background reading (5)	321	5200	
Direct Background reading (AVERAGE)	307	5227	
Efficiency = (CPM-Background) / DPM	0.21%	~~0.37%~~	0.13% EM 7/27/01
MID-DAY SOURCE READING	785	5965	
MID-DAY BACKGROUND READING	296	EM ~~5154~~	
EVENING SOURCE READING	EM ~~745~~	EM ~~6006~~	
EVENING BACKGROUND READING	296	5014	
8:00AM Morning check performed by	EKM	EKM	
12:48PM Mid-day check performed by	EKM	EKM	
6:10pm Evening check performed by	EKM	EKM	

FIDLER Serial Number A945P/A378Q

DATE: 6-8-01	PAGE 8 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920	channel 1	
Source emission rate	254925 dpm ←	710400 for out	
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage	1.1	1.1	
Battery Check	OK	OK	
Source Check Reading (1)		6290	
Source Check Reading (2)		6209	EWK
Source Check Reading (3)		6045	
Source Check Reading (4)	EWK	6165	
Source Check Reading (5)		6237	
Source Check Reading (AVERAGE)		6189	
Direct Background reading (1)		5248	
Direct Background reading (2)		5121	
Direct Background reading (3)		5189	EWK
Direct Background reading (4)		5137	
Direct Background reading (5)		5073	
Direct Background reading (AVERAGE)		5154	
Efficiency = (CPM-Background) / DPM		~~0.117.~~ ← 0.15%	em 7/27/01
MID-DAY SOURCE READING		6034	
MID-DAY BACKGROUND READING		4923	
EVENING SOURCE READING		6021	
EVENING BACKGROUND READING		5113	EWK
7:40 am Morning check performed by		EKM	
12:30pm Mid-day check performed by		EKM	
1820 Evening check performed by		JRH	

FIDLER Serial Number A945P/A378Q

DATE: 6-9-01	PAGE 9 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920		
Source emission rate	254925 dpm for ch 1 710490 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		OK	
Source Check Reading (1)		6221	
Source Check Reading (2)		6180	
Source Check Reading (3)		6246	
Source Check Reading (4)		6236	
Source Check Reading (5)		6090	
Source Check Reading (AVERAGE)		6195	
Direct Background reading (1)		5216	
Direct Background reading (2)		5151	
Direct Background reading (3)		5158	
Direct Background reading (4)		5195	
Direct Background reading (5)		5054	
Direct Background reading (AVERAGE)		5155	
Efficiency = (CPM-Background) / DPM		~~0.41%~~ ← 0.15%	
MID-DAY SOURCE READING		6008	
MID-DAY BACKGROUND READING		5081	
EVENING SOURCE READING		5869	
EVENING BACKGROUND READING		5031	
0720 Morning check performed by		EKM	
1240 Mid-day check performed by		EKM	
1640 Evening check performed by		EKM	

RM 7/27/01

FIDLER Serial Number A945P/A378Q

DATE: 6-10-01 (VEH)		PAGE 10 OF 59	
Source		Am-241	
Calibration Date		1/0/1900	
Out of Cal Date		1/0/1900	
Serial Number		8920	
Source emission rate		254925 dpm for CH1	710400 for out
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		OK	
Source Check Reading (1)		6266	
Source Check Reading (2)		6225	
Source Check Reading (3)		6200	
Source Check Reading (4)		6176	
Source Check Reading (5)		6253	
Source Check Reading (AVERAGE)		6224	
Direct Background reading (1)		5276	
Direct Background reading (2)		5128	
Direct Background reading (3)		5160	
Direct Background reading (4)		5217	
Direct Background reading (5)		5198	
Direct Background reading (AVERAGE)		5196	
Efficiency = (CPM-Background) / DPM		0.40 %	0.14 %
MID-DAY SOURCE READING		6002	
MID-DAY BACKGROUND READING		5014	
EVENING SOURCE READING		5887	
EVENING BACKGROUND READING		4997	
0750 Morning check performed by		EKM	
1230 Mid-day check performed by		VEH	
1700 Evening check performed by		EKM	

Bm 7/27/01

Bat OK HV 1.08

Bat OK HV 1.1

FIDLER Serial Number A945P/A378Q

DATE: 6/11/01	PAGE 11 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920		for Ch 4
Source emission rate	254925 dpm		710 400 for out
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	ok	ok	
Source Check Reading (1)	841	6741	KMK
Source Check Reading (2)	847	6839	
Source Check Reading (3)	862	6854	
Source Check Reading (4)	820	6700	
Source Check Reading (5)	821	6688	
Source Check Reading (AVERAGE)	838.2	6764.4	
Direct Background reading (1)	338	5629	
Direct Background reading (2)	371	5656	
Direct Background reading (3)	314	5544	KMK
Direct Background reading (4)	351	5521	
Direct Background reading (5)	356	5775	
Direct Background reading (AVERAGE)	346	5625	
Efficiency = (CPM-Background) / DPM	0.19 %	~~0.45 %~~	0.16 % Rsm 7/27/01
MID-DAY SOURCE READING	Not used in AM		
MID-DAY BACKGROUND READING			
EVENING SOURCE READING	799	6204	KMK
EVENING BACKGROUND READING	324	5023	
0755 Morning check performed by	JKH	JKH	
Mid-day check performed by	Not used in AM		
1845 Evening check performed by	EKM	EKM	

checking 1x per week (Monday)

~~6/5/01~~ 6/12/01 JC4

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 12 of 59	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A945P	A945P
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Probe	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A365Q	A365Q
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	8920
Source emission rate	254925 dpm	~~254925~~ dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.20%	0.50%
2 Sigma Range	766-879	5817-6154
3 Sigma Range	738-907	5732-6238

710450
RM
7/27/01

Instrument: A945P Fidler TIME 1730
S/N: A945P - Out

Overcast, humid, ~ 70°F

Background

1	5162
2	5281
3	5132
4	5142
5	5163
6	5046
7	5253
8	5127
9	5153
10	5025
11	5234
12	5042
13	5136
14	5135
15	5029

Avg = 5137
σ = 72

Source Type: Am-241 S/N: 8920

1	6123	11	6370
2	6256	12	6128
3	6523	13	6046
4	6111	14	6045
5	6135	15	6127
6	6131		
7	6239		
8	6059		
9	6091		
10	6203		

Avg = 6172

FIDLER Serial Number A945P/A378Q

DATE: 4/12/01	PAGE 14 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920 for ch 1		
Source emission rate	254925 dpm 7(2925) for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		ok	
Battery Check		1.1	
Source Check Reading (1)		6322	
Source Check Reading (2)		6200	
Source Check Reading (3)		6269	
Source Check Reading (4)		6226	
Source Check Reading (5)		6074	
Source Check Reading (AVERAGE)		6218	
Direct Background reading (1)		5259	
Direct Background reading (2)		5261	
Direct Background reading (3)		5206	
Direct Background reading (4)		5125	
Direct Background reading (5)		5241	
Direct Background reading (AVERAGE)		5218	
Efficiency = (CPM-Background) / DPM		~~0.39%~~ 0.14 %	EM 7/27/01
MID-DAY SOURCE READING		6044	
MID-DAY BACKGROUND READING		5198	
EVENING SOURCE READING		6183	
EVENING BACKGROUND READING		5171	
0745 Morning check performed by		EKM	
1220 Mid-day check performed by		EKM	
1705 Evening check performed by		EKM	

FIDLER Serial Number A945P/A378Q

DATE: 6/13/01	PAGE 15 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920		
Source emission rate	254925 dpm for ch1 7/04/01		for out
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		OK	
Source Check Reading (1)		6472	
Source Check Reading (2)		6350	
Source Check Reading (3)		6363	
Source Check Reading (4)		6220	
Source Check Reading (5)		6222	
Source Check Reading (AVERAGE)		6325	
Direct Background reading (1)		5206	
Direct Background reading (2)		5414	
Direct Background reading (3)		5355	
Direct Background reading (4)		5346	
Direct Background reading (5)		5378	
Direct Background reading (AVERAGE)		5340	
Efficiency = (CPM-Background) / DPM		~~0.38 %~~ ← 0.14 %	RM 7/27/01
MID-DAY SOURCE READING		not used in AM	
MID-DAY BACKGROUND READING		NA →	
EVENING SOURCE READING		not used in PM	
EVENING BACKGROUND READING		NA →	
Morning check performed by		JRH 0650	
Mid-day check performed by		NA	
Evening check performed by		NA	

FIDLER Serial Number A945P/A378Q

DATE: 6-18-01	PAGE 16 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920		
Source emission rate	254925 dpm for Ch1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.1	→	→
Battery Check	OK	→	→
Source Check Reading (1)		6208	
Source Check Reading (2)		6175	
Source Check Reading (3)		6224	
Source Check Reading (4)		6208	
Source Check Reading (5)		6124	
Source Check Reading (AVERAGE)		6187.8	
Direct Background reading (1)		5036	
Direct Background reading (2)		5148	
Direct Background reading (3)		5224	
Direct Background reading (4)		5277	
Direct Background reading (5)		5300	
Direct Background reading (AVERAGE)		5197	
Efficiency = (CPM-Background) / DPM	N/A	~~0.1980~~	0.14 % Rom 7/27/01
MID-DAY SOURCE READING		Not used in AM	
MID-DAY BACKGROUND READING		Not used in	AM
EVENING SOURCE READING		6088	
EVENING BACKGROUND READING		5082	
Morning check performed by	JRH		
Mid-day check performed by		JRH 1720	
Evening check performed by		~~JRH~~	

FIDLER Serial Number A945P/A378Q

DATE: 6/19/01	PAGE 17 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920 for ch1		
Source emission rate	254925 dpm	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		ok 1.08	
Battery Check		~~1.00~~ ok	
Source Check Reading (1)		6272	
Source Check Reading (2)		6181	
Source Check Reading (3)		6375	
Source Check Reading (4)		6100	
Source Check Reading (5)		6160	
Source Check Reading (AVERAGE)		6218	within 3σ ck
Direct Background reading (1)		5329	
Direct Background reading (2)		5278	
Direct Background reading (3)		5290	
Direct Background reading (4)		5316	
Direct Background reading (5)		5210	
Direct Background reading (AVERAGE)		5285	
Efficiency = (CPM-Background) / DPM	N/A	~~0.37~~	0.13 % Rm 7/27/01
MID-DAY SOURCE READING		~~6237~~ 6080 JRH	~~within 3σ~~ JRH
MID-DAY BACKGROUND READING		5247	JRH NA
EVENING SOURCE READING		6204	JRH 3σ
EVENING BACKGROUND READING		5152	NA
Morning check performed by		JRH 0700	
Mid-day check performed by		JRH 1230	
Evening check performed by		JRH 1700	

SENECA ARMY DEPOT
SEAD-12 RI/FS
~~6-12-01~~ front
6/20/01 JEH

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 18 of 59	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A945P	A945P
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Probe:	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A365Q	A365Q
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	8920
Source emission rate	254925 dpm	~~254925~~ dpm 710400
Instrument Channel	Channel 1	Out RM
instrument efficiency	0.20%	0.50% 7/27/01
2 Sigma Range	766-879	5791-6367
3 Sigma Range	738-907	5647-6511

wrong EU

FIDLER Serial Number A945P/A378Q

DATE: 6/20/01	PAGE 19 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920 for ch1		
Source emission rate	254925 dpm	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)		6259	
Source Check Reading (2)		6157	
Source Check Reading (3)		6168	
Source Check Reading (4)		6291	
Source Check Reading (5)		6148	
Source Check Reading (AVERAGE)		6205	
Direct Background reading (1)		5181	
Direct Background reading (2)		5164	
Direct Background reading (3)		5336	
Direct Background reading (4)		5172	
Direct Background reading (5)		5256	
Direct Background reading (AVERAGE)		5222	
Efficiency = (CPM-Background) / DPM	NA	~~0.3876~~	0.14 %
MID-DAY SOURCE READING		6092	
MID-DAY BACKGROUND READING		5254	
EVENING SOURCE READING		6017	
EVENING BACKGROUND READING		4905	
Morning check performed by		JRH 0730	
Mid-day check performed by		JRH 1211	
Evening check performed by		JRH 1735	

RM 7/27/01

Midday battery low so it was changed

FIDLER Serial Number A945P/A378Q

DATE: 6/21/01	PAGE 20 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920		
Source emission rate	254925 dpm for Ch 1	71040 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		Ok	
Source Check Reading (1)		6151	
Source Check Reading (2)		6202	
Source Check Reading (3)		6124	
Source Check Reading (4)		6135	
Source Check Reading (5)		6301	
Source Check Reading (AVERAGE)		6183	
Direct Background reading (1)		5221	
Direct Background reading (2)		5297	
Direct Background reading (3)		5182	
Direct Background reading (4)		5189	
Direct Background reading (5)		5184	
Direct Background reading (AVERAGE)		5215	
Efficiency = (CPM-Background) / DPM		~~2.38%~~	0.14 % RDM 7/27/01
MID-DAY SOURCE READING	RDM	5281	
MID-DAY BACKGROUND READING	RDM	~~5281~~ 6349	
EVENING SOURCE READING		~~6349~~ 6081	
EVENING BACKGROUND READING		5840	
Morning check performed by		0725 RDM	
Mid-day check performed by		1245 KKS	
Evening check performed by		JRH 1730	

FIDLER Serial Number A945P/A378Q

DATE: 6/22/01	PAGE 21 OF 59		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920		
Source emission rate	254925 dpm for Ch 1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)		6187	
Source Check Reading (2)		6182	
Source Check Reading (3)		6231	
Source Check Reading (4)		6322	
Source Check Reading (5)		6246	
Source Check Reading (AVERAGE)		6234	
Direct Background reading (1)		5243	
Direct Background reading (2)		5163	
Direct Background reading (3)		5307	
Direct Background reading (4)		5120	
Direct Background reading (5)		5208	
Direct Background reading (AVERAGE)		5208	
Efficiency = (CPM-Background) / DPM	NA	~~0.40%~~	0.14%
MID-DAY SOURCE READING		6225	
MID-DAY BACKGROUND READING		5085	
EVENING SOURCE READING		6414	
EVENING BACKGROUND READING		5349	
Morning check performed by		JRH 0730	
Mid-day check performed by		KKS 1230	
Evening check performed by		JRH 1725	

Rom 7/27/01

within 3σ - check in morning

A945P

FIDLER Serial Number ~~A968P/A367Q~~ → kh

DATE: 6/23/01	PAGE 22 OF 59		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm for Ch1		710402 for Ch2
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)		6526	
Source Check Reading (2)		6518	
Source Check Reading (3)		6522	
Source Check Reading (4)		6598	
Source Check Reading (5)		6531	
Source Check Reading (AVERAGE)		6539	
Direct Background reading (1)		5497	
Direct Background reading (2)		5527	
Direct Background reading (3)		5548	
Direct Background reading (4)		5628	
Direct Background reading (5)		5654	
Direct Background reading (AVERAGE)		5571	
Efficiency = (CPM-Background) / DPM	NA	~~0.38 %~~ 0.14 %	from 7/27/01
MID-DAY SOURCE READING		6465	
MID-DAY BACKGROUND READING		5333	
EVENING SOURCE READING		6342	
EVENING BACKGROUND READING		5049	
Morning check performed by		JRH 0827	
Mid-day check performed by		JRH 1217	
Evening check performed by		JRH 1620	

FIDLER Serial Number ~~A968P/A367Q~~ A945P KK

DATE: 6/24/01	PAGE 23 OF 59		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm for Ch1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)		JRH ~~5T~~ 6206	
Source Check Reading (2)		6248	
Source Check Reading (3)		6070	
Source Check Reading (4)		JRH ~~6275~~ 6275	
Source Check Reading (5)		6320	
Source Check Reading (AVERAGE)		6224	
Direct Background reading (1)		5115	
Direct Background reading (2)		5309	
Direct Background reading (3)		5038	
Direct Background reading (4)		5164	
Direct Background reading (5)		5126	
Direct Background reading (AVERAGE)		5150	
Efficiency = (CPM-Background) / DPM	N/A	~~0.42~~ %	0.15%
MID-DAY SOURCE READING		6175	
MID-DAY BACKGROUND READING		5165	
EVENING SOURCE READING		6014	
EVENING BACKGROUND READING		5090	
Morning check performed by		JRH 0750	
Mid-day check performed by		JRH 1205	
Evening check performed by		KK 1530	

dpm 7/27/01

FIDLER Serial Number A945P/A378Q

DATE: 6/25/01	PAGE 24 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm for Ch 1 / 210403 for Ch 2		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		ok	
Source Check Reading (1)		6031	
Source Check Reading (2)		6096	
Source Check Reading (3)		6230	
Source Check Reading (4)		6230	
Source Check Reading (5)		6262	
Source Check Reading (AVERAGE)		6169.8	
Direct Background reading (1)	5126 OUT		
Direct Background reading (2)	5019 OUT		
Direct Background reading (3)	5180 OUT		
Direct Background reading (4)	5093 OUT		
Direct Background reading (5)	5129 OUT		
Direct Background reading (AVERAGE)	5109.4 OUT		
Efficiency = (CPM-Background) / DPM	~~0.41%~~	0.15%	RM 7/27/01
MID-DAY SOURCE READING	~~6115~~ KLC	6115	
MID-DAY BACKGROUND READING	~~5100~~ KLC	5100	
EVENING SOURCE READING	NA	6027	
EVENING BACKGROUND READING	NA	5052	
Morning check performed by	KLK 0800		
Mid-day check performed by	JMK 1249		
Evening check performed by	KLK 1730		

FIDLER Serial Number A945P/A378Q

DATE: 6/26/01	PAGE 25 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm	for Ch 1 710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		OK	
Source Check Reading (1)		6031	
Source Check Reading (2)	KLH	6135	
Source Check Reading (3)		6068	
Source Check Reading (4)		6043	
Source Check Reading (5)		6096	
Source Check Reading (AVERAGE)		6074	
Direct Background reading (1)	5162 OUT		
Direct Background reading (2)	5166		
Direct Background reading (3)	5066		
Direct Background reading (4)	5091		
Direct Background reading (5)	5042		
Direct Background reading (AVERAGE)	~~5105~~ 5105		
Efficiency = (CPM-Background) / DPM	0.14%	~~0.38%~~ NA	
MID-DAY SOURCE READING		6261	
MID-DAY BACKGROUND READING		5086	
EVENING SOURCE READING		6173	
EVENING BACKGROUND READING		4801	
Morning check performed by Sunny 65°F	KLH 0730		
Mid-day check performed by	Rom 12:10p		
Evening check performed by	JRH 1744		

Dm 7/27/01

FIDLER Serial Number A945P/A378Q

DATE: 6/27/01	PAGE 26 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm for Ch 1	710400 for OUT	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.04	
Battery Check		ok	
Source Check Reading (1)		6356	
Source Check Reading (2)		6202	
Source Check Reading (3)		6331	
Source Check Reading (4)		6306	
Source Check Reading (5)		6225	
Source Check Reading (AVERAGE)		6284	
Direct Background reading (1)	4972 OUT		
Direct Background reading (2)	5178		
Direct Background reading (3)	5141		
Direct Background reading (4)	5216		
Direct Background reading (5)	5168		
Direct Background reading (AVERAGE)	5135		
Efficiency = (CPM-Background) / DPM	~~0.45%~~	0.16%	RM 7/27/01
MID-DAY SOURCE READING	6206 OUT		
MID-DAY BACKGROUND READING	5161		
EVENING SOURCE READING	6131		
EVENING BACKGROUND READING	5083		
Morning check performed by	RDM 07:30 Sunny, 70°		
Mid-day check performed by	AML 1230 Sunny 78°		
Evening check performed by	JMK 1739		

FIDLER Serial Number A945P/A378Q

DATE: 6/28/01	PAGE 27 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch 1		
Source emission rate	254925 dpm	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.0e	
Battery Check		ok	
Source Check Reading (1)		6515	
Source Check Reading (2)		6467	
Source Check Reading (3)		6413	
Source Check Reading (4)		6342	
Source Check Reading (5)		6279	
Source Check Reading (AVERAGE)		6403	ok
Direct Background reading (1)	5446 OUT		
Direct Background reading (2)	5277		
Direct Background reading (3)	5304		
Direct Background reading (4)	5254		
Direct Background reading (5)	5151		
Direct Background reading (AVERAGE)	5286		
Efficiency = (CPM-Background) / DPM	0.16%	NA	em 7/27/01
MID-DAY SOURCE READING	6104		
MID-DAY BACKGROUND READING	5152		
EVENING SOURCE READING		6150	
EVENING BACKGROUND READING		5173	
Morning check performed by sunny hazy 72°	JRH 0725		
Mid-day check performed by	JRH 1220		
Evening check performed by	Rom 05:34p		

FIDLER Serial Number A945P/A378Q

DATE: 6/29/01	PAGE 28 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch 1		
Source emission rate	254925 dpm	7/2430 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)	FW	6228	
Source Check Reading (2)		6162	
Source Check Reading (3)		6349	
Source Check Reading (4)		6338	
Source Check Reading (5)		6236	
Source Check Reading (AVERAGE)		6263	
Direct Background reading (1)	5191 out		
Direct Background reading (2)	5257		
Direct Background reading (3)	5245		
Direct Background reading (4)	5184		
Direct Background reading (5)	5344		
Direct Background reading (AVERAGE)	5244		
Efficiency = (CPM-Background) / DPM	~~0.1470~~	0.14%	Rm 7/27/01
MID-DAY SOURCE READING	6378		
MID-DAY BACKGROUND READING	5224	FW	
EVENING SOURCE READING	6093		
EVENING BACKGROUND READING	5267		
Morning check performed by	Rm 07:55a Hazy 70°		
Mid-day check performed by	AML 1130 Hazy 72°		
Evening check performed by	JRH 1540		

FIDLER Serial Number A945P/A378Q

DATE: 7/9/01	PAGE 29 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm for Ch 1	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		~~625~~ 1.08	
Battery Check		ok	
Source Check Reading (1)		6251	
Source Check Reading (2)		6275	
Source Check Reading (3)		6261	
Source Check Reading (4)		6246	
Source Check Reading (5)		6225	
Source Check Reading (AVERAGE)		6252	
Direct Background reading (1)	5357 out		
Direct Background reading (2)	5338		
Direct Background reading (3)	5377		
Direct Background reading (4)	5295		
Direct Background reading (5)	5236		
Direct Background reading (AVERAGE)	5321		
Efficiency = (CPM-Background) / DPM	0.13%	N/A	DM 7/27/01
MID-DAY SOURCE READING	Not Used In	AM	
MID-DAY BACKGROUND READING			
EVENING SOURCE READING		6138	
EVENING BACKGROUND READING		5272	
Morning check performed by 70°F sunny	JEH 0715		
Mid-day check performed by Not used in	AM JEH		
Evening check performed by	JEH 1752		

FIDLER Serial Number A945P/A378Q

DATE: 7/10/01	PAGE 30 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch 1		
Source emission rate	254925 dpm	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)		6294	
Source Check Reading (2)	EWL	6249	
Source Check Reading (3)		6366	
Source Check Reading (4)		6319	
Source Check Reading (5)		6323	
Source Check Reading (AVERAGE)		6310	
Direct Background reading (1)	5295 out		
Direct Background reading (2)	5143		
Direct Background reading (3)	5262		
Direct Background reading (4)	4971		
Direct Background reading (5)	5061		
Direct Background reading (AVERAGE)	5154		
Efficiency = (CPM-Background) / DPM	0.1620	~~0.145~~ %	RDM 7/27/01
MID-DAY SOURCE READING	NOT USED IN AM - JRH		
MID-DAY BACKGROUND READING			
EVENING SOURCE READING	EWL	6121	
EVENING BACKGROUND READING		5079	
Morning check performed by 65°F thund	JRH 0700		
Mid-day check performed by Not used in	AM		
Evening check performed by	JRH 1740		

FIDLER Serial Number A945P/A378Q

DATE: 7/11/01	PAGE 31 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch 1		
Source emission rate	254925 dpm	7.0420 for out	
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.1	
Battery Check		ok	
Source Check Reading (1)		6275	
Source Check Reading (2)		6171	
Source Check Reading (3)		6195	
Source Check Reading (4)		6162	
Source Check Reading (5)		6289	
Source Check Reading (AVERAGE)		6218	
Direct Background reading (1)	5036 OUT		
Direct Background reading (2)	5136		
Direct Background reading (3)	5067		
Direct Background reading (4)	5161		
Direct Background reading (5)	4916		
Direct Background reading (AVERAGE)	5063		
Efficiency = (CPM-Background) / DPM	~~2.45 %~~	0.16%	
MID-DAY SOURCE READING	~~5040~~	6315	
MID-DAY BACKGROUND READING		5090	
EVENING SOURCE READING		6040	
EVENING BACKGROUND READING		5114	
Morning check performed by RDM 72° sunny	7:25a		
Mid-day check performed by RDM 72° sunny	12:02p		
Evening check performed by RDM 74° sunny	5:25p		

RDM 7/27/01

FIDLER Serial Number A945P/A378Q

DATE: 7/12/01	PAGE 32 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch 1		
Source emission rate	254925 dpm	710430 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1,1	
Battery Check		ok	
Source Check Reading (1)		6318	
Source Check Reading (2)		6258	
Source Check Reading (3)		6253	
Source Check Reading (4)		6349	
Source Check Reading (5)		6158	
Source Check Reading (AVERAGE)		6267	
Direct Background reading (1)	5135 OUT		
Direct Background reading (2)	5112		
Direct Background reading (3)	5054		
Direct Background reading (4)	5150		
Direct Background reading (5)	5021		
Direct Background reading (AVERAGE)	5094		
Efficiency = (CPM-Background) / DPM	0.46%	0.17%	Rom 7/27/01
MID-DAY SOURCE READING		6110	
MID-DAY BACKGROUND READING		5094	
EVENING SOURCE READING		6049	
EVENING BACKGROUND READING		5129	
Morning check performed by Rom 7:05a sunny	68°		
Mid-day check performed by Rom 11:55a	overcast 68°		
Evening check performed by Rom 5:30p	PC 68°		

Battery changed immediately before midday check

FIDLER Serial Number A945P/A378Q

DATE: 7/13/01	PAGE 33 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch 1		
Source emission rate	254925 dpm	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		ok	
Source Check Reading (1)		6100	
Source Check Reading (2)		6068	
Source Check Reading (3)		6262	
Source Check Reading (4)		6066	
Source Check Reading (5)		6150	
Source Check Reading (AVERAGE)		6129	
Direct Background reading (1)	5073 (out)		
Direct Background reading (2)	5197		
Direct Background reading (3)	5175		
Direct Background reading (4)	5080		
Direct Background reading (5)	5109		
Direct Background reading (AVERAGE)	5127		
Efficiency = (CPM-Background) / DPM	~~2.39%~~	0.14%	RDM 7/27/01
MID-DAY SOURCE READING		6065	
MID-DAY BACKGROUND READING		5160	
EVENING SOURCE READING		6015	
EVENING BACKGROUND READING		5120	
Morning check performed by RDM 07:05a	sunny 65°		
Mid-day check performed by JRH 1220	NA		
Evening check performed by KLK 1730	70°		

FIDLER Serial Number A945P/A378Q

DATE: 7/14/01	PAGE 34 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm for Ch 1	210400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		0.8 KV	
Battery Check		OK	
Source Check Reading (1)		5963	
Source Check Reading (2)		6161	
Source Check Reading (3)		6263	
Source Check Reading (4)		6086	
Source Check Reading (5)		6252	
Source Check Reading (AVERAGE)		6141	
Direct Background reading (1)	5164 (OUT)		
Direct Background reading (2)	5248		
Direct Background reading (3)	5235		
Direct Background reading (4)	5196		
Direct Background reading (5)	5291		
Direct Background reading (AVERAGE)	5227		
Efficiency = (CPM-Background) / DPM	←	0.13%	
MID-DAY SOURCE READING		6271	
MID-DAY BACKGROUND READING		5211	
EVENING SOURCE READING	not used	in PM	
EVENING BACKGROUND READING	not used	in PM	
Morning check performed by	MA		
Mid-day check performed by	KH 1220		
Evening check performed by	~~KHS 1536~~		

em 7/27/01

FIDLER Serial Number A945P/A378Q

DATE: 7/13/01	PAGE 35 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch 1		
Source emission rate	254925 dpm	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		ok	
Source Check Reading (1)		6232	
Source Check Reading (2)		6231	
Source Check Reading (3)		6124	
Source Check Reading (4)		6110	
Source Check Reading (5)		6178	
Source Check Reading (AVERAGE)		6175	
Direct Background reading (1)	5269 OUT		
Direct Background reading (2)	5219		
Direct Background reading (3)	5152		
Direct Background reading (4)	5146		
Direct Background reading (5)	5340		
Direct Background reading (AVERAGE)	5225		
Efficiency = (CPM-Background) / DPM	~~0.37%~~	0.13%	Rom 7/27/01
MID-DAY SOURCE READING		6383	
MID-DAY BACKGROUND READING		5239	
EVENING SOURCE READING		6129	
EVENING BACKGROUND READING		5191	
Morning check performed by Rom overcast 7:17a 68°			
Mid-day check performed by Rom ~~overcast~~ sunny 12:10p 72°			
Evening check performed by KICS 1537	78°, P. Cloudy		

FIDLER Serial Number A945P/A378Q

DATE: 7/16/01	PAGE 36 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P for Ch1		
Source emission rate	254925 dpm	210400 for OUT	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1,1	
Battery Check		OK	
Source Check Reading (1)		6363	
Source Check Reading (2)		6303	
Source Check Reading (3)		6362 RDM	
Source Check Reading (4)		6288	
Source Check Reading (5)		6376	
Source Check Reading (AVERAGE)		6338	
Direct Background reading (1)	5258 (OUT)		
Direct Background reading (2)	5194		
Direct Background reading (3)	5309		
Direct Background reading (4)	5128		
Direct Background reading (5)	5192		
Direct Background reading (AVERAGE)	5216		
Efficiency = (CPM-Background) / DPM	~~0.44%~~	0.16%	RDM 7/27/01
MID-DAY SOURCE READING	6324 (OUT)		
MID-DAY BACKGROUND READING	5248		
EVENING SOURCE READING	6113		
EVENING BACKGROUND READING	5140		
Morning check performed by RDM 68°	sunny		
Mid-day check performed by AML 73°	sunny, warm		
Evening check performed by AML 68°	cloudy, cooler		

FIDLER Serial Number A945P/A378Q

DATE: 7/17/01	PAGE 37 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm for Ch1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)		6694	
Source Check Reading (2)		6501	
Source Check Reading (3)		6443	
Source Check Reading (4)		6535	
Source Check Reading (5)		6610	
Source Check Reading (AVERAGE)		6557	
Direct Background reading (1)	5322 OUT		
Direct Background reading (2)	5357		
Direct Background reading (3)	5424		
Direct Background reading (4)	5471		
Direct Background reading (5)	5451		
Direct Background reading (AVERAGE)	5404		
Efficiency = (CPM-Background) / DPM	0.16%	~~0.15%~~	Rom 7/27/01
MID-DAY SOURCE READING		6283	
MID-DAY BACKGROUND READING		5169	
EVENING SOURCE READING		6255	
EVENING BACKGROUND READING		5151	
Morning check performed by rainy	JRH 0730		
Mid-day check performed by	JRH 1200		
Evening check performed by	AML 1720		

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 38 of	59
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A945P	A945P
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Probe	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A365Q	A365Q
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	8920
Source emission rate	254925 dpm	254925 dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.20%	0.50%
2 Sigma Range	544-660	5791-6367
3 Sigma Range	515-689	5647-6511

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 40 of 59	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A945P	A945P
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Probe	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A365Q	A365Q
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	11/21/2001	11/21/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	8920
Source emission rate	254925 dpm	254925 dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.20%	0.50%
2 Sigma Range	472-696	5791-6367
3 Sigma Range	416-752	5647-6511

FIDLER Serial Number A945P/A378Q

DATE: 7/28/01	PAGE 41 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P	CH1	OUT
Source emission rate	254925 dpm	710400	
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.1		
Battery Check	ok		
Source Check Reading (1)	667		
Source Check Reading (2)	620		
Source Check Reading (3)	630		
Source Check Reading (4)	613		
Source Check Reading (5)	599		
Source Check Reading (AVERAGE)	626		
Direct Background reading (1)	230		
Direct Background reading (2)	198		
Direct Background reading (3)	219		
Direct Background reading (4)	231		
Direct Background reading (5)	202		
Direct Background reading (AVERAGE)	216		
Efficiency = (CPM-Background) / DPM	0.16%	N/A	
MID-DAY SOURCE READING	initial check	time inaction	
MID-DAY BACKGROUND READING	"	"	
EVENING SOURCE READING	* 472	KK	
EVENING BACKGROUND READING	110		
Morning check performed by 1115	RM/KK		
Mid-day check performed by N/A	N/A		
Evening check performed by 1615	KK		

check done in afternoon

* Reading was low - but it seems to be a function of ~~station~~ background. We will check in morning KKC 7/28/01

FIDLER Serial Number A945P/A378Q

DATE: 7/29/01	PAGE 42 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm Americium		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	←	1.1	
Battery Check	←	ok	
Source Check Reading (1)	667		
Source Check Reading (2)	644		
Source Check Reading (3)	641		
Source Check Reading (4)	632		
Source Check Reading (5)	630		
Source Check Reading (AVERAGE)	6420		
Direct Background reading (1)	261		
Direct Background reading (2)	222		
Direct Background reading (3)	199		
Direct Background reading (4)	222		
Direct Background reading (5)	244		
Direct Background reading (AVERAGE)	229.6		
Efficiency = (CPM-Background) / DPM	0.16%	NA	
MID-DAY SOURCE READING	450	~~101 96 OUT~~	
MID-DAY BACKGROUND READING	~~0085 OUT~~ ←	175	
EVENING SOURCE READING	573		
EVENING BACKGROUND READING	225		
Morning check performed by Ram 7:0°	Sunny 07:10		
Mid-day check performed by ~~MK~~ Ram 100° 72° Sunny	72° Overcast 1220		
Evening check performed by Ram 4:05p	76° Overcast		

*There seems to be a lot of fluxuation in the CH 1 readings so we are going to take the 5 readings from this morning, 5 in the mid day and 5 in evening + add those 15 to the initial check done on 7/27/01. The OUT Channel always comes right in 2 sigma.

FIDLER Serial Number A945P/A378Q

DATE: 7/30/01	PAGE 43 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		ok	
Source Check Reading (1)		670	
Source Check Reading (2)	Shielded	623	
Source Check Reading (3)	he th.t RDM	682	
Source Check Reading (4)		608	
Source Check Reading (5)		638	
Source Check Reading (AVERAGE)		644	
Direct Background reading (1)	245		
Direct Background reading (2)	220		
Direct Background reading (3)	211		
Direct Background reading (4)	195		
Direct Background reading (5)	201		
Direct Background reading (AVERAGE)	214		
Efficiency = (CPM-Background) / DPM	0.17%	n/a	
MID-DAY SOURCE READING	660		
MID-DAY BACKGROUND READING	181		
EVENING SOURCE READING	521	EVE	
EVENING BACKGROUND READING	189		
Morning check performed by RDM 7:15a	70° overcast ~~Sunny~~		
Mid-day check performed by RDM 12:05p	70° overcast		
Evening check performed by RDM 5:05p	76° overcast		

FIDLER Serial Number A945P/A378Q

DATE: 7/31/01 PAGE 44 OF 59

Source		Am-241
Calibration Date		5/25/2001
Out of Cal Date		11/21/2001
Serial Number		A945P
Source emission rate		254925 dpm
Instrument Channel	CHANNEL 1	OUT
High Voltage	1.1	$ KLK
Battery Check	OK	
Source Check Reading (1)	655	
Source Check Reading (2)	619	KLK
Source Check Reading (3)	617	
Source Check Reading (4)	617	
Source Check Reading (5)	658	
Source Check Reading (AVERAGE)	633.2	
Direct Background reading (1)	242	
Direct Background reading (2)	228	
Direct Background reading (3)	231	KLK
Direct Background reading (4)	256	
Direct Background reading (5)	227	
Direct Background reading (AVERAGE)	236.8	
Efficiency = (CPM-Background) / DPM	0.2%	NA
MID-DAY SOURCE READING	480	6117
MID-DAY BACKGROUND READING	198	5328
EVENING SOURCE READING	456	6080
EVENING BACKGROUND READING	174	5007

Morning check performed by Rom 7:00a humid, sunny, 72°

Mid-day check performed by KLK 1235 humid, sunny, 72°

Evening check performed by Rom 6:03p humid, sunny, 76°

FIDLER Serial Number A945P/A378Q

DATE: 8/1/01	PAGE 45 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.1	1.1	
Battery Check	ok	OK	
Source Check Reading (1)	589	6440	
Source Check Reading (2)	631	6427	
Source Check Reading (3)	638	6339	
Source Check Reading (4)	606	6292	
Source Check Reading (5)	611	6289	
Source Check Reading (AVERAGE)	615	6357	
Direct Background reading (1)	220	5388	
Direct Background reading (2)	215	5290	
Direct Background reading (3)	243	5241	
Direct Background reading (4)	217	5244	
Direct Background reading (5)	216	5407	
Direct Background reading (AVERAGE)	222	5314	
Efficiency = (CPM-Background) / DPM	0.15%	0.15%	
MID-DAY SOURCE READING	485	5948	
MID-DAY BACKGROUND READING	172	5130	
EVENING SOURCE READING	not used in PM		
EVENING BACKGROUND READING	———	——— KK	
Morning check performed by humid	rain sunny	72° 7:15a	
Mid-day check performed by "	KK "	78° 1250	
Evening check performed by	not used in PM		

Ch 1 DPM
710,400 Eff out

FIDLER Serial Number A945P/A378Q

DATE: 8/8/01	PAGE 46 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm / 710400		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.08	
Battery Check		ok	
Source Check Reading (1)		6279	
Source Check Reading (2)		6200	
Source Check Reading (3)		6363	
Source Check Reading (4)		6336	
Source Check Reading (5)		6259	
Source Check Reading (AVERAGE)		6287	
Direct Background reading (1)		5433	
Direct Background reading (2)		5446	
Direct Background reading (3)		5450	
Direct Background reading (4)		5431	
Direct Background reading (5)		5368	
Direct Background reading (AVERAGE)		5426	
Efficiency = (CPM-Background) / DPM	N/A	0.12%	
MID-DAY SOURCE READING		6432 / 6277	
MID-DAY BACKGROUND READING		5205	
EVENING SOURCE READING	NOT USED	IN PM	
EVENING BACKGROUND READING			
Morning check performed by humid warm	JRH 0740		
Mid-day check performed by sunny hot	JRH 1115		
Evening check performed by	NA		

FIDLER Serial Number A945P/A378Q

DATE: 8/9/01	PAGE 47 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm / 710400		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	OK	ok	
Source Check Reading (1)	575	6430	
Source Check Reading (2)	570	6214	
Source Check Reading (3)	556	6396	
Source Check Reading (4)	591	6122	
Source Check Reading (5)	563	6355	
Source Check Reading (AVERAGE)	571	6303	
Direct Background reading (1)	226	5379	
Direct Background reading (2)	223	5418	
Direct Background reading (3)	226	5221	
Direct Background reading (4)	203	5281	
Direct Background reading (5)	221	5337	
Direct Background reading (AVERAGE)	220	5327	
Efficiency = (CPM-Background) / DPM	0.14%	0.14%	
MID-DAY SOURCE READING	493	6362	
MID-DAY BACKGROUND READING	200	5300	
EVENING SOURCE READING	527	6243	
EVENING BACKGROUND READING	214	5509	
Morning check performed by warm humid	JRH 0745	NA	
Mid-day check performed by 80°F	JRH 1150	NA	
Evening check performed by Rain 6:10p	humid overcast 83°		

FIDLER Serial Number A945P/A378Q

DATE: 8/10/01	PAGE 48 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	254925 dpm		710400 dpm
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage	1.08	1.08	
Battery Check	ok	ok	
Source Check Reading (1)	583	6246	
Source Check Reading (2)	589	6415	
Source Check Reading (3)	542	6362	
Source Check Reading (4)	576	6481	
Source Check Reading (5)	573	6331	
Source Check Reading (AVERAGE)	573	6367	
Direct Background reading (1)	209	5467	
Direct Background reading (2)	231	5407	
Direct Background reading (3)	220	5483	
Direct Background reading (4)	212	5484	
Direct Background reading (5)	217	5397	
Direct Background reading (AVERAGE)	217.8	5448	
Efficiency = (CPM-Background) / DPM	0.14%	0.13%	
MID-DAY SOURCE READING	548	6499	
MID-DAY BACKGROUND READING	PM ~~5195~~ 178	PM ~~178~~ 5195	
EVENING SOURCE READING	500	6227	
EVENING BACKGROUND READING	179	5127	
Morning check performed by Wornhund	JRH 0800	overcast	
Mid-day check performed by humid 80°	Pam 12:47p	mostly sunny	
Evening check performed by sunny warm 81°	JRH 1749	NA	

FIDLER Serial Number A945P/A378Q

DATE: 8/11/01	PAGE 49 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(in) 254925 dpm / 710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	ok	ok	
Source Check Reading (1)	618	6328	
Source Check Reading (2)	607	6359	
Source Check Reading (3)	613	6223	
Source Check Reading (4)	620	6267	
Source Check Reading (5)	573	6250	
Source Check Reading (AVERAGE)	607.8	6285	
Direct Background reading (1)	213	5445	
Direct Background reading (2)	220	5439	
Direct Background reading (3)	239	5211	
Direct Background reading (4)	218	5329	
Direct Background reading (5)	231	5358	
Direct Background reading (AVERAGE)	224	5356	
Efficiency = (CPM-Background) / DPM	0.15%	0.13%	
MID-DAY SOURCE READING	494	6139	
MID-DAY BACKGROUND READING	180	5271	
EVENING SOURCE READING	460	6415	
EVENING BACKGROUND READING	232	5247	
Morning check performed by 78°F	JRH 0839	Warm not so wet	
Mid-day check performed by 78°F	JRH 1200	sunny warm	
Evening check performed by 82°F	Pam Coop	Sunny	

FIDLER Serial Number A945P/A378Q

DATE: 8/12/01	PAGE 50 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch1) 254925 dpm / 710400 (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	OK	ok	
Source Check Reading (1)	600	6450	
Source Check Reading (2)	554	6412	
Source Check Reading (3)	613	6277	
Source Check Reading (4)	553	~~6591~~ JRH 6479	
Source Check Reading (5)	582	6525	
Source Check Reading (AVERAGE)	581	6442 ok	
Direct Background reading (1)	216	5452	
Direct Background reading (2)	207	5348	
Direct Background reading (3)	222	5469	
Direct Background reading (4)	208	5504	
Direct Background reading (5)	201	5458	
Direct Background reading (AVERAGE)	211	5446	
Efficiency = (CPM-Background) / DPM	0.15%	0.14%	
MID-DAY SOURCE READING	587	6304	
MID-DAY BACKGROUND READING	200	5451	
EVENING SOURCE READING	NOT USED IN PM		
EVENING BACKGROUND READING			
Morning check performed by 76°F	JRH 0800	sunny mild	
Mid-day check performed by 80°F	JRH 12:00	over cast	
Evening check performed by	NA	NA	

out channel > 26 in AM
but is ok will check again
- ok at midday
JRH

FIDLER Serial Number A945P/A378Q

DATE: 8/13/01	PAGE 51 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(chi) 254925 dpm / 710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	OK	ok	
Source Check Reading (1)	607	~~5929~~ 6364	
Source Check Reading (2)	615	6185	
Source Check Reading (3)	606	6219	
Source Check Reading (4)	624	6284	
Source Check Reading (5)	645	6505	
Source Check Reading (AVERAGE)	619	6311	
Direct Background reading (1)	223	5344	
Direct Background reading (2)	204	5276	
Direct Background reading (3)	218	5464	
Direct Background reading (4)	200	5474	
Direct Background reading (5)	213	5423	
Direct Background reading (AVERAGE)	212	5396	
Efficiency = (CPM-Background) / DPM	0.16%	0.13%	
MID-DAY SOURCE READING	502	6197	
MID-DAY BACKGROUND READING	167	5271	
EVENING SOURCE READING	NOT USED IN PM		
EVENING BACKGROUND READING			
Morning check performed by	JRH 0804	Partly sunny ~70°F	
Mid-day check performed by	Rom 1:10 p	mostly sunny 80°F	
Evening check performed by	NA	NA	

FIDLER Serial Number A945P/A378Q

DATE: 8/14/01	PAGE 52 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch1) 254925 dpm / 710400 dpm (ch2)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	ok	ok	
Source Check Reading (1)	620	6371	
Source Check Reading (2)	645	6533	
Source Check Reading (3)	630	~~6615~~ 6365	
Source Check Reading (4)	604	6494	
Source Check Reading (5)	618	6493	
Source Check Reading (AVERAGE)	623	6451 ok	
Direct Background reading (1)	225	5455	
Direct Background reading (2)	241	5320	
Direct Background reading (3)	226	5367	
Direct Background reading (4)	225	5376	
Direct Background reading (5)	224	5357	
Direct Background reading (AVERAGE)	228	5375	
Efficiency = (CPM-Background) / DPM	0.15%	0.15%	
MID-DAY SOURCE READING	572	6273	
MID-DAY BACKGROUND READING	208	5214	
EVENING SOURCE READING	508	6296	
EVENING BACKGROUND READING	188	5262	
Morning check performed by	JRH 0810	Cool misty	
Mid-day check performed by	Rom 12:30p	76° Sunny	
Evening check performed by	JRH 1700	Sunny 78°F	

Watch out for Cs-137 source on GM jig while doing Fidler fn. checks!

FIDLER Serial Number A945P/A378Q

DATE: 8/20/01	PAGE 53 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch1) 254925 dpm / 710400 dpm (ch1)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.68	
Battery Check	ok	ok	
Source Check Reading (1)	607	6424	
Source Check Reading (2)	606	6312	
Source Check Reading (3)	577	6431	
Source Check Reading (4)	607	6537	
Source Check Reading (5)	596	6308	
Source Check Reading (AVERAGE)	599	6402	
Direct Background reading (1)	192	5225	
Direct Background reading (2)	203	5257	
Direct Background reading (3)	217	5269	
Direct Background reading (4)	221	5321	
Direct Background reading (5)	235	5194	
Direct Background reading (AVERAGE)	214	5253	
Efficiency = (CPM-Background) / DPM	0.15%	0.16%	
MID-DAY SOURCE READING	~~167~~ JRH 552	6236	
MID-DAY BACKGROUND READING	167	5291	
EVENING SOURCE READING	546	6353	
EVENING BACKGROUND READING	196	5092	
Morning check performed by	JRH 0935	sunny warm	
Mid-day check performed by	JRH 1219	Still sunny + warm	
Evening check performed by	JRH 1615	still sunny + warmish	

Check out chanel again in PM - ok in PM
→ Background a little high in AM

FIDLER Serial Number A945P/A378Q

DATE: 8/21/2001	PAGE 54 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(Ch1) 254925 dpm / 710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	ok	ok JRH	
Source Check Reading (1)	626	~~6536~~ 6467	
Source Check Reading (2)	576	6500	
Source Check Reading (3)	644	6514	
Source Check Reading (4)	647	6370	
Source Check Reading (5)	608	6408	
Source Check Reading (AVERAGE)	620	6452 ok	
Direct Background reading (1)	192	5314	
Direct Background reading (2)	193	5343	
Direct Background reading (3)	188	5301	
Direct Background reading (4)	203	5222	
Direct Background reading (5)	216	5200	
Direct Background reading (AVERAGE)	198	5276	
Efficiency = (CPM-Background) / DPM	0.17%	0.17%	
MID-DAY SOURCE READING	607	6198 ok	
MID-DAY BACKGROUND READING	192	5185	
EVENING SOURCE READING	527	6246 ok	
EVENING BACKGROUND READING	182	5227	
Morning check performed by	JRH 0800	Overcast cooler	
Mid-day check performed by	JRH 1224	" "	
Evening check performed by	JRH 1737	sunny warm pleasant	

- Charged battery during AM function check

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Look at open window during midday checks } - ok

FIDLER Serial Number A945P/A378Q

DATE: 8/22/01	PAGE 55 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch1) 254925 dpm / 710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	OK	ok	
Source Check Reading (1)	624	6522	
Source Check Reading (2)	644	6371	
Source Check Reading (3)	614	6452	
Source Check Reading (4)	584	6465	
Source Check Reading (5)	624	6497	
Source Check Reading (AVERAGE)	618	6461 ok	
Direct Background reading (1)	183	5246	
Direct Background reading (2)	220	5321	
Direct Background reading (3)	215	5368	
Direct Background reading (4)	205	5316	
Direct Background reading (5)	211	5357	
Direct Background reading (AVERAGE)	207	5322	
Efficiency = (CPM-Background) / DPM	0.16%	0.16%	
MID-DAY SOURCE READING	542	6311	
MID-DAY BACKGROUND READING	212	5177	
EVENING SOURCE READING	465	6307	
EVENING BACKGROUND READING	174	5293	
Morning check performed by	JRH 0740	sunny cool	
Mid-day check performed by	JRH 1517	sunny warm	
Evening check performed by	JRH 1700	sunny warm	

AM > 20 but will re-check in PM

FIDLER Serial Number A945P/A378Q

DATE: 8/23/01	PAGE 56 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch1) 254925 dpm / 710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.08	1.08	
Battery Check	OK	ok	
Source Check Reading (1)	564	6434	
Source Check Reading (2)	521	6450	
Source Check Reading (3)	509	6427	
Source Check Reading (4)	585	6527	
Source Check Reading (5)	524	6340	
Source Check Reading (AVERAGE)	541	6436	
Direct Background reading (1)	198	5388	
Direct Background reading (2)	185	5245	
Direct Background reading (3)	196	5265	
Direct Background reading (4)	201	5503	
Direct Background reading (5)	225	5411	
Direct Background reading (AVERAGE)	* 201	5362	
Efficiency = (CPM-Background) / DPM	0.13%	0.15%	
MID-DAY SOURCE READING	534	6634	
MID-DAY BACKGROUND READING	191	5447	
EVENING SOURCE READING	514	6403 RDM	
EVENING BACKGROUND READING	157	~~4733~~ 5376	
Morning check performed by	JRH 0830	sunny	
Mid-day check performed by	JRH 1237	Partly sunny	
Evening check performed by humid	RDM 5:00	Part Sunny 76°	

→ Instrument left on overnight

["out" >26 in AM]

FIDLER Serial Number A945P/A378Q

DATE: 8/26/01	PAGE 57 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch1) 254925 dpm / 710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.10	1.10	
Battery Check	ok	ok	
Source Check Reading (1)		6357	
Source Check Reading (2)		6509	
Source Check Reading (3)	KK	6436	
Source Check Reading (4)		6484	
Source Check Reading (5)		6422	
Source Check Reading (AVERAGE)		6441.6	
Direct Background reading (1)		5324	
Direct Background reading (2)		5377	
Direct Background reading (3)		5262	
Direct Background reading (4)	KK	5396	
Direct Background reading (5)		5463	
Direct Background reading (AVERAGE)		5364	
Efficiency = (CPM-Background) / DPM	NA	0.15%	
MID-DAY SOURCE READING		KK	
MID-DAY BACKGROUND READING	KK		
EVENING SOURCE READING		6243	
EVENING BACKGROUND READING	~~5310~~ 00	5310	
Morning check performed by	NA	NA	
Mid-day check performed by	JRH 1253	P. Sumy 76°F	
Evening check performed by	KM 1625	NA	

(ch1) Am-241 chanel not necesary today

FIDLER Serial Number A945P/A378Q

DATE: 8/27/01	PAGE 58 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch1) 254925 dpm /710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.10	KL	
Battery Check	ok		
Source Check Reading (1)	546	6470	
Source Check Reading (2)	545	6402	
Source Check Reading (3)	581	6362	
Source Check Reading (4)	537	6570	
Source Check Reading (5)	576	6232	
Source Check Reading (AVERAGE)	~~547~~ 557	6395	
Direct Background reading (1)	177	5776	
Direct Background reading (2)	192	5361	
Direct Background reading (3)	172	5448	
Direct Background reading (4)	198	5365	
Direct Background reading (5)	210	5171	
Direct Background reading (AVERAGE)	189.8	~~5001~~ 5304.2 KL	
Efficiency = (CPM-Background) / DPM	0.14%	0.15%	
MID-DAY SOURCE READING	479	6251	
MID-DAY BACKGROUND READING	164	5144	
EVENING SOURCE READING	547	6514	
EVENING BACKGROUND READING	147	5001	
Morning check performed by	JRH 0840	overcast humid	
Mid-day check performed by	JRH 1500	humid sunny	
Evening check performed by	KLK 1800	NA	

FIDLER Serial Number A945P/A378Q

DATE: 8.28.01	PAGE 59 OF 59		
Source	Am-241		
Calibration Date	5/25/2001		
Out of Cal Date	11/21/2001		
Serial Number	A945P		
Source emission rate	(ch) 254925 dpm / 710400 dpm (out)		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.10	ok 1.10	
Battery Check	OK	ok	
Source Check Reading (1)	518	6643	
Source Check Reading (2)	557	6571	
Source Check Reading (3)	610	6621	
Source Check Reading (4)	542	6605	
Source Check Reading (5)	616	6655	
Source Check Reading (AVERAGE)	569	6619	
Direct Background reading (1)	201	5532	
Direct Background reading (2)	172	5403	
Direct Background reading (3)	207	5394	
Direct Background reading (4)	173	5433	
Direct Background reading (5)	225	5357	
Direct Background reading (AVERAGE)	196	5424	
Efficiency = (CPM-Background) / DPM	0.15%	0.17%	
MID-DAY SOURCE READING	606	6949	
MID-DAY BACKGROUND READING	221	5706	
EVENING SOURCE READING	531	6634	
EVENING BACKGROUND READING	194	5324	
Morning check performed by	JRH 0725	sunny cool moist	
Mid-day check performed by	KATIE	sunny	
Evening check performed by	Katie 2015	NA	

AM → > 30

SENECA ARMY DEPOT
SEAD-12 RI/FS
6/4/01

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 1 of 13	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A954P	A954P
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	10/21/2001	10/21/2001
Probe	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A365Q	A365Q
Calibration Date	5/25/2001	5/25/2001
Out of Cal Date	10/21/2001	10/21/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	8920
Source emission rate	254925 dpm	254925 dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.20%	0.40%
2 Sigma Range	778-887	6004-6383
3 Sigma Range	751-914	5910-6477

PARSONS MAIN, INC.

A954P - Ch. 1

PARSONS

CLIENT _____ JOB NO. _____ SHEET 2 OF 13

SUBJECT INITIAL FUNCTION CHECK BY JRH DATE 6/4/01

CKD. _____ REVISION _____

Allison

INSTRUMENT: FIDLER

S/N: A954P A402Q

11:45 AM

BATTERY: OK

SOURCE TYPE Am-241

S/N: 8920

at 330 PM

BACKGROUND _____ @ 4:30

	Ch. 1		JIG BKGD		
1	1379	1	314	1	644
2	1505	2	275	2	536
3	1637	3	329	3	579
4	1542	Floor 4	316	4	577
5	1743	5	360	5	549
6	1749	6	307	6	594
7	1336	7	321	7	605
8	1324	8	379	8	544
9	1306	9	327	9	579
10	1471	10	324	10	575
11	1206	11	332	11	549
12	2113	12	304	12	517
13	1841	13	362	13	537
14	2306	14	345	14	562
15	1357	15	292	15	549

Avg = 1588 Avg = 326 Avg = 566

σ = 40 σ = 18 σ = 7.

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CLIENT _____ JOB NO. _____ SHEET 3 OF 13

SUBJECT Initial Function Check BY AML DATE 6/6/01

Weather: Sunny, clear, ~60°F CKD. _____ REVISION 1000

Instrument: FIDLER #1 Battery OK
S/N: A954P HV OK

Source Type: ~~Am~~ 241
S/N: 8920

SIG ~~Background~~ Source - Source w/ type-face down

CH	1	1000		OUT	1000
1	804		1	6065	
2	821		2	6256	
3	776		3	6187	
4	874		4	6120	
5	841		5	6285	
6	855		6	6308	
7	829		7	6215	
8	825		8	[redacted] 6272 Jeh	
9	794		9	6193	
10	866		10	~~6120~~ @ 6210 Jeh	
11	844		11	0348	
12	851		12	6042	
13	852		13	6049	
14	844		14	6140	
15	815		15	6212	

Avg =
σ =

Avg =
σ =

FIDLER Serial Number A954P/A402Q

DATE: 6/5/01	PAGE 4 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage	1.04		
Battery Check	OK		
Source Check Reading (1)	Initial Function checks		EWL
Source Check Reading (2)			
Source Check Reading (3)			
Source Check Reading (4)			
Source Check Reading (5)			
Source Check Reading (AVERAGE)			
Direct Background reading (1)	Initial function checks		
Direct Background reading (2)			
Direct Background reading (3)			
Direct Background reading (4)		EWL	
Direct Background reading (5)			
Direct Background reading (AVERAGE)			
Efficiency = (CPM-Background) / DPM	~~N/A~~	~~N/A~~	N/A
MID-DAY SOURCE READING	Not used in AM		
MID-DAY BACKGROUND READING	"		
EVENING SOURCE READING	526	5668	EWL
EVENING BACKGROUND READING	299	5115	
Morning check performed by	VRH/AML	VRH/AML	
Mid-day check performed by	NA	NA	
Evening check performed by	DRG	DRG	

FIDLER Serial Number A954P/A402Q

DATE: 6/6/01 0930	PAGE 5 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage	1.1	1.1	
Battery Check	OK	OK	
Source Check Reading (1)			
Source Check Reading (2)			
Source Check Reading (3)			
Source Check Reading (4)			
Source Check Reading (5)			
Source Check Reading (AVERAGE)			
Direct Background reading (1)	282	5048	
Direct Background reading (2)	348	5110	
Direct Background reading (3)	305	5113	
Direct Background reading (4)	323	5163	
Direct Background reading (5)	294	5168	
Direct Background reading (AVERAGE)	310	5120	
Efficiency = (CPM-Background) / DPM			
MID-DAY SOURCE READING	not used in morning		
MID-DAY BACKGROUND READING	not used in morning		
EVENING SOURCE READING			
EVENING BACKGROUND READING			
Morning check performed by			
Mid-day check performed by			
Evening check performed by			

initial & check done in morning - KLK

KLK 6/6/01

KLK 6/6/01

KLK 6/6/01

FIDLER Serial Number A954P/A402Q

DATE: 6/7/01	PAGE 6 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	OK	OK	
Battery Check	OK	OK	
Source Check Reading (1)	801	6197	
Source Check Reading (2)	801	6175	KLK
Source Check Reading (3)	799	6275	
Source Check Reading (4)	821	6260	
Source Check Reading (5)	836	6276	
Source Check Reading (AVERAGE)	811.6	6236	
Direct Background reading (1)	300	5247	
Direct Background reading (2)	301	5019	
Direct Background reading (3)	287	5134	
Direct Background reading (4)	274	5085	KLK
Direct Background reading (5)	306	5186	
Direct Background reading (AVERAGE)	293.6	5134.2	
Efficiency = (CPM-Background) / DPM		0.43 %	
MID-DAY SOURCE READING	not used in morning		
MID-DAY BACKGROUND READING	not used in morning		
EVENING SOURCE READING	753 EM	6026	
EVENING BACKGROUND READING	300	5216	
Morning check performed by	KLK		
Mid-day check performed by	n/a		
Evening check performed by	ERM		

6:18 pm

FIDLER Serial Number A954P/A402Q

DATE: 6/8/01	PAGE 7 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage	1.1	1.1	
Battery Check	OK	OK	
Source Check Reading (1)		6346	
Source Check Reading (2)		6450	
Source Check Reading (3)		6474	
Source Check Reading (4)		6298	
Source Check Reading (5)		6274	
Source Check Reading (AVERAGE)		6368	
Direct Background reading (1)		5129	
Direct Background reading (2)		5216	
Direct Background reading (3)		5349	
Direct Background reading (4)		5248	
Direct Background reading (5)		5322	
Direct Background reading (AVERAGE)		~~5268~~ 5253	
Efficiency = (CPM-Background) / DPM		0.44 %	NA
MID-DAY SOURCE READING		6366	
MID-DAY BACKGROUND READING		5209	
EVENING SOURCE READING		5979	
EVENING BACKGROUND READING		5139	
7:20am Morning check performed by	EKM	EKM	
1230 Mid-day check performed by	EKM	EKM	
1615 Evening check performed by	JRH	JRH	

FIDLER Serial Number A954P/A402Q

DATE: 6-9-01	PAGE 8 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.1	
Battery Check		OK	
Source Check Reading (1)		5933	
Source Check Reading (2)		6186	
Source Check Reading (3)		5956	
Source Check Reading (4)		6077	
Source Check Reading (5)		6102	
Source Check Reading (AVERAGE)		6051	
Direct Background reading (1)		5293	
Direct Background reading (2)		5055	
Direct Background reading (3)		5166	
Direct Background reading (4)		5175	
Direct Background reading (5)		5094	
Direct Background reading (AVERAGE)		5157	
Efficiency = (CPM-Background) / DPM		0.35 %	
MID-DAY SOURCE READING			
MID-DAY BACKGROUND READING			
EVENING SOURCE READING			
EVENING BACKGROUND READING			
0740 Morning check performed by		EKM	NA
Mid-day check performed by		Not used	AM
Evening check performed by		Not used	PM

FIDLER Serial Number A954P/A402Q

DATE: 6/11/01	PAGE 9 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage	1.04	1.04	
Battery Check	ok	ok	
Source Check Reading (1)	888	6577	
Source Check Reading (2)	829	6379	
Source Check Reading (3)	897	6456	
Source Check Reading (4)	868	6346	
Source Check Reading (5)	870	6335	
Source Check Reading (AVERAGE)	870 ok	6419	→ a little high, but background is high today
Direct Background reading (1)	372	5459	
Direct Background reading (2)	382	5226	
Direct Background reading (3)	389	5275	
Direct Background reading (4)	371	5259	
Direct Background reading (5)	376	5244	
Direct Background reading (AVERAGE)	378	5293	
Efficiency = (CPM-Background) / DPM	0.19 %	0.44 %	NA
MID-DAY SOURCE READING	804	5773 ~~5625~~ EM	
MID-DAY BACKGROUND READING	337	4909	
EVENING SOURCE READING	758	5755	
EVENING BACKGROUND READING	334	4754	
0830 Morning check performed by	JRL	JRL	
1220 Mid-day check performed by	EKM	EKM	
1845 Evening check performed by	EKM	EKM	

FIDLER Serial Number A954P/A402Q

DATE: 6/12/01	PAGE 10 OF 13	
Source	Am-241	
Calibration Date	4/10/2001	
Out of Cal Date	3/31/2003	
Serial Number	8920	
Source emission rate	254925 b/min	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.1
Battery Check		OK
Source Check Reading (1)		5693
Source Check Reading (2)		5820
Source Check Reading (3)		5772
Source Check Reading (4)		5724
Source Check Reading (5)		5775
Source Check Reading (AVERAGE)		5757
Direct Background reading (1)		4922
Direct Background reading (2)		5019
Direct Background reading (3)		5059
Direct Background reading (4)		5042
Direct Background reading (5)		4773
Direct Background reading (AVERAGE)		4963
Efficiency = (CPM-Background) / DPM		0.31 %
MID-DAY SOURCE READING		Not used in AVG
MID-DAY BACKGROUND READING		
EVENING SOURCE READING		
EVENING BACKGROUND READING		
0800 Morning check performed by		ERM
Mid-day check performed by		
Evening check performed by		

Instrument: A954 P Fidler Time: 1400
S/N: A954P - Out

Background

Muggy, humid, ~80°F

1	4919
2	4779
3	4849
4	4825
5	4961
6	4851
7	4783
8	4914
9	4779
10	4854
11	4866
12	4879
13	4736
14	4826
15	4766

Avg =
σ =

Source

Type: Am-241 S/N: 8920

1	5634
2	5589
3	5553
4	5784
5	5593
6	5653
7	5540
8	5586
9	5648
10	5610
11	5641
12	5578
13	5637
14	5739
15	5584

Avg =
σ =

FIDLER Serial Number A954P/A402Q

DATE: 6/13/01	PAGE 12 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.04	
Battery Check		Ok	
Source Check Reading (1)		5956	
Source Check Reading (2)		5951	
Source Check Reading (3)		5904	
Source Check Reading (4)		5780	
Source Check Reading (5)		5998	
Source Check Reading (AVERAGE)		5918	
Direct Background reading (1)		5059	
Direct Background reading (2)		4927	
Direct Background reading (3)		4992	
Direct Background reading (4)		4966	
Direct Background reading (5)		5032	
Direct Background reading (AVERAGE)		4995	
Efficiency = (CPM-Background) / DPM		0.36%	NA
MID-DAY SOURCE READING			
MID-DAY BACKGROUND READING			
EVENING SOURCE READING			
EVENING BACKGROUND READING			
Morning check performed by		JRH 0720	
Mid-day check performed by		~~EKM 1330~~ EM	
Evening check performed by			

FIDLER Serial Number A954P/A402Q

DATE: 18 JUNE 2001	PAGE 13 OF 13		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min		
Instrument Channel	CHANNEL 1	OUT	OUT *
High Voltage	1.0 kV	1 kV	OK
Battery Check	OK	OK	OK
Source Check Reading (1)		~~4857~~ 1MK	~~3496~~
Source Check Reading (2)		~~4765~~ 1MK	4514
Source Check Reading (3)		~~4762~~ 1MK	4655
Source Check Reading (4)		~~4730~~ 1MK	4810
Source Check Reading (5)		~~4083~~ 1MK	4845
Source Check Reading (AVERAGE)		~~4759.4~~ 1MK	~~4808~~ ~~4776~~ KLK
Direct Background reading (1)			
Direct Background reading (2)			
Direct Background reading (3)			
Direct Background reading (4)		FLK	
Direct Background reading (5)			
Direct Background reading (AVERAGE)			
Efficiency = (CPM-Background) / DPM	NA	NA	NA
MID-DAY SOURCE READING			~ 4600 - low
MID-DAY BACKGROUND READING			~ 4200 - reading +
EVENING SOURCE READING			NA
EVENING BACKGROUND READING	FLK	KLK	NA
Morning check performed by			NA
Mid-day check performed by			JEH 1430
Evening check performed by			NA

* CHANGED BATTERIES 6-15-2001 1045hrs

** NOT WITHIN 20

SENECA ARMY DEPOT
SEAD-12 RI/FS
6/4/01

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 1 of 3	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A968P	A968P
Calibration Date	1/25/2001	1/25/2001
Out of Cal Date	7/24/2001	7/24/2001
Probe:	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A367Q	A367Q
Calibration Date	1/25/2001	1/25/2001
Out of Cal Date	7/24/2001	7/24/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	6/2/1924
Source emission rate	254925 dpm	254925 dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.30%	0.30%
2 Sigma Range	2700-3152	5198-5608
3 Sigma Range	2587-3265	5095-5711

PARSONS MAIN, INC.

A968P - OUT

PARSONS

CLIENT _____ JOB NO. _____ SHEET 2 OF 13

SUBJECT INITIAL FUNCTION CHECK BY JEH DATE 6/04/01

CKD. _____ REVISION _____

Erin

INSTRUMENT: FIDLER 12:15PM

S/N: A968P A367Q BATTERY: OK

	BACKGROUND OUT		09:45 SOURCE Am-241 TYPE: 6/5/01 S/N: 8920
1	5226		5464
2	4826		5475
3	4819		5492
4	4838	Floor	5326
5	6040		5318
6	6211		5446
7	6856		5219
8	5105		5531
9	5258		5211
10	3923		5372
11	4959		5341
12	4905		5469
13	3809		5417
14	5181		5540
15	7261		5422

Avg = 5281.13

σ = 72.67

Avg = 5403

σ = 74

Jig Background 6/5/01 10:20

1	4802	8	4634
2	4682	9	4582
3	4622	10	4650
4	4590	11	4721
5	4639	12	4813
6	4569	13	4565
7	4707	14	4753
		15	4737

Avg: 4671

σ: 68

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 3 of 13	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A968P	A968P
Calibration Date	1/25/2001	1/25/2001
Out of Cal Date	7/24/2001	7/24/2001
Probe:	Nal Scintilator	Nal Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A367Q	A367Q
Calibration Date	1/25/2001	1/25/2001
Out of Cal Date	7/24/2001	7/24/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	6/2/1924
Source emission rate	254925 dpm	254925 dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.30%	0.30%
2 Sigma Range		5799-6079
3 Sigma Range		5730-6149

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET 4 OF 13

SUBJECT FUNCTION CHECK BY JR4 DATE 6/19/01

TIME

CKD. _____ REVISION 1237

FIDLER A968 P

AM-241 SOURCE S/N: 8920 Warm, humid, ~ 80°F

OUT WINDOW

1	6025	
2	5885	
3	5988	1242
4	6006	
5	5956	
6	5910	1259
7	5922	
8	5974	
9	5806	1302
10	5925	
11	5872	
12	6042	1306
13	5960	
14	5827	
15	5989	

5939 Average

$\sigma = 77.4$

FIDLER Serial Number A968P/A367Q

DATE: 6/19/01	PAGE 5 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		~1.28 ok	
Battery Check		ok	
Source Check Reading (1)		5450	
Source Check Reading (2)		5373	
Source Check Reading (3)		5459	
Source Check Reading (4)		5437	
Source Check Reading (5)		5551	
Source Check Reading (AVERAGE)		5454	
Direct Background reading (1)		4713	
Direct Background reading (2)		4712	
Direct Background reading (3)		4656	
Direct Background reading (4)		4735	
Direct Background reading (5)		4888	
Direct Background reading (AVERAGE)		4741	
Efficiency = (CPM-Background) / DPM	NA	2.7%	NA
MID-DAY SOURCE READING		5340 → ok	w/source upside-down
MID-DAY BACKGROUND READING		4708	-will check with correct geometry at end of day
EVENING SOURCE READING		5911 →	checked against correct geometry
EVENING BACKGROUND READING		4615	
Morning check performed by		JRH 0720	
Mid-day check performed by		JRH 1230	
Evening check performed by		JRH 1650	

Morning check → source upside down
initial functic- checks were performed w/ source upside down and have not been re-done - will redo at lunch

FIDLER Serial Number A968P/A367Q

DATE: 06/20/2001	PAGE 6 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.28kV	
Battery Check		OK	
Source Check Reading (1)		5778	
Source Check Reading (2)		6046	
Source Check Reading (3)		5782	
Source Check Reading (4)		5908	
Source Check Reading (5)		6048	
Source Check Reading (AVERAGE)		5912.4	
Direct Background reading (1)		4674	
Direct Background reading (2)		4684	
Direct Background reading (3)		4496	
Direct Background reading (4)		4628	
Direct Background reading (5)		4597	
Direct Background reading (AVERAGE)		1615.8	
Efficiency = (CPM-Background) / DPM	NA	05%	NA
MID-DAY SOURCE READING		5920	
MID-DAY BACKGROUND READING		4758	
EVENING SOURCE READING		5916	
EVENING BACKGROUND READING		4661	
Morning check performed by		JRH 0710	
Mid-day check performed by		JRH 1200	
Evening check performed by		JRH 1730	

FIDLER Serial Number A968P/A367Q

DATE: 6/21/01	PAGE 7 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.28	
Battery Check		ok	
Source Check Reading (1)		6025	
Source Check Reading (2)		6161	
Source Check Reading (3)		6067	
Source Check Reading (4)		5944	
Source Check Reading (5)		6081	
Source Check Reading (AVERAGE)		6056	
Direct Background reading (1)		4735	
Direct Background reading (2)		4675	
Direct Background reading (3)		4675	
Direct Background reading (4)		4703	
Direct Background reading (5)		4634	
Direct Background reading (AVERAGE)		4684	
Efficiency = (CPM-Background) / DPM	NA	0.5%	NA
MID-DAY SOURCE READING		6108	
MID-DAY BACKGROUND READING		4745	
EVENING SOURCE READING		6059	
EVENING BACKGROUND READING		4660	
Morning check performed by		JRH 0750	
Mid-day check performed by		KKS 1236	
Evening check performed by		JRH 1740	

FIDLER Serial Number A968P/A367Q

DATE: 6/22/01	PAGE 8 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		6063	
Source Check Reading (2)	KK	5875	KK
Source Check Reading (3)		5907	
Source Check Reading (4)		6095	
Source Check Reading (5)		5936	
Source Check Reading (AVERAGE)		5975	
Direct Background reading (1)		4788	
Direct Background reading (2)		4745	
Direct Background reading (3)	KK	4778	KK
Direct Background reading (4)		4706	
Direct Background reading (5)		4731	
Direct Background reading (AVERAGE)		4750	
Efficiency = (CPM-Background) / DPM	NA	0.48%	NA
MID-DAY SOURCE READING		5927	KK
MID-DAY BACKGROUND READING		4713	
EVENING SOURCE READING		6131	Check in AM
EVENING BACKGROUND READING	KK	4865	KK
Morning check performed by		JRH 0745	
Mid-day check performed by		KKS 1235	KK
Evening check performed by		JRH 1730	

FIDLER Serial Number A968P/A367Q

DATE: 6/23/01	PAGE 9 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		6479	
Source Check Reading (2)		6373	
Source Check Reading (3)		6396	
Source Check Reading (4)		6479	
Source Check Reading (5)		6160	
Source Check Reading (AVERAGE)		6369	
Direct Background reading (1)		5033	
Direct Background reading (2)		4941	
Direct Background reading (3)		4863	
Direct Background reading (4)		4867	
Direct Background reading (5)		4959	
Direct Background reading (AVERAGE)		4933	
Efficiency = (CPM-Background) / DPM	NA	0.56%	NA
MID-DAY SOURCE READING		6267	
MID-DAY BACKGROUND READING		4943	
EVENING SOURCE READING		5999	
EVENING BACKGROUND READING		4636	
Morning check performed by		JRH 0800	
Mid-day check performed by		JRH 1210	
Evening check performed by		JRH 1610	

FIDLER Serial Number A968P/A367Q

DATE: 6/24/01	PAGE 10 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.28	
Battery Check		ok	
Source Check Reading (1)		6082	
Source Check Reading (2)		5942	
Source Check Reading (3)		5918	
Source Check Reading (4)		6058	
Source Check Reading (5)		5926	
Source Check Reading (AVERAGE)		5985	
Direct Background reading (1)		4728	
Direct Background reading (2)		4815	
Direct Background reading (3)		4704	
Direct Background reading (4)		4766	
Direct Background reading (5)		4843	
Direct Background reading (AVERAGE)		4771	
Efficiency = (CPM-Background) / DPM	N/A	0.48 %	N/A
MID-DAY SOURCE READING		6078	
MID-DAY BACKGROUND READING		4692	
EVENING SOURCE READING		5857	
EVENING BACKGROUND READING		4446	
Morning check performed by		JRH 0720	
Mid-day check performed by		JRH 1210	
Evening check performed by		EJK 1530	

FIDLER Serial Number A968P/A367Q

DATE: 6/25/01	PAGE 11 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.28	
Battery Check		ok	
Source Check Reading (1)		6110	
Source Check Reading (2)		6034	
Source Check Reading (3)		6106	
Source Check Reading (4)		5935	
Source Check Reading (5)		6126	
Source Check Reading (AVERAGE)		6062	
Direct Background reading (1)		4725	
Direct Background reading (2)		4642	
Direct Background reading (3)		4775	
Direct Background reading (4)		4624	
Direct Background reading (5)		4493	
Direct Background reading (AVERAGE)		4652	
Efficiency = (CPM-Background) / DPM	N/A	0.6%	N/A
MID-DAY SOURCE READING	5992 OUT		
MID-DAY BACKGROUND READING	4566 OUT		
EVENING SOURCE READING		5849	
EVENING BACKGROUND READING		4625	
Morning check performed by 65° Sunny	KK		
Mid-day check performed by 75° sunny	JMK/KK		
Evening check performed by 75° sunny	KK 1745		

FIDLER Serial Number A968P/A367Q

DATE: 6/26/01	PAGE 12 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.28	
Battery Check		OK	
Source Check Reading (1)		5899	
Source Check Reading (2)	KLK	6039	
Source Check Reading (3)		5997	
Source Check Reading (4)		6086	
Source Check Reading (5)		5944	
Source Check Reading (AVERAGE)		5993	
Direct Background reading (1)	4762 OUT		
Direct Background reading (2)	4593 OUT		
Direct Background reading (3)	4759 OUT		
Direct Background reading (4)	4758 OUT		
Direct Background reading (5)	4657 OUT		
Direct Background reading (AVERAGE)	4705.8 OUT		
Efficiency = (CPM-Background) / DPM	0.50% OUT		
MID-DAY SOURCE READING	KK	5899	
MID-DAY BACKGROUND READING	4637		
EVENING SOURCE READING	KK	5768	
EVENING BACKGROUND READING	4455		
Morning check performed by sunny 65°F	KLK 0710		
Mid-day check performed by	ROM 12:15p		
Evening check performed by	ROM 6:50p		

Batteries changed at midday

FIDLER Serial Number A968P/A367Q

DATE: 6/27/01	PAGE 13 OF 13		
Source	Am-241		
Calibration Date	1/25/2001		
Out of Cal Date	7/24/2001		
Serial Number	A968P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		olc	
Source Check Reading (1)		6046	
Source Check Reading (2)		5928	
Source Check Reading (3)		5990	
Source Check Reading (4)		6012	
Source Check Reading (5)		5885	
Source Check Reading (AVERAGE)		5972	
Direct Background reading (1)	4557		
Direct Background reading (2)	4594		
Direct Background reading (3)	4634		
Direct Background reading (4)	4677		
Direct Background reading (5)	~~477~~ 4759		
Direct Background reading (AVERAGE)	4644		
Efficiency = (CPM-Background) / DPM	0.52%		
MID-DAY SOURCE READING	out of service	NA	
MID-DAY BACKGROUND READING			
EVENING SOURCE READING		NA	
EVENING BACKGROUND READING			
Morning check performed by	RM 07:15 70° sunny		
Mid-day check performed by	NA		
Evening check performed by	NA		

taken out of service instrument stopped working after drop on 6/26/01 at day's end

SENECA ARMY DEPOT
SEAD-12 RI/FS
6-20-01front

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 1 of 23	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A951P	A951P
Calibration Date	1/25/2001	1/25/2001
Out of Cal Date	7/24/2001	7/24/2001
Probe	Nal Scintilator	Nal Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A365Q	A365Q
Calibration Date	1/25/2001	1/25/2001
Out of Cal Date	7/24/2001	7/24/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	8920
Source emission rate	254925 dpm	~~254925~~ dpm
Instrument Channel	Channel 1	Out
instrument efficiency	0.50%	0.30%
2 Sigma Range		9233-9505
3 Sigma Range		9165-9572

710400 dpm 7/27/01

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET 2 OF 23

SUBJECT INSTRUMENT FUNCTION CHECKS BY JRH DATE 06/20/01

CKD. _____ TIME REVISION 1230

INSTRUMENT: FIDLER A951 P

BACKGROUND W/ JIG: OUT WINDOW HV: 1.24 kV

		TIME		
1	6363		AVG: 6545	
2	6450		σ:	
3	6658	1235		
4	6459			
5	6314			
6	6375			
7	6397			
8	6396	1242		
9	6548			
10	6504			
11	6441			
12	6437	1245		
13	6428			
14	6324			
15	6442		Δ = 6545	2×BKG: 13090

SOURCE: AM-241
S/N: 8920

1	9329	1249	AVG 9369	-2σ = 9175
2	9359		σ: 97	+2σ = 9563
3	9394			
4	9420			
5	9460			
6	9401			
7	9387			
8	9296			
9	9359			
10	9264			
11	9394			
12	9325	1303		
13	9311			
14	9524			
15	9310			

FIDLER Serial Number A954P/A402Q

DATE: 6-20-01	PAGE 3 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for ch1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.2	
Battery Check		ok	
Source Check Reading (1)		7882	KW
Source Check Reading (2)		~~7966~~ 7968	RDM
Source Check Reading (3)		8134	
Source Check Reading (4)		7878	
Source Check Reading (5)		7944	
Source Check Reading (AVERAGE)		7961	
Direct Background reading (1)		6449	
Direct Background reading (2)		6470	
Direct Background reading (3)		6473	KW
Direct Background reading (4)		6419	
Direct Background reading (5)		6485	
Direct Background reading (AVERAGE)		6461	
Efficiency = (CPM-Background) / DPM	NA	0.21 %	NA
~~MID-DAY~~ End of day SOURCE READING (upside down source)		8075	ok
~~MID-DAY~~ BACKGROUND READING	NA	NA	NA
EVENING SOURCE READING (correct source)		9301	ok
EVENING BACKGROUND READING	NA	6395	
Morning check performed by	KW	RJM 0755	
Mid-day check performed by		NA	KW
Evening check performed by		JRH 1723	

RDM 7/27/01

Morning check performed with source upside a la the original function check

New function checks were performed @ midday

FIDLER Serial Number A945P/~~A378Q~~ 51

DATE: 6/21/01	PAGE 4 OF 23		
Source	Am-241		
Calibration Date	1/0/1900		
Out of Cal Date	1/0/1900		
Serial Number	8920 for Ch1		
Source emission rate	254925 dpm	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.2	
Battery Check		ok	
Source Check Reading (1)		9598	
Source Check Reading (2)	KWK	9515	KWK
Source Check Reading (3)		9409	
Source Check Reading (4)		9427	
Source Check Reading (5)		9512	
Source Check Reading (AVERAGE)		9492	
Direct Background reading (1)		6423	
Direct Background reading (2)		6455	
Direct Background reading (3)	KWK	6346	KWK
Direct Background reading (4)		6419	
Direct Background reading (5)		6479	
Direct Background reading (AVERAGE)		6424	
Efficiency = (CPM-Background) / DPM	NA	~~9624-6425 1.24~~	0.43 % RDM 7/27/01
MID-DAY SOURCE READING		9624	
MID-DAY BACKGROUND READING		6393	
EVENING SOURCE READING	KWK	9403	KWK
EVENING BACKGROUND READING		6409	
Morning check performed by		0715 RDM	
Mid-day check performed by		1225 KWS	
Evening check performed by		JCH 1740	

FIDLER Serial Number A951P/~~A402Q~~

DATE: 6/22/01	PAGE 5 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for ch 1		
Source emission rate	254925 b/min	710430 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	FW
Battery Check		ok	
Source Check Reading (1)	FW	9548	
Source Check Reading (2)		~~9668~~	9417 JRH
Source Check Reading (3)		9526	
Source Check Reading (4)		9578	FW
Source Check Reading (5)		9477	
Source Check Reading (AVERAGE)		9510	ok Check a PM also
Direct Background reading (1)		6468	
Direct Background reading (2)		6472	
Direct Background reading (3)	FW	6609	FW
Direct Background reading (4)		6600	
Direct Background reading (5)		6650	
Direct Background reading (AVERAGE)		6559.8	
Efficiency = (CPM-Background) / DPM	N/A	~~1.24~~	0.42% RM 7/27/01
MID-DAY SOURCE READING		9475	N/A
MID-DAY BACKGROUND READING		6355	N/A
EVENING SOURCE READING		9787 →	check tomorrow AM
EVENING BACKGROUND READING	FW	6719	N/A
Morning check performed by		JRH 0710	
Mid-day check performed by		KCS 1230	FW
Evening check performed by		JRH 1714	

FIDLER Serial Number A951P/A402Q

DATE: 6/23/01	PAGE 6 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for Ch 1		
Source emission rate	254925 b/min	710400 for out	
Instrument Channel	**CHANNEL 1**	**OUT**	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		9904	
Source Check Reading (2)		9674	
Source Check Reading (3)		9805	
Source Check Reading (4)		10007	
Source Check Reading (5)		9721	
Source Check Reading (AVERAGE)		9822.	
Direct Background reading (1)		6752	
Direct Background reading (2)		6702	
Direct Background reading (3)		6833	
Direct Background reading (4)		6795	
Direct Background reading (5)		6868	
Direct Background reading (AVERAGE)		6790	
Efficiency = (CPM-Background) / DPM	NA	~~12%~~.	0.43%
MID-DAY SOURCE READING		9731	
MID-DAY BACKGROUND READING		6543	
EVENING SOURCE READING		9430	
EVENING BACKGROUND READING		6303	
Morning check performed by		JRH ~~1213~~	0825
Mid-day check performed by		JRH 1213	
Evening check performed by		JRH 1617	

Dm 7/27/01

A951P

FIDLER Serial Number ~~A968~~P/A367Q

DATE: 6/24/01		PAGE 7 OF 23	
Source		Am-241	
Calibration Date		1/25/2001	
Out of Cal Date		7/24/2001	
Serial Number		A968P ~~for 467~~	
Source emission rate		254925 dpm 710900 for 367	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		9408	
Source Check Reading (2)	KLK	9366	KLK
Source Check Reading (3)		9521	
Source Check Reading (4)		9251	
Source Check Reading (5)		9312	
Source Check Reading (AVERAGE)		9372	
Direct Background reading (1)		6223	
Direct Background reading (2)		6367	
Direct Background reading (3)	KLK	6335	KLK
Direct Background reading (4)		6585	
Direct Background reading (5)		6354	
Direct Background reading (AVERAGE)		6373	
Efficiency = (CPM-Background) / DPM	NA	~~1.2%~~	0.42%
MID-DAY SOURCE READING		~~9775~~ 9409 JRH	
MID-DAY BACKGROUND READING		6279	
EVENING SOURCE READING	KLK	9356	
EVENING BACKGROUND READING		6351	KLK
Morning check performed by		JRH 0740	
Mid-day check performed by		JRH 1200	
Evening check performed by		KLK 1530	

Rom 7/27/01

→ Charged battery after midday function check

FIDLER Serial Number A951P/A402Q

DATE: 6/25/01	PAGE 8 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for Ch1		
Source emission rate	254925 b/min	710700 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		9287	
Source Check Reading (2)		9471	
Source Check Reading (3)		9251	
Source Check Reading (4)		9222	
Source Check Reading (5)		9354	
Source Check Reading (AVERAGE)		9317	
Direct Background reading (1)	6335 OUT		
Direct Background reading (2)	6175		
Direct Background reading (3)	6211		
Direct Background reading (4)	6360		
Direct Background reading (5)	6371		
Direct Background reading (AVERAGE)	6290		
Efficiency = (CPM-Background) / DPM	~~1.2%~~	0.43%	Rom 7/27/01
MID-DAY SOURCE READING	9523 OUT	NA	
MID-DAY BACKGROUND READING	6286		
EVENING SOURCE READING	~~9177~~ 9260	NA	
EVENING BACKGROUND READING	6324		
Morning check performed by	60-70 sunny Rom 7:10a		
Mid-day check performed by	JMK 1214		
Evening check performed by	70-80 sunny KK 1635		

FIDLER Serial Number A951P/A402Q

DATE: 6/26/01	PAGE 9 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for Ch1		
Source emission rate	254925 b/min	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		OK	
Source Check Reading (1)		9382	
Source Check Reading (2)	KLK	9337	
Source Check Reading (3)		9302	
Source Check Reading (4)		9356	
Source Check Reading (5)		9192	
Source Check Reading (AVERAGE)		9313.8	
Direct Background reading (1)	6274 OUT		
Direct Background reading (2)	6496		
Direct Background reading (3)	6397		
Direct Background reading (4)	6476		
Direct Background reading (5)	6446		
Direct Background reading (AVERAGE)	6411.8		
Efficiency = (CPM-Background) / DPM	2.41%	~~1.49%~~	RDM 7/27/01
MID-DAY SOURCE READING	9188 OUT	NA	
MID-DAY BACKGROUND READING	6188		
EVENING SOURCE READING	9102	NA	
EVENING BACKGROUND READING	6172		
Morning check performed by Sunny 65°F	KLK 0720		
Mid-day check performed by	RDM 12:10p		
Evening check performed by	RDM 5:45p		

FIDLER Serial Number A951P/A402Q

DATE: 6/27/01	PAGE 10 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for Ch 1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		Ok	
Source Check Reading (1)		9328	
Source Check Reading (2)		9319	
Source Check Reading (3)		9421	
Source Check Reading (4)		9507	
Source Check Reading (5)		9343	
Source Check Reading (AVERAGE)		9384	
Direct Background reading (1)	6401		
Direct Background reading (2)	6491		
Direct Background reading (3)	6372		
Direct Background reading (4)	6514		
Direct Background reading (5)	6577		
Direct Background reading (AVERAGE)	6471		
Efficiency = (CPM-Background) / DPM	N.T	2.41%	12m 7/27/01
MID-DAY SOURCE READING	9398	N/A	
MID-DAY BACKGROUND READING	6463		
EVENING SOURCE READING	9357	N/A	
EVENING BACKGROUND READING	6241		
Morning check performed by	RM Sunny 70° 7:50a		
Mid-day check performed by	AML Sunny 78° 1230		
Evening check performed by	JMK 1743		

Out only

FIDLER Serial Number A951P/A402Q

DATE: 6/28/01	PAGE 11 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920	for CH1	
Source emission rate	254925 b/min	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		9494	
Source Check Reading (2)		9605	
Source Check Reading (3)		9591	
Source Check Reading (4)		9625	
Source Check Reading (5)		9475	
Source Check Reading (AVERAGE)		9558	ok
Direct Background reading (1)	6607		
Direct Background reading (2)	6750		
Direct Background reading (3)	6566		
Direct Background reading (4)	6423		
Direct Background reading (5)	6537		
Direct Background reading (AVERAGE)	6577		
Efficiency = (CPM-Background) / DPM	NA	0.42%	Rm 7/27/01
MID-DAY SOURCE READING	9445	NA	
MID-DAY BACKGROUND READING	6433		
EVENING SOURCE READING	9412	NA	
EVENING BACKGROUND READING	6289		
Morning check performed by sunny 72°F	JRH 0710		
Mid-day check performed by	JRH 1216		
Evening check performed by	Rm 05:45p		

FIDLER Serial Number A951P/A402Q

DATE: 6/29/01	PAGE 12 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for Ch1		
Source emission rate	254925 b/min	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		Ok	
Source Check Reading (1)		9564	
Source Check Reading (2)		9677	
Source Check Reading (3)		9604	
Source Check Reading (4)		9422	
Source Check Reading (5)		9494	
Source Check Reading (AVERAGE)		9552	
Direct Background reading (1)	6561		
Direct Background reading (2)	6470		
Direct Background reading (3)	6507		
Direct Background reading (4)	6557		
Direct Background reading (5)	6827		
Direct Background reading (AVERAGE)	6584		
Efficiency = (CPM-Background) / DPM	~~1.20%~~	0.42%	
MID-DAY SOURCE READING	9449	NA	
MID-DAY BACKGROUND READING	6476		
EVENING SOURCE READING	9450	NA	
EVENING BACKGROUND READING	6408		
Morning check performed by	Ron Hdty 730 07:45a		
Mid-day check performed by	AMC Hdty 780 1130		
Evening check performed by	RH 1525		

Ron 7/27/01

FIDLER Serial Number A951P/A402Q

DATE: 7/10/01	PAGE 13 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for Ch1		
Source emission rate	254925 b/min 71000 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		9465	
Source Check Reading (2)		~~9692~~ 9575 JRH	
Source Check Reading (3)		9640	
Source Check Reading (4)		9559	
Source Check Reading (5)		9580	
Source Check Reading (AVERAGE)		9574	ok
Direct Background reading (1)	6550 (OUT)		
Direct Background reading (2)	6549		
Direct Background reading (3)	6524		
Direct Background reading (4)	6658		
Direct Background reading (5)	6642		
Direct Background reading (AVERAGE)	6585		
Efficiency = (CPM-Background) / DPM	0.42 %	~~1.17 %~~	Rom 7/27/01
MID-DAY SOURCE READING	9376 (OUT)	N/A	
MID-DAY BACKGROUND READING	6363		
EVENING SOURCE READING	9178	N/A	
EVENING BACKGROUND READING	6309		
Morning check performed by 65°F humid	0733 JRH		
Mid-day check performed by 74°F Sunny	12:00 Rom		
Evening check performed by 78°F Sunny	5:23p Rom		

FIDLER Serial Number A951P/A402Q

DATE: 7/11/01	PAGE 14 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for Ch1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.24 (OUT)	FLR	
Battery Check	ok		
Source Check Reading (1)	~~4246~~ RM	9296	
Source Check Reading (2)		9193	
Source Check Reading (3)		9332	
Source Check Reading (4)	LS	9303	
Source Check Reading (5)		9267	
Source Check Reading (AVERAGE)		9278	
Direct Background reading (1)	6218 (OUT)		
Direct Background reading (2)	6450		
Direct Background reading (3)	6335		
Direct Background reading (4)	6248		
Direct Background reading (5)	6452		
Direct Background reading (AVERAGE)	6347		
Efficiency = (CPM-Background) / DPM	NA	0.41%	
MID-DAY SOURCE READING	NA	9288	
MID-DAY BACKGROUND READING	6365 (OUT)		
EVENING SOURCE READING	NA	9355	
EVENING BACKGROUND READING	6424 (OUT)		
Morning check performed by RM sunny 72°	7:07a		
Mid-day check performed by RM sunny 72°	12:09p		
Evening check performed by RM sunny 74°	5:10p		

RM 7/12/01

FIDLER Serial Number A951P/A402Q

DATE: 7/12/01		PAGE 15 OF 23	
Source		Am-241	
Calibration Date		4/10/2001	
Out of Cal Date		3/31/2003	
Serial Number		8920 for Ch 1	
Source emission rate		254925 b/min / 710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		9509	
Source Check Reading (2)		9272	
Source Check Reading (3)		9275	
Source Check Reading (4)		9339	
Source Check Reading (5)		9437	
Source Check Reading (AVERAGE)		9366	
Direct Background reading (1)	6396 (OUT)		
Direct Background reading (2)	6456		
Direct Background reading (3)	6515		
Direct Background reading (4)	6403		
Direct Background reading (5)	6393		
Direct Background reading (AVERAGE)	6433		
Efficiency = (CPM-Background) / DPM	~~1.15%~~	2.41%	
MID-DAY SOURCE READING	NA	9284	
MID-DAY BACKGROUND READING	6180 (OUT)		
EVENING SOURCE READING	NA	9294	
EVENING BACKGROUND READING	6397 (OUT)		
Morning check performed by RDM ~~12:00 p~~ 7:00 a	~~68° overcast~~ 64° sunny		
Mid-day check performed by RDM 12:30 p	68° overcast		
Evening check performed by RDM 5:15 p	68° PC		

RDM 7/27/01

FIDLER Serial Number A951P/A402Q

DATE: 7/13/01	PAGE 16 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for Ch 1		
Source emission rate	254925 b/min	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		9272	
Source Check Reading (2)		9464	
Source Check Reading (3)		9318	
Source Check Reading (4)		9513	
Source Check Reading (5)		9445	
Source Check Reading (AVERAGE)		9402	
Direct Background reading (1)	6555 out		
Direct Background reading (2)	6364		
Direct Background reading (3)	6363		
Direct Background reading (4)	6327		
Direct Background reading (5)	6330		
Direct Background reading (AVERAGE)	6388		
Efficiency = (CPM-Background) / DPM	~~18%~~	8.42%	RDM 7/27/01
MID-DAY SOURCE READING	~~RDM 50°F~~	9512	
MID-DAY BACKGROUND READING	6397 out		
EVENING SOURCE READING		NA	
EVENING BACKGROUND READING			
Morning check performed by RDM 7:47a	Sunny 68°		
Mid-day check performed by ~~AMC~~ 1200	Cloudy 70°F		
Evening check performed by NOT used in Afternoon	NA		

FIDLER Serial Number A951P/A402Q

DATE: 7/14/01	PAGE 17 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for ch 1		
Source emission rate	254925 b/min 7/20/01 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.2KV OUT	NA	
Battery Check	OK	NA	
Source Check Reading (1)		9485	
Source Check Reading (2)		9339	
Source Check Reading (3)	NK	9675	
Source Check Reading (4)		9618	
Source Check Reading (5)		9412	
Source Check Reading (AVERAGE)		9506	
Direct Background reading (1)	6496 OUT		
Direct Background reading (2)	6295		
Direct Background reading (3)	6351		
Direct Background reading (4)	6391		
Direct Background reading (5)	6485		
Direct Background reading (AVERAGE)	6404		
Efficiency = (CPM-Background) / DPM	NA	3.44%	
MID-DAY SOURCE READING	9454 →		
MID-DAY BACKGROUND READING	6434 OUT		
EVENING SOURCE READING	EK	NA	
EVENING BACKGROUND READING			
Morning check performed by AML 0700	Cloudy, cool 63°F		
Mid-day check performed by AML 1200	Cloudy, 65°F		
Evening check performed by	not used in PM		

Ran 7/20/01

FIDLER Serial Number A951P/A402Q

DATE: 7/15/01	PAGE 18 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for CH1		
Source emission rate	254925 b/min	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.2	
Battery Check		ok	
Source Check Reading (1)		9489	
Source Check Reading (2)		9841	
Source Check Reading (3)		9713	
Source Check Reading (4)		9524	
Source Check Reading (5)		9562	
Source Check Reading (AVERAGE)		9626	
Direct Background reading (1)	6557 (OUT)		
Direct Background reading (2)	6671		
Direct Background reading (3)	6544		
Direct Background reading (4)	6474		
Direct Background reading (5)	6473		
Direct Background reading (AVERAGE)	6544		
Efficiency = (CPM-Background) / DPM	~~1.20%~~	0.43%	RM 7/27/01
MID-DAY SOURCE READING	NA	9422	
MID-DAY BACKGROUND READING	6493 (OUT)		
EVENING SOURCE READING	NA	9352	
EVENING BACKGROUND READING	6583 (OUT)		
Morning check performed by RDM 7:40a overcast humid 65°			
Mid-day check performed by RDM 12:00p Sunny 72°			
Evening check performed by KKS 1531	P. Cloudy, 77°F		

Battery changs between mornins & midday check

FIDLER Serial Number A951P/A402Q

DATE: 7/16/01	PAGE 19 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for Ch 1	710400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.2 kV	
Battery Check		O/C	
Source Check Reading (1)		9560	
Source Check Reading (2)		9474	
Source Check Reading (3)		9603	
Source Check Reading (4)		9636	
Source Check Reading (5)		9651	
Source Check Reading (AVERAGE)		9585	
Direct Background reading (1)	6625		
Direct Background reading (2)	6647		
Direct Background reading (3)	6575		
Direct Background reading (4)	6535		
Direct Background reading (5)	6518		
Direct Background reading (AVERAGE)	6580		
Efficiency = (CPM-Background) / DPM	~~1.18%~~	0.42%	
MID-DAY SOURCE READING	9440 →		
MID-DAY BACKGROUND READING	6355 (out)		
EVENING SOURCE READING	9448 →		
EVENING BACKGROUND READING	6267 (out)		
Morning check performed by RJM 7:15a	68° sunny		
Mid-day check performed by AML 1200	73F sunny warm		
Evening check performed by kkj ~~06~~ 1730	73°F cloudy		

RJM 7/27/01

FIDLER Serial Number A951P/A402Q

DATE: 7/17/01	PAGE 26 OF 28		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for Ch 1 710400 for OUT		
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.2 →	→	
Battery Check	ok →	→	
Source Check Reading (1)		9953	
Source Check Reading (2)		9937	
Source Check Reading (3)	FULL	9826	
Source Check Reading (4)		9705	
Source Check Reading (5)		9630	
Source Check Reading (AVERAGE)		9810	
Direct Background reading (1)	6908 OUT		
Direct Background reading (2)	6766		
Direct Background reading (3)	6758		
Direct Background reading (4)	6688		
Direct Background reading (5)	6685		
Direct Background reading (AVERAGE)	6761		
Efficiency = (CPM-Background) / DPM	3.43%	1.2 eff OUT	RM 11/27/01
MID-DAY SOURCE READING	9291 OUT	NA	
MID-DAY BACKGROUND READING	6406		
EVENING SOURCE READING	9725	NA	
EVENING BACKGROUND READING	6656		
Morning check performed by ~humid rainy	JRH 0715		
Mid-day check performed by	JRH 1200		
Evening check performed by	AMC 1720		

FIDLER Serial Number A951P/A402Q

DATE: 7/18/01	PAGE 21 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920 for Ch 1		
Source emission rate	254925 b/min	710433 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage	1.25 kV →		
Battery Check	OK →		
Source Check Reading (1)		9560	
Source Check Reading (2)		9750	
Source Check Reading (3)	KV	9609	
Source Check Reading (4)		9639	
Source Check Reading (5)		9523	
Source Check Reading (AVERAGE)		9616	
Direct Background reading (1)	6589 OUT		
Direct Background reading (2)	6627		
Direct Background reading (3)	6589		
Direct Background reading (4)	6759		
Direct Background reading (5)	6674		
Direct Background reading (AVERAGE)	6648		
Efficiency = (CPM-Background) / DPM	0.42%	NA	
MID-DAY SOURCE READING	9537 OUT	~~6448~~ RL	
MID-DAY BACKGROUND READING	6448		
EVENING SOURCE READING	KV	NA	
EVENING BACKGROUND READING			
Morning check performed by JMK	Foggy 70°		
Mid-day check performed by AML 1200	Sunny 72° F		
Evening check performed by	not used in PM		

RM 7/27/01

FIDLER Serial Number A951P/A402Q

DATE: 7/23/01	PAGE 22 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for ch1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.2 kV	
Battery Check		OK	
Source Check Reading (1)		9614 ~~6595~~ KK	
Source Check Reading (2)		9521	
Source Check Reading (3)		9392	
Source Check Reading (4)		9792	
Source Check Reading (5)		9427	
Source Check Reading (AVERAGE)		9549.2	
Direct Background reading (1)	6595 OUT		
Direct Background reading (2)	6581		
Direct Background reading (3)	6613		
Direct Background reading (4)	6616		
Direct Background reading (5)	6754		
Direct Background reading (AVERAGE)	6632		
Efficiency = (CPM-Background) / DPM	NA	0.41%	
MID-DAY SOURCE READING	9440 →		
MID-DAY BACKGROUND READING	6589 OUT		
EVENING SOURCE READING	9517 →		
EVENING BACKGROUND READING	6335 OUT		
Morning check performed by	KK 0930		
Mid-day check performed by Sunny 75° humid	JK 1244		
Evening check performed by Hazy 78	OMK		

Rom 7/27/01

FIDLER Serial Number A951P/A402Q

DATE: 7-24-01	PAGE 23 OF 23		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for ch1 710400 for out		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.22	
Battery Check		OK	
Source Check Reading (1)		9812	
Source Check Reading (2)		9675	
Source Check Reading (3)		9740	
Source Check Reading (4)		9685	
Source Check Reading (5)		9788	
Source Check Reading (AVERAGE)		9740	
Direct Background reading (1)	6599 OUT		
Direct Background reading (2)	6720		
Direct Background reading (3)	6668		
Direct Background reading (4)	6767		
Direct Background reading (5)	6749		
Direct Background reading (AVERAGE)	6700.6		
Efficiency = (CPM-Background) / DPM	~~1.19%~~ RJC	2.43%	Rm 7/27/01
MID-DAY SOURCE READING	9636 OUT	NA	
MID-DAY BACKGROUND READING	6749		
EVENING SOURCE READING	9454	NA	
EVENING BACKGROUND READING	6377		
Morning check performed by JK 0714 76°	OVERCAST HUMID		
Mid-day check performed by JK 1201 76°	OVERCAST HUMID		
Evening check performed by JK 1737 78°	OVERCAST HUMID		

Last Day instrument was within Calibration Date

FIDLER Serial Number A983P/A367Q

DATE: 7-26-01	PAGE 17 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P	
Source emission rate	~~254925~~ dpm 710,400 for out	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.22 kV
Battery Check		OK
Source Check Reading (1)		10436
Source Check Reading (2)		10370
Source Check Reading (3)		10415
Source Check Reading (4)		10542
Source Check Reading (5)		10320
Source Check Reading (AVERAGE)		10416.6
Direct Background reading (1)		7194
Direct Background reading (2)		7216
Direct Background reading (3)		7388
Direct Background reading (4)		7375
Direct Background reading (5)		7380
Direct Background reading (AVERAGE)		7310.6
Efficiency = (CPM-Background) / DPM		0.4372%
MID-DAY SOURCE READING	10143 (OUT)	
MID-DAY BACKGROUND READING	6966	
EVENING SOURCE READING	10031	
EVENING BACKGROUND READING	6854	
Morning check performed by JMK 74° RAIN	0714	
Mid-day check performed by JMK 73° SUN	P/C 1200	
Evening check performed by JK 74°	SUNNY 1730	

KLK

KLK

KLK

FIDLER Serial Number A983P/A367Q

DATE: 7-27-01	PAGE 18 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P	
Source emission rate	~~74,400dpm~~ JMK 254925 dpm	71040dpm
Instrument Channel	CHANNEL 1	OUT
High Voltage		OK 1.22kV
Battery Check		OK
Source Check Reading (1)		10247
Source Check Reading (2)	KUK	10214
Source Check Reading (3)		10264
Source Check Reading (4)		10196
Source Check Reading (5)		10283
Source Check Reading (AVERAGE)		10240.8
Direct Background reading (1)		7176
Direct Background reading (2)		1068
Direct Background reading (3)	KUK	7014
Direct Background reading (4)		7168
Direct Background reading (5)		7124
Direct Background reading (AVERAGE)		7110
Efficiency = (CPM-Background) / DPM	NA	0.44%
MID-DAY SOURCE READING	KUK	10060
MID-DAY BACKGROUND READING		6965
EVENING SOURCE READING	FIDLER NOT USED PM	
EVENING BACKGROUND READING	" " "	
Morning check performed by JK 0700 68°F Sunny		
Mid-day check performed by JK 1235 72° Sunny	KUK	Battery changed at midday
Evening check performed by	NA	

FIDLER Serial Number A983P/A367Q

DATE: 7/28/01	PAGE 19 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P	
Source emission rate	~~254925 dpm~~ 710,400	
Instrument Channel	CHANNEL 1	OUT
High Voltage	~~1.22 KW~~	1.22
Battery Check	OK KW	OK
Source Check Reading (1)		10418
Source Check Reading (2)		10485
Source Check Reading (3)	KLK	10239
Source Check Reading (4)		10337
Source Check Reading (5)		10496
Source Check Reading (AVERAGE)		10395
Direct Background reading (1)		7130
Direct Background reading (2)		7217
Direct Background reading (3)	KLK	7295
Direct Background reading (4)		7123
Direct Background reading (5)		7093
Direct Background reading (AVERAGE)		7171.6
Efficiency = (CPM-Background) / DPM	NA	0.4537%
MID-DAY SOURCE READING		10254
MID-DAY BACKGROUND READING	KLK	6944
EVENING SOURCE READING		10399
EVENING BACKGROUND READING		6989
Morning check performed by JMK	KLK	
Mid-day check performed by JMK 1300	Sunny 74°	KLK
Evening check performed by JMK 1800	Sunny 74°	

FIDLER Serial Number A983P/A367Q

DATE: 7 29-01	PAGE 20 OF 20		
Source	Am-241		
Calibration Date	3/20/2001		
Out of Cal Date	9/16/2001		
Serial Number	A983P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.2	
Battery Check		ok	
Source Check Reading (1)		10306	
Source Check Reading (2)		10455	
Source Check Reading (3)		10290	
Source Check Reading (4)		10316	
Source Check Reading (5)		10335	
Source Check Reading (AVERAGE)		10340.4	
Direct Background reading (1)	7081 (OUT)		
Direct Background reading (2)	7124		
Direct Background reading (3)	7226		
Direct Background reading (4)	7231		
Direct Background reading (5)	7104		
Direct Background reading (AVERAGE)	7153.2		
Efficiency = (CPM-Background) / DPM	0.4486%		
MID-DAY SOURCE READING	NA	10196	
MID-DAY BACKGROUND READING	6085 (OUT)		
EVENING SOURCE READING	NA	10318	
EVENING BACKGROUND READING	6980		
Morning check performed by JK 0707 70° Sunny Light Haze			
Mid-day check performed by JMK 72° Sunny 1220			
Evening check performed by Ron 76° overcast 3:55p			

SENECA ARMY DEPOT
SEAD-12 RI/FS
~~6/4/01~~ 6/27/01 RSm

Site: Seneca Army Depot		
Project: SEAD-12		
Team:		
	Page 1 of 20	
Instrument Type	Bicron Fidler	Bicron Fidler
AKA	Fidler	Fidler
Make	Bicron	Bicron
Model	Analyst	Analyst
Serial Number	A983P	A983P
Calibration Date	3/20/2001	3/20/2001
Out of Cal Date	9/16/2001	9/16/2001
Probe:	NaI Scintilator	NaI Scintilator
Make	Bicron	Bicron
Model	G-5	G-5
Serial Number	A367Q	A367Q
Calibration Date	3/20/2001	3/20/2001
Out of Cal Date	9/16/2001	9/16/2001
Source	Am-241	Am-241
Source type	Low E gamma	Low E gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2003	3/31/2003
Serial Number	8920	6/2/1924
Source emission rate	254925 dpm	~~254925~~ dpm 7/27/01
Instrument Channel	Channel 1	Out
instrument efficiency		1.30%
2 Sigma Range		9737-10681
3 Sigma Range		9501-10917

RSm 7/27/01

7/6/01

Am-241 window function check not completed

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET 2 OF 20

SUBJECT _____ BY Rom DATE 6/27/01

_____ CKD. _____ REVISION _____

Fidler A983P 08:55a 75° Sunny CHANNEL CUT

	Sig Background		Am-241 Source	
1	6945		10122	
2	7214		10124	
3	6947		10257	
4	6988		9928	
5	6862		9951	
6	7003		10072	
7	6893	9:05a	10179	
8	6966		10033	9:17a
9	6962	9:31a	10190	
10	6859		10250	
11	7075	9:35a	10318	
12	7166		10651	
13	6873		10760	
14	7119		10062	
15	7069		10176	9:30a
Ave =	6996		10209	
σ =	84		101	
2σ =	168		202	
3σ =	252		303	

−	+		−	+	
6828	7164	±2σ	10007	10411	±2σ
6744	7248	±3σ	9906	10512	±3σ

A983P

FIDLER Serial Number ~~A945P/A378Q~~ KW

DATE: 6/27/01	PAGE 3 OF 10		
Source	Am-241		
Calibration Date	~~5/25/2001~~ 3/20/01		
Out of Cal Date	~~11/21/2001~~ 9/16/01		
Serial Number	A945P		
Source emission rate	254925 dpm		
Instrument Channel	CHANNEL 1	OUT	
High Voltage			
Battery Check			
Source Check Reading (1)	Initial Function Check		
Source Check Reading (2)			
Source Check Reading (3)			
Source Check Reading (4)			
Source Check Reading (5)			
Source Check Reading (AVERAGE)			
Direct Background reading (1)	Initial Function Check		
Direct Background reading (2)			
Direct Background reading (3)			
Direct Background reading (4)			
Direct Background reading (5)			
Direct Background reading (AVERAGE)			
Efficiency = (CPM-Background) / DPM	NA	NA	
MID-DAY SOURCE READING	~~10167~~	10167	
MID-DAY BACKGROUND READING		6937	
EVENING SOURCE READING		9926	
EVENING BACKGROUND READING		6947	
Morning check performed by	NA		
Mid-day check performed by	AHL Sunny 78°F 1230		
Evening check performed by	JMK 1737		

A983P

FIDLER Serial Number ~~A945P/A378~~Q

DATE: 6/28/01	PAGE 4 OF 20		
Source	Am-241		
Calibration Date	~~5/25/2001~~ 3/20/01		
Out of Cal Date	~~11/21/2001~~ 9/16/01		
Serial Number	A945P		
Source emission rate	254925 dpm	7/27/01 for Ch 1 712900 for OUT	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.24	
Battery Check		ok	
Source Check Reading (1)		10104	
Source Check Reading (2)		10017	
Source Check Reading (3)		10142	
Source Check Reading (4)		10049	
Source Check Reading (5)		10099	
Source Check Reading (AVERAGE)		10082	
Direct Background reading (1)	7113 OUT		
Direct Background reading (2)	7097		
Direct Background reading (3)	7101		
Direct Background reading (4)	6977		
Direct Background reading (5)	6965		
Direct Background reading (AVERAGE)	7051		
Efficiency = (CPM-Background) / DPM		0.43%	
MID-DAY SOURCE READING		10119	
MID-DAY BACKGROUND READING		6934	
EVENING SOURCE READING		10236	
EVENING BACKGROUND READING		6862	
Morning check performed by sunny hazy 72°	JRH 0745		
Mid-day check performed by	JRH 1212		
Evening check performed by	RM 5:37p		

RM 7/27/01

FIDLER Serial Number A983P/A367Q

DATE: 6/29/01	PAGE 5 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for Ch1	
Source emission rate	254925 dpm 710422 for out	
Instrument Channel	**CHANNEL 1**	**OUT**
High Voltage		1.24
Battery Check		ok
Source Check Reading (1)		10195
Source Check Reading (2)		10153
Source Check Reading (3)		10189
Source Check Reading (4)		10277
Source Check Reading (5)		10246
Source Check Reading (AVERAGE)		10212
Direct Background reading (1)		~~10212~~ RDM 6993
Direct Background reading (2)		7063 7063
Direct Background reading (3)		6971
Direct Background reading (4)		6928
Direct Background reading (5)		6540
Direct Background reading (AVERAGE)		6959
Efficiency = (CPM-Background) / DPM	0.46% →	~~7.3%~~ RDM 7/27/01
MID-DAY SOURCE READING	9939 OUT	
MID-DAY BACKGROUND READING	7028	
EVENING SOURCE READING	10201	
EVENING BACKGROUND READING	6845	
Morning check performed by	RDM 0725a 64°F 22°	
Mid-day check performed by	AML 1130 hazy 78°F	
Evening check performed by	JRH 1530	

FIDLER Serial Number A983P/A367Q

DATE: 7/9/01	PAGE 6 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P	for ch1
Source emission rate	254925 dpm	719400 for out
Instrument Channel	CHANNEL 1	OUT
High Voltage		JRH 1.24
Battery Check		.6
Source Check Reading (1)		10158
Source Check Reading (2)		10294
Source Check Reading (3)		10381
Source Check Reading (4)		10370
Source Check Reading (5)		10281
Source Check Reading (AVERAGE)		10297
Direct Background reading (1)		7021
Direct Background reading (2)		7027
Direct Background reading (3)		6912
Direct Background reading (4)		6958
Direct Background reading (5)		7011
Direct Background reading (AVERAGE)		6986
Efficiency = (CPM-Background) / DPM	0.4776	~~1.30 %~~ cpm 7/27/01
MID-DAY SOURCE READING		9940
MID-DAY BACKGROUND READING		6877
EVENING SOURCE READING		9987
EVENING BACKGROUND READING		6943
Morning check performed by 70°F SUNNY		JRH 0735
Mid-day check performed by		JRH 1155
Evening check performed by		JRH 1740

FIDLER Serial Number A983P/A367Q

DATE: 7/10/01	PAGE 7 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for Ch 1	
Source emission rate	254925 dpm 7/10/01 for out	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.24
Battery Check		ok
Source Check Reading (1)		10328
Source Check Reading (2)		10334
Source Check Reading (3)		10210
Source Check Reading (4)		10184
Source Check Reading (5)		10224
Source Check Reading (AVERAGE)		10256
Direct Background reading (1)		7006
Direct Background reading (2)		7150
Direct Background reading (3)		7087
Direct Background reading (4)		7007
Direct Background reading (5)		7132
Direct Background reading (AVERAGE)		7076
Efficiency = (CPM-Background) / DPM	2.45% → ~~1.25%~~	Rom 7/27/01
MID-DAY SOURCE READING		10107
MID-DAY BACKGROUND READING		7023
EVENING SOURCE READING		9876
EVENING BACKGROUND READING		6884
Morning check performed by 65°F Humd		0720 JRH
Mid-day check performed by		1210 JRH
Evening check performed by		1736 JRH

FIDLER Serial Number A983P/A367Q

DATE: 7/11/01	PAGE 8 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for ch 1	
Source emission rate	254925 dpm 710422 for out	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.22
Battery Check		ok
Source Check Reading (1)		9995
Source Check Reading (2)		10027
Source Check Reading (3)		10042
Source Check Reading (4)		10052
Source Check Reading (5)		9998
Source Check Reading (AVERAGE)		10029
Direct Background reading (1)		6867
Direct Background reading (2)		7005
Direct Background reading (3)		6762
Direct Background reading (4)		6800
Direct Background reading (5)		6783
Direct Background reading (AVERAGE)		6843
Efficiency = (CPM-Background) / DPM	0.45% → 1.25 To	
MID-DAY SOURCE READING	NA	10132
MID-DAY BACKGROUND READING	NA	6965
EVENING SOURCE READING	Not used in	
EVENING BACKGROUND READING	afternoon	
Morning check performed by	RPM 72° sunny 7:40 a	
Mid-day check performed by	KLK 1220 sunny 72°F	klk
Evening check performed by	NA	

RPM 7/27/01

bat = OK
HV = 1.22

Cable switched due to intermitent problem w. on HV supply

FIDLER Serial Number A983P/A367Q

DATE: 7/12/01	PAGE 9 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P	for ch1
Source emission rate	254925 dpm	7/13/00 for out
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.22
Battery Check		ok
Source Check Reading (1)		10128
Source Check Reading (2)		10264
Source Check Reading (3)		10191
Source Check Reading (4)		10228
Source Check Reading (5)		10051
Source Check Reading (AVERAGE)		10132
Direct Background reading (1)	7000 →	
Direct Background reading (2)	6850 →	Rom
Direct Background reading (3)	6848 →	done with
Direct Background reading (4)	6883 →	selector at "out"
Direct Background reading (5)	6910 →	
Direct Background reading (AVERAGE)	6898 →	
Efficiency = (CPM-Background) / DPM	1.27%	0.46%
MID-DAY SOURCE READING		10330
MID-DAY BACKGROUND READING		6897
EVENING SOURCE READING		9926
EVENING BACKGROUND READING		6900
Morning check performed by Rom Sunny 68°	7:20a	
Mid-day check performed by Rom overcast	68° 12:05p	
Evening check performed by Rom PC	68° 5:20p	

Rom 7/17/01

Battery changed for midday check

FIDLER Serial Number A983P/A367Q

DATE: 7/13/01	PAGE 10 OF 20	
Source	**Am-241**	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for Ch1	
Source emission rate	254925 dpm 7/10/01 for out	
Instrument Channel	**CHANNEL 1**	**OUT**
High Voltage		1.22
Battery Check		ok
Source Check Reading (1)		10302
Source Check Reading (2)	KMK	10298
Source Check Reading (3)		10221
Source Check Reading (4)		10079
Source Check Reading (5)		10144
Source Check Reading (AVERAGE)		10209
Direct Background reading (1)		6962
Direct Background reading (2)		6852
Direct Background reading (3)	KMK	6787
Direct Background reading (4)		6992
Direct Background reading (5)		7020
Direct Background reading (AVERAGE)		6923
Efficiency = (CPM-Background) / DPM	0.46%	~~4.29%~~ RJM 7/27/01
MID-DAY SOURCE READING		10044
MID-DAY BACKGROUND READING	KMK	6875
EVENING SOURCE READING		9451
EVENING BACKGROUND READING		6382
Morning check performed by RJM 65° Sunny 7:20a		
Mid-day check performed by KML 70°F cloudy		KMK
Evening check performed by RJM 5:35p	75° overcast	

FIDLER Serial Number A983P/A367Q

DATE: 7/14/01	PAGE 11 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P	
Source emission rate	254925 dpm for ch1 710400 for out	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.3 KV
Battery Check		OK
Source Check Reading (1)		10203
Source Check Reading (2)		10146
Source Check Reading (3)		10150
Source Check Reading (4)		10000
Source Check Reading (5)		10181
Source Check Reading (AVERAGE)		10136
Direct Background reading (1)		7283
Direct Background reading (2)		6946
Direct Background reading (3)		6893
Direct Background reading (4)		6871
Direct Background reading (5)		6826
Direct Background reading (AVERAGE)		6831
Efficiency = (CPM-Background) / DPM	NA	9.47% RM 7/27/01
MID-DAY SOURCE READING	NA	NA
MID-DAY BACKGROUND READING	NA	NA
EVENING SOURCE READING	NA	NA
EVENING BACKGROUND READING	NA	NA
Morning check performed by AML 0720	Cloudy, cool, 62°F	
Mid-day check performed by	used with gamma spec not for surveys	
Evening check performed by		

FIDLER Serial Number A983P/A367Q

DATE: 7/15/01	PAGE 12 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for CH1	
Source emission rate	254925 dpm 7,0427 for out	
Instrument Channel	CHANNEL 1	OUT
High Voltage kv		1.22
Battery Check		ok
Source Check Reading (1)		10151
Source Check Reading (2)		10055
Source Check Reading (3)		10128
Source Check Reading (4)		10050
Source Check Reading (5)		10188
Source Check Reading (AVERAGE)		10114
Direct Background reading (1)	7035 OUT	
Direct Background reading (2)	6802	
Direct Background reading (3)	6964	
Direct Background reading (4)	6871	
Direct Background reading (5)	6965	
Direct Background reading (AVERAGE)	6927	
Efficiency = (CPM-Background) / DPM	~~1.25 %~~ KK	0.145 %
MID-DAY SOURCE READING		N.A
MID-DAY BACKGROUND READING		N/A
EVENING SOURCE READING		9847
EVENING BACKGROUND READING	~~6725~~ KKS	6725
Morning check performed by RDM overcast	68° 8:10a	
Mid-day check performed by	not used in AM	
Evening check performed by KKS 1725	Cloudy, 78°	

RDM 7/27/01

FIDLER Serial Number A983P/A367Q

DATE: 7/16/01	PAGE 13 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for CH1	
Source emission rate	254925 dpm 710400 for OUT	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.22 kV
Battery Check		ok
Source Check Reading (1)		10435
Source Check Reading (2)		10301
Source Check Reading (3)		10422
Source Check Reading (4)		10404
Source Check Reading (5)		10240
Source Check Reading (AVERAGE)		10360
Direct Background reading (1)		7149
Direct Background reading (2)		7029
Direct Background reading (3)		6971
Direct Background reading (4)		6829
Direct Background reading (5)		7016
Direct Background reading (AVERAGE)		6999
Efficiency = (CPM-Background) / DPM	~~1.32 %~~	0.47 % RM 7/27/01
MID-DAY SOURCE READING	10388 (OUT)	
MID-DAY BACKGROUND READING	7149	
EVENING SOURCE READING	10249	
EVENING BACKGROUND READING	6925	
Morning check performed by RDM 700	68° SUNNY	
Mid-day check performed by AML 1200	73° SUNNY, WINDY	
Evening check performed by AML	1720	

FIDLER Serial Number A983P/A367Q

DATE: 7/17/01	PAGE 14 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for ch1	
Source emission rate	254925 dpm 712499 for out	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.24
Battery Check		ok
Source Check Reading (1)		10590
Source Check Reading (2)		10501
Source Check Reading (3)		10519
Source Check Reading (4)		10516
Source Check Reading (5)		10367
Source Check Reading (AVERAGE)		10499
Direct Background reading (1)		7158
Direct Background reading (2)		7284
Direct Background reading (3)		7033
Direct Background reading (4)		7140
Direct Background reading (5)		7141
Direct Background reading (AVERAGE)		7151
Efficiency = (CPM-Background) / DPM	2.47%	~~43~~ % RM 7/27/01
MID-DAY SOURCE READING		9961
MID-DAY BACKGROUND READING		7465
EVENING SOURCE READING		10276
EVENING BACKGROUND READING		6892
Morning check performed by rainy 65°F	JRH 0745	
Mid-day check performed by	JRH 1200	
Evening check performed by	AML 1715	

FIDLER Serial Number A983P/A367Q

DATE: 7/18/01	PAGE 15 OF 20	
Source	Am-241	
Calibration Date	3/20/2001	
Out of Cal Date	9/16/2001	
Serial Number	A983P for Ch 1	
Source emission rate	254925 dpm 212400 for out	
Instrument Channel	CHANNEL 1	OUT
High Voltage		1.22
Battery Check		OK
Source Check Reading (1)		10565
Source Check Reading (2)	Junk	10505
Source Check Reading (3)		10411
Source Check Reading (4)		10339
Source Check Reading (5)		10283
Source Check Reading (AVERAGE)		10421
Direct Background reading (1)		8104
Direct Background reading (2)		8042
Direct Background reading (3)	Junk	8011
Direct Background reading (4)		8091
Direct Background reading (5)		8046
Direct Background reading (AVERAGE)		8059
Efficiency = (CPM-Background) / DPM	NA	0.33% RDM 7/27/01
MID-DAY SOURCE READING		10091
MID-DAY BACKGROUND READING	NA	6866
EVENING SOURCE READING		not used in PM
EVENING BACKGROUND READING		NA
Morning check performed by 0730 JMK	FOGGY 70°	
Mid-day check performed by RDM	Sunny 73°	JMK
Evening check performed by	NA	

A953P

FIDLER Serial Number ~~A951P/A402Q~~

DATE: 7-25-01	PAGE 16 OF 20		
Source	Am-241		
Calibration Date	4/10/2001		
Out of Cal Date	3/31/2003		
Serial Number	8920		
Source emission rate	254925 b/min for Ch 1	212400 for out	
Instrument Channel	CHANNEL 1	OUT	
High Voltage		1.22kV	
Battery Check		OK	
Source Check Reading (1)		10410	
Source Check Reading (2)		10413	
Source Check Reading (3)		10157	
Source Check Reading (4)		10237	
Source Check Reading (5)		10415	
Source Check Reading (AVERAGE)		10326.4	
Direct Background reading (1)	7088 (OUT)		
Direct Background reading (2)	6982		
Direct Background reading (3)	7110		
Direct Background reading (4)	7196		
Direct Background reading (5)	6986		
Direct Background reading (AVERAGE)	7072		
Efficiency = (CPM-Background) / DPM	~~1.27%~~	0.46%	RM 7/27/01
MID-DAY SOURCE READING	10290 (OUT)	NA	
MID-DAY BACKGROUND READING	6953		
EVENING SOURCE READING	10326	NA	
EVENING BACKGROUND READING	7012		
Morning check performed by JK 0710 75°	HAZE HUMID		
Mid-day check performed by JK 1148 76°	CLEAR		
Evening check performed by JK 1735 78	P/C HUMID		

Site: Seneca Army Depot
Project: SEAD-12

Instrument Type	A/B			
AKA	phoswich			
Make	Ludlum			
Model	2224			
Serial Number	119815			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-1-1			
Serial Number	PR155183			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		4/10/2001	
Out of Cal Date	3/31/2003		3/31/2003	
Serial Number	1841-94		1039-92	
Source emission	8880		11100	
Instrument Chan	N/A		N/A	
2-pie Instrument	14.59%			14.82%
2 Sigma Range	1245-1347			1731-1944
3-sigma Range	1220-1372			1677-1997

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CLIENT _____ JOB NO. _____ SHEET 2 OF 35

SUBJECT INITIAL FUNCTION CHECKS BY _____ DATE 6/05/01

CKD. _____ REVISION _____

INSTRUMENT: PHOSWICH #2
S/N: PR 155183 / 119 815

HV: 0.75
BATTERY: OK

BACKGROUND (α / β)
TIME: 1140
DATE: 6/5/01

SOURCE
TIME: 12:00 PM
DATE: 6/5/01

TYPE: Th-230
S/N: 1841-94 DNS-9

	α / β	α
1	1/191	1354
2	2/174	1272
3	1/204	1302
4	0/198	1313
5	1/200	1289
6	0/200	1322
7	0/207	1274
8	0/200	1268
9	2/174	1310
10	2/213	1290
11	0/186	1315
12	0/197	1309
13	1/176	1264
14	0/181	1265
15	1/175	1294.

Avg (α) = 0.73
σ (α) = 0.85

Avg = 1296.07
σ = 36.0
2σ = 72.0

Avg (β) = 191.73
σ (β) = 13.85

Source Type: Tc-99
Time: 12:30PM S/N: 1845-94 DNS-9
Date: 6/5/01

Stopped 1340
resume 1620

1	1787	6	1918	11	1823
2	1754	7	1784	12	1831
3	1904	8	1819	13	1804
4	1865	9	1837	14	1817
5	1844	10	1846	15	1804

Avg = 1837.13
σ = 42.9
2σ = 85.8

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PARSONS

CLIENT _____ JOB NO. _____ SHEET 3 OF 35

SUBJECT DAILY FUNCTION CHECKS BY JRH DATE 6/06/01

CKD. _____ REVISION _____

INSTRUMENT: PHOSWICH #2 BATTERY: OK
S/N: PR 155183/119815 HV: 0.75 kV

TIME 0830

BACKGROUND (α/β) midday (DRC)

1	0/208
2	2/189
3	1/195
4	1/184 JRH
5	2/205
Avg =	1.2/196.2

~~Source~~ ~~Evening~~

2/192

Evening: 0/197

SOURCE TYPE: Th-230 TIME: 0845
S/N: 1841-94

1	1298
2	1271
3	1332
4	1278
5	1251 JRH
Avg =	~~1030.4~~ 1286

DRC midday: 1254 (PRC)

DRC Evening: 1298 (DRC)

SOURCE TYPE: Tc-99 TIME: 0855
S/N: 1845-94

1	1831
2	1841
3	1763
4	1757
5	1786
Avg:	1795.6

(PRC) midday: 1810

DRC Evening: 1818

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Phoswich Serial Number 119815 15593 ~~119803/166008~~

DATE: 6/7/01	PAGE 4 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75 KV			
Battery Check	OK			
Source Check Reading (1)	1275			1825
Source Check Reading (2)	1174			1842
Source Check Reading (3)	1270			1794
Source Check Reading (4)	1270			1789
Source Check Reading (5)	1276			1900
Source Check Reading (AVERAGE)	1289			
Direct Background reading (1)	1		199	
Direct Background reading (2)	1		188	
Direct Background reading (3)	2		208	
Direct Background reading (4)	3		192	
Direct Background reading (5)	1		185	
Direct Background reading (AVERAGE)	1.6		194.4	
Efficiency = (CPM-Background) / DPM * 100	14.49 %		15.4 %	
MID-DAY SOURCE READING	1302			1775
MID-DAY BACKGROUND READING	2		201	
EVENING SOURCE READING	1251			1708
EVENING BACKGROUND READING	3		213	
Morning check performed by	DR6	0830		
Mid-day check performed by	DR6	1245		
Afternoon check performed by	DR6	1800		

HV: 0.75 Bat OK

HV: 0.75 Bat OK

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Phoswich Serial Number ~~119803/166008~~ 119815 / 155183

DATE: 6/6/01	PAGE 5 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75		0.75	0.75
Battery Check	OK		OK	OK
Source Check Reading (1)	1189			
Source Check Reading (2)	1246			
Source Check Reading (3)	1278	KLK	FLK	FLK
Source Check Reading (4)	1198			
Source Check Reading (5)	1237			
Source Check Reading (AVERAGE)	1229.6			
Direct Background reading (1) 0720	α 3		β 197	
Direct Background reading (2)	3		229	
Direct Background reading (3)	3		190	
Direct Background reading (4)	5 / 1 redo		200	
Direct Background reading (5)	2		186	
Direct Background reading (AVERAGE)	2.4		200.4	
Efficiency = (CPM-Background) / DPM * 100	NA		NA	
MID-DAY SOURCE READING	1257			1794
MID-DAY BACKGROUND READING	2		162	
EVENING SOURCE READING	NA			NA
EVENING BACKGROUND READING	0		207	
Morning check performed by	JMH			
Mid-day check performed by	DRG 1245			
Afternoon check performed by	KLK			

B.S OK HV a 75

A/B Phoswich Serial Number 119803/~~166008~~ 119815 | 155183

DATE: 6/9/01	PAGE 6 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75	0.75		0.75
Battery Check	OK	OK		OK
Source Check Reading (1)	1239			1837
Source Check Reading (2)	1217			1762
Source Check Reading (3)	1307			1828
Source Check Reading (4)	1236			1859
Source Check Reading (5)	1233			1774
Source Check Reading (AVERAGE)	1246			1812
Direct Background reading (1)	2		196	
Direct Background reading (2)	0		188	
Direct Background reading (3)	2		194	
Direct Background reading (4)	3		207	
Direct Background reading (5)	1		195	
Direct Background reading (AVERAGE)	1.6		196	
Efficiency = (CPM-Background) / DPM * 100	14%		14.6%	
MID-DAY SOURCE READING	1258			1843
MID-DAY BACKGROUND READING	2		213	
EVENING SOURCE READING	1277			1782
EVENING BACKGROUND READING	4		208	
Morning check performed by	JRH 0730			
Mid-day check performed by	JRH 1245			
Afternoon check performed by	DRG 1640			

Bat: OK
HV: 0.7

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Phoswich Serial Number ~~119803/166008~~ 119915 / 155183 KM

DATE: 6/10/01	PAGE 7 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75	0.75		0.75
Battery Check	OK	OK		OK
Source Check Reading (1)	1242			1836
Source Check Reading (2)	1333			1847
Source Check Reading (3)	1205			1821
Source Check Reading (4)	1304			1750
Source Check Reading (5)	1258			1844
Source Check Reading (AVERAGE)	1268			1820
Direct Background reading (1)	α 1		β 267	
Direct Background reading (2)	1		194	
Direct Background reading (3)	2		215	
Direct Background reading (4)	2		237	
Direct Background reading (5)	1		227	
Direct Background reading (AVERAGE)	1.4		228	
Efficiency = (CPM-Background) / DPM * 100	14.3 %		14.3 %	
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING	Not Used in AM		Not used in AM JEH	
EVENING SOURCE READING	NA			
EVENING BACKGROUND READING	NA			
Morning check performed by	JEH 0750			
Mid-day check performed by	Not used JEH			
Afternoon check performed by	Not used JEH			

A/B Phoswich Serial Number ~~119803/166008~~ 119815 / 155183 KW

DATE: 6/11/01	PAGE 8 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	oK			
Source Check Reading (1)	1179			1719
Source Check Reading (2)	1225			1779
Source Check Reading (3)	1273	KW	KW	1741
Source Check Reading (4)	1193			1749
Source Check Reading (5)	1260			1805
Source Check Reading (AVERAGE) low →	1226			1759
Direct Background reading (1)	3		189	
Direct Background reading (2)	1		215	
Direct Background reading (3)	2		201	
Direct Background reading (4)	2		191	
Direct Background reading (5)	2		189	
Direct Background reading (AVERAGE)	2		197	
Efficiency = (CPM-Background) / DPM * 100	14% & OK		14% ~~197~~ OK	
MID-DAY SOURCE READING	KW		KW	
MID-DAY BACKGROUND READING				
EVENING SOURCE READING	KW		KW	
EVENING BACKGROUND READING				
Morning check performed by	DRG / JRH 0830			
Mid-day check performed by	did not use in AM			
Afternoon check performed by	did not use in PM			

A/B Phoswich Serial Number ~~119803/166008~~ 119815 / 155183 KM

DATE:	PAGE 9 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75	0.75		0.75
Battery Check	ok	OK		OK
Source Check Reading (1)	1279			~~1739~~ 1781 ok
Source Check Reading (2)	1169		KM	1799
Source Check Reading (3)	1189			1758
Source Check Reading (4)	1275			1819
Source Check Reading (5)	1330			1852
Source Check Reading (AVERAGE) ok	1248.4			1801.8 ok
Direct Background reading (1)	α 1		β 241	
Direct Background reading (2)	2		209	
Direct Background reading (3)	0		197	
Direct Background reading (4)	3		235	
Direct Background reading (5)	0		178	
Direct Background reading (AVERAGE)	1		212	
Efficiency = (CPM-Background) / DPM * 100	14 %		14.3 %	
MID-DAY SOURCE READING	1252			1773 But OK HV: 0.75
MID-DAY BACKGROUND READING	1		234	
EVENING SOURCE READING	1319			1839 But OK HV: 0.75
EVENING BACKGROUND READING	2		221	
Morning check performed by	VRH 0745			
Mid-day check performed by	DRG 1225			
Afternoon check performed by	DRG 1705			

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Phoswich Serial Number ~~119803/166008~~ 119813 / 15983 VK

DATE: 6/13/01	PAGE 10 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	OK			
Source Check Reading (1)	1279			1756
Source Check Reading (2)	1303		VK	1735
Source Check Reading (3)	1292			1810
Source Check Reading (4)	1296			1847
Source Check Reading (5)	1240			1798
Source Check Reading (AVERAGE)	1282			1789
Direct Background reading (1)	2		194	
Direct Background reading (2)	4		189	
Direct Background reading (3)	1		179	
Direct Background reading (4)	1		196	
Direct Background reading (5)	4		186	
Direct Background reading (AVERAGE)	2.4		189	
Efficiency = (CPM-Background) / DPM * 100	14.4 %		14.4 %	
MID-DAY SOURCE READING	not used in AM →			
MID-DAY BACKGROUND READING	NA →			
EVENING SOURCE READING	not used in AM →			
EVENING BACKGROUND READING	NA →			
Morning check performed by	JRH 0720			
Mid-day check performed by	NA			
Afternoon check performed by	NA			

SENECA ARMY DEPOT
SEAD-12 RI/FS

119815 / 155183
~~119815~~ ~~155183~~ JMK 1-k
~~155172~~

A/B Phoswich Serial Number ~~119803/166008~~ JMK

DATE: 6/18/01	PAGE 11 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	~~0.75~~ JMK 0.75 kV			
Battery Check	OK			
Source Check Reading (1)	1184	377	3	1756
Source Check Reading (2)	1244	~~344~~ 415 JMK	2	1714
Source Check Reading (3)	1207	375	0	1799
Source Check Reading (4)	1239	395	1	1746
Source Check Reading (5)	1284	411	1	1796
Source Check Reading (AVERAGE)	1231.6	394.6	1.4	1762.2
Direct Background reading (1)	~~22~~ JMK 5		184	
Direct Background reading (2)	~~40~~ JMK 3		161	
Direct Background reading (3)	3		177	
Direct Background reading (4)	2		173	
Direct Background reading (5)	1		169	
Direct Background reading (AVERAGE)	2.8		176.8	
Efficiency = (CPM-Background) / DPM * 100	14%		14%	
MID-DAY SOURCE READING	not used in AM			
MID-DAY BACKGROUND READING	NA			
EVENING SOURCE READING	1261	357	2	1707
EVENING BACKGROUND READING 5:18 RDM	2		204	
Morning check performed by	JMK			
Mid-day check performed by	NA			
Afternoon check performed by	RDM			

A/B Phoswich Serial Number 119803/~~166008~~ 15/185183 VK

DATE: 6/19/01	PAGE 12 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75 kV			
Battery Check	ok			
Source Check Reading (1)	1217	351	NA Rom 3	1727
Source Check Reading (2) Rom 1258	~~1226~~	368		1705
Source Check Reading (3)	1227	351	NA Rom	1706
Source Check Reading (4)	1184	357		1691
Source Check Reading (5)	1200	384		1743
Source Check Reading (AVERAGE)	1217, σ=35	362 σ=19		~~1710~~ 1714 Rom σ=41
Direct Background reading (1)	3		192	
Direct Background reading (2)	3		196	
Direct Background reading (3)	1		187	
Direct Background reading (4)	5		196	
Direct Background reading (5)	1		185	
Direct Background reading (AVERAGE)	2,6 σ=1,6		191,2 σ=13,8	
Efficiency = (CPM-Background) / DPM * 100	14%		14%	
MID-DAY SOURCE READING	1191	335	1	1756
MID-DAY BACKGROUND READING	0		187	
EVENING SOURCE READING	1298	368	3	1716
EVENING BACKGROUND READING	180		180	
Morning check performed by	Rom 7:15a			
Mid-day check performed by	Rom 12:26p			
Afternoon check performed by	JMK 1655hrs			

A/B Phoswich Serial Number 119815/185183 ~~119803/166008~~ KM

DATE: 6/20/2001	PAGE 13 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.8 kV			
Battery Check	OK			
Source Check Reading (1)	1270			1712
Source Check Reading (2)	1215			1645
Source Check Reading (3)	1253			1615
Source Check Reading (4)	1307			1732
Source Check Reading (5)	1255			1757
Source Check Reading (AVERAGE)	1260			16922
Direct Background reading (1)	JRK ~~107~~ 0		196	
Direct Background reading (2)	JRK ~~204~~ 2		166	
Direct Background reading (3)	α 2		β 172	
Direct Background reading (4)	2		167	
Direct Background reading (5)	2		193	
Direct Background reading (AVERAGE)	1.6		178.8	
Efficiency = (CPM-Background) / DPM * 100	14%		14%	
MID-DAY SOURCE READING	1248 ~~1136~~ JRK	~~335~~ RDM	1	1687
MID-DAY BACKGROUND READING	1	352	193	
EVENING SOURCE READING	1251			1695
EVENING BACKGROUND READING	0		193	
Morning check performed by	JRK		0710	
Mid-day check performed by	RDM		12:05 p	
Afternoon check performed by	KLK			

A/B Phoswich Serial Number 119815/155183

DATE: 6/21/01	PAGE 14 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	OK			
Source Check Reading (1)	1152		KVE	1692
Source Check Reading (2)	1100			1737
Source Check Reading (3)	1117			1777
Source Check Reading (4)	1136			1821
Source Check Reading (5)	1135			1765
Source Check Reading (AVERAGE)	1128			1748.4
Direct Background reading (1)	1		193	
Direct Background reading (2)	4		208	
Direct Background reading (3)	1		184	
Direct Background reading (4)	1		188	
Direct Background reading (5)	0		185	
Direct Background reading (AVERAGE)	1.4		191	
Efficiency = (CPM-Background) / DPM * 100	13%		14%	
MID-DAY SOURCE READING	1250	NA	NA	1840
MID-DAY BACKGROUND READING	1		235	
EVENING SOURCE READING	mylar	changed		
EVENING BACKGROUND READING	NA	→		
Morning check performed by	KKS			
Mid-day check performed by	JMK			
Afternoon check performed by	NA			

Mylar was broken during afternoon scanning - the data collected prior to the breakage is ok.

Site: Seneca Army Depot
Project: SEAD-12

Instrument Type	A/B			
AKA	phoswich			
Make	Ludlum			
Model	2224			
Serial Number	119815			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-1-1			
Serial Number	PR155183			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		4/10/2001	
Out of Cal Date	3/31/2003		3/31/2003	
Serial Number	1841-94		1039-92	
Source emission	8880		11100	
Instrument Chan	N/A		N/A	
2-pie Instrument	14.19%			14.47%
2 Sigma Range	1174-1349			1700-1888
3-sigma Range	1131-1393			1654-1935

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PARSONS

CLIENT _____ JOB NO. _____ SHEET 16 OF 35

SUBJECT _____ BY _____ DATE 6/27/01

Initial fx check PHOSWICH #119815 CKD. _____ REVISION _____

Th-230

~~Tc-99~~

alpha

1	1211	(0940)
2	1296	
3	1307	
4	1233	
5	1240	
6	1340	
7	1279	
8	1288	(1007)
9	1190	
10	1202	
11	1273	
12	1302	
13	1231	
14	1289	
15	1243	

Tc-99 (beta)

1	1794	(0945)
2	1796	
3	1776	
4	1838	
5	1751	
6	1871	
7	1844	
8	1873	
9	1792	(1015)
10	1741	
11	1746	
12	1744	
13	1747	
14	1833	
15	1768	

	α BACKGROUND	β	
1	1	183	(0950)
2	2	178	
3	2	209	
4	1	197	
5	2	183	
6	6	181	
7	1	184	
8	1	198	
9	2	199	(1025)
10	1	179	
11	3	183	
12	3	183	
13	1	194	
14	2	197	
15	1	170	

A/B Phoswich Serial Number 119815/155183

DATE: 6/27/01	PAGE 17 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	OK			
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)				
Source Check Reading (4)				
Source Check Reading (5)			Initial fx check done	in
Source Check Reading (AVERAGE)				
Direct Background reading (1)			morning	
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)				
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100	NA		NA	
MID-DAY SOURCE READING	1672	NA	NA	1383
MID-DAY BACKGROUND READING	1		183	
EVENING SOURCE READING	1283	NA	NA	1798
EVENING BACKGROUND READING	1		185	
Morning check performed by	initial fx check done			
Mid-day check performed by	JK			
Afternoon check performed by	JF			

↓ represents α+β.
Initial fx checks just finished at 1030 thru L.
Kuba

A/B Phoswich Serial Number 119815/155183

DATE: 6/28/01	PAGE 18 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.756V			
Battery Check	ok			
Source Check Reading (1)	1290			1845
Source Check Reading (2)	1276			1741
Source Check Reading (3)	1250			1819
Source Check Reading (4)	1292			1733
Source Check Reading (5)	1288			1850
Source Check Reading (AVERAGE)	1279			1798
Direct Background reading (1)	0		206	
Direct Background reading (2)	1		184	
Direct Background reading (3)	3		177	
Direct Background reading (4)	2		194	
Direct Background reading (5)	2		175	
Direct Background reading (AVERAGE)	1.6		187	
Efficiency = (CPM-Background) / DPM * 100	14%		15%	
MID-DAY SOURCE READING	1229	333	[illegible]	1784
MID-DAY BACKGROUND READING	2		213	
EVENING SOURCE READING	1294	NA	NA	1815
EVENING BACKGROUND READING	1		192	
Morning check performed by sunny 72°F	JRH 0712			
Mid-day check performed by Humid Sunny 86°F	JMK 1214			
Afternoon check performed by	JMK 1730			

A/B Phoswich Serial Number 119815/155183

DATE: 6/29/01	PAGE 19 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	1.7 KV			
Battery Check	OK			
Source Check Reading (1)	1242			1836
Source Check Reading (2)	1246			1828
Source Check Reading (3)	1313			1755
Source Check Reading (4)	1188	NA	NA	1904
Source Check Reading (5)	1280			1886
Source Check Reading (AVERAGE)	1254			1842
Direct Background reading (1)	3		184	
Direct Background reading (2)	3		201	
Direct Background reading (3)	1		173	
Direct Background reading (4)	2		175	
Direct Background reading (5)	2		208	
Direct Background reading (AVERAGE)	2.2		188	
Efficiency = (CPM-Background) / DPM * 100	14%		15%	
MID-DAY SOURCE READING	1291			1805
MID-DAY BACKGROUND READING	2		206	
EVENING SOURCE READING	1306	NA	NA	1752
EVENING BACKGROUND READING	3		195	
Morning check performed by	AML 0700		Overcast 70°F	
Mid-day check performed by	JMK 1121		P/C 80°F	HUMID
Afternoon check performed by	JK 1529		80°F	"

A/B Phoswich Serial Number 119815/155183

DATE: 7/9/01	PAGE 20 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	ok			
Source Check Reading (1)	1286			1794
Source Check Reading (2)	1327			1883
Source Check Reading (3)	1252			1803
Source Check Reading (4)	1280			1855
Source Check Reading (5)	1299			1749
Source Check Reading (AVERAGE)	1288.8			1816.8
Direct Background reading (1)	A 3		B 213	
Direct Background reading (2)	2		217	
Direct Background reading (3)	5		187	
Direct Background reading (4)	3		204	
Direct Background reading (5)	2		182	
Direct Background reading (AVERAGE)	3		201	
Efficiency = (CPM-Background) / DPM * 100	14.5%		14.6%	
MID-DAY SOURCE READING	1260			1876
MID-DAY BACKGROUND READING	4		193	
EVENING SOURCE READING	1215			1787
EVENING BACKGROUND READING	3		205	
Morning check performed by 70°F sunny	JRH 0725			
Mid-day check performed by	JRH 1155			
Afternoon check performed by 70°F sunny	AMC 1745			

Batteries changed after midday check - JRH

A/B Phoswich Serial Number 119815/155183

DATE: 7/10/01	PAGE 21 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	ok			
Source Check Reading (1)	1247			1941
Source Check Reading (2)	1365			1852
Source Check Reading (3)	1272	EVK		1836
Source Check Reading (4)	1302			1841
Source Check Reading (5)	1296			1902
Source Check Reading (AVERAGE)	1296			1874
Direct Background reading (1) β/α	274/1			
Direct Background reading (2)	187/3			
Direct Background reading (3)	178/4			
Direct Background reading (4)	209/2		NA	
Direct Background reading (5)	189/7			
Direct Background reading (AVERAGE)	207/3.4			
Efficiency = (CPM-Background) / DPM * 100	α ~~12.3~~ % 14.6		β 15 %	
MID-DAY SOURCE READING	1262			1853
MID-DAY BACKGROUND READING	2/216			
EVENING SOURCE READING	1353			1732
EVENING BACKGROUND READING	3/187		NA	
Morning check performed by	Ron 07:03a 70° overcast/humid			
Mid-day check performed by	JRH 1215			
Afternoon check performed by	JRH 1735			

A/B Phoswich Serial Number 119815/155183

DATE: 7/11/01	PAGE 22 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	OK			
Source Check Reading (1)	1254			1890
Source Check Reading (2)	1254			1793
Source Check Reading (3)	1297	KWL	KWL	1789
Source Check Reading (4)	1278			1791
Source Check Reading (5)	1328			1785
Source Check Reading (AVERAGE)	1282			1810
Direct Background reading (1)	5		214	
Direct Background reading (2)	2		194	
Direct Background reading (3)	5		183	
Direct Background reading (4)	3		200	
Direct Background reading (5)	5		208	
Direct Background reading (AVERAGE)	4		200	
Efficiency = (CPM-Background) / DPM * 100	14%		15%	
MID-DAY SOURCE READING	1328			1884
MID-DAY BACKGROUND READING	7		234	
EVENING SOURCE READING 1331	2			1841
EVENING BACKGROUND READING	2		226	
Morning check performed by AML 0710	Warm sunny 70°F			
Mid-day check performed by	JRH 1205		Cloudy	
Afternoon check performed by	JRH 1730			

A/B Phoswich Serial Number 119815/155183

DATE: 7/12/01	PAGE 23 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.7 kV			
Battery Check	OK			
Source Check Reading (1)	1259			1842
Source Check Reading (2)	1309			1567
Source Check Reading (3)	1270			1571
Source Check Reading (4)	1302			1616
Source Check Reading (5)	1343			1640
Source Check Reading (AVERAGE)	1297			1647
Direct Background reading (1)	4		255	
Direct Background reading (2)	2		209	
Direct Background reading (3)	7		165	
Direct Background reading (4)	1		209	
Direct Background reading (5)	3		198	
Direct Background reading (AVERAGE)	3		207	
Efficiency = (CPM-Background) / DPM * 100	15%		13%	
MID-DAY SOURCE READING	1298			1874
MID-DAY BACKGROUND READING	4		229	
EVENING SOURCE READING	1184	NA	NA	1799
EVENING BACKGROUND READING	2		232	
Morning check performed by	AML 0700 cloudy cooler			
Mid-day check performed by	KLK 1200 windy, 70°F			
Afternoon check performed by	JMK 1730 windy 70°F			

A/B Phoswich Serial Number 119815/155183

DATE: 7/13/01	PAGE 24 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.7 KV			
Battery Check	OK			
Source Check Reading (1)	1213			1876
Source Check Reading (2)	1272			1822
Source Check Reading (3)	1236	KWK	KWK	1867
Source Check Reading (4)	1243			1824
Source Check Reading (5)	1245			1921
Source Check Reading (AVERAGE)	1242			1862
Direct Background reading (1)	2		257	
Direct Background reading (2)	0		244	
Direct Background reading (3)	5		228	
Direct Background reading (4)	6		201	
Direct Background reading (5)	3		181	
Direct Background reading (AVERAGE)	3		186	
Efficiency = (CPM-Background) / DPM * 100	14 %		15 %	
MID-DAY SOURCE READING	1244			1779
MID-DAY BACKGROUND READING	5		222	
EVENING SOURCE READING	1304	NA	NA	1791
EVENING BACKGROUND READING	4		222	
Morning check performed by	AML 0700 Cloudy/rain 68°F			
Mid-day check performed by	JRH 1218			
Afternoon check performed by	KLK 1730			

A/B Phoswich Serial Number 119815/155183

DATE: 7/14/01	PAGE 25 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.75			
Battery Check	ok			
Source Check Reading (1)	1271			1748
Source Check Reading (2)	1310		KLK	1829
Source Check Reading (3)	1340			1773
Source Check Reading (4)	1276			1844
Source Check Reading (5)	1250			1837
Source Check Reading (AVERAGE)	1289			1806
Direct Background reading (1)	4		204	
Direct Background reading (2)	3		196	
Direct Background reading (3)	7		185	
Direct Background reading (4)	2		209	
Direct Background reading (5)	3		199	
Direct Background reading (AVERAGE)	3.8		199	
Efficiency = (CPM-Background) / DPM * 100	14%		14%	
MID-DAY SOURCE READING	1261	NA	NA	1865
MID-DAY BACKGROUND READING	7		207	
EVENING SOURCE READING	not used in PM →			
EVENING BACKGROUND READING	not used in PM			
Morning check performed by	JRL 0705 cool rainy			
Mid-day check performed by	KLK 1210 68°			
Afternoon check performed by	NA			

A/B Phoswich Serial Number 119815/155183

DATE: 7/15/01	PAGE 26 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.7 KV			
Battery Check	OK			
Source Check Reading (1)	1263			1814
Source Check Reading (2)	1296			1866
Source Check Reading (3)	1248	KVL	KVL	1753
Source Check Reading (4)	1276			1902
Source Check Reading (5)	1220			1808
Source Check Reading (AVERAGE)	1261			1829
Direct Background reading (1)	6		194	
Direct Background reading (2)	7		201	
Direct Background reading (3)	10		210	
Direct Background reading (4)	7		212	
Direct Background reading (5)	9		212	
Direct Background reading (AVERAGE)	8		206	
Efficiency = (CPM-Background) / DPM * 100	14%		15%	
MID-DAY SOURCE READING	1300			1770
MID-DAY BACKGROUND READING	5		217	
EVENING SOURCE READING	1365			1845
EVENING BACKGROUND READING	5		224	
Morning check performed by AML 0715	Partly cloudy, warm 68°F			
Mid-day check performed by	JRH 1200			
Afternoon check performed by AML 1530	Sunny, warm 74°F			

A/B Phoswich Serial Number 119815/155183

DATE: James Kurfu 7/16/9			PAGE 27 of 35	
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72 KV			
Battery Check	OK			
Source Check Reading (1)	1307			1684
Source Check Reading (2)	1277			1919
Source Check Reading (3)	1198			1840
Source Check Reading (4)	1240			1913
Source Check Reading (5)	1279			1844
Source Check Reading (AVERAGE)	1260			1880
Direct Background reading (1)	9		229	
Direct Background reading (2)	5		194	
Direct Background reading (3)	3		182	
Direct Background reading (4)	9		188	
Direct Background reading (5)	3		185	
Direct Background reading (AVERAGE)	5.8		196	
Efficiency = (CPM-Background) / DPM * 100	14.1%		15.2%	
MID-DAY SOURCE READING	1228			1850
MID-DAY BACKGROUND READING	7		216	
EVENING SOURCE READING	1284			1884
EVENING BACKGROUND READING	2		185	
Morning check performed by	JRH 0715			
Mid-day check performed by	JRH 1210			
Afternoon check performed by	AMC 1710			

A/B Phoswich Serial Number 119815/155183

DATE: 7/17/01	PAGE 28 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72 kV			
Battery Check	ok			
Source Check Reading (1)	1333			1864
Source Check Reading (2)	1235		KW	1898
Source Check Reading (3)	1201			1833
Source Check Reading (4)	1170			1877
Source Check Reading (5)	1267			1836
Source Check Reading (AVERAGE)	1241			1862
Direct Background reading (1)	2		225	
Direct Background reading (2)	7		177	
Direct Background reading (3)	2		216	
Direct Background reading (4)	6		213	
Direct Background reading (5)	4		187	
Direct Background reading (AVERAGE)	4.2		204	
Efficiency = (CPM-Background) / DPM * 100	13.9 %		14.9 %	
MID-DAY SOURCE READING	1286			1853
MID-DAY BACKGROUND READING	5		204	
EVENING SOURCE READING	1329			1765
EVENING BACKGROUND READING	3		212	
Morning check performed by rainy hand	JRH 0715			
Mid-day check performed by	JRH 1200			
Afternoon check performed by	RDM 5:07p			

A/B Phoswich Serial Number 119815/155183

DATE: 7-18-2001	PAGE 29 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72 kV			
Battery Check	OK			
Source Check Reading (1)	1190			1826
Source Check Reading (2)	1341			1854
Source Check Reading (3)	1196			1840
Source Check Reading (4)	1229			1867
Source Check Reading (5)	1276			1977
Source Check Reading (AVERAGE)	1246.4			1712.6
Direct Background reading (1)	4		234	
Direct Background reading (2)	3		180	
Direct Background reading (3)	4		196	
Direct Background reading (4)	7		230	
Direct Background reading (5)	7		221	
Direct Background reading (AVERAGE)	5		212.2	
Efficiency = (CPM-Background) / DPM * 100	14%		14%	
MID-DAY SOURCE READING	1245			1988
MID-DAY BACKGROUND READING	5		221	
EVENING SOURCE READING	not used in PM →			
EVENING BACKGROUND READING	NA		NA	
Morning check performed by JAMES KUFFEL	FOGGY 68° 0730			
Mid-day check performed by AML	SUNNY WARM 73° F			
Afternoon check performed by	NA			

A/B Phoswich Serial Number 119815/155183

DATE: 7.22 - 01	PAGE 30 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.7kV			
Battery Check	ok			
Source Check Reading (1)	1189			1777
Source Check Reading (2)	1250			1677
Source Check Reading (3)	1260	KLK	KLK	1738
Source Check Reading (4)	1271			1815
Source Check Reading (5)	1321			1729
Source Check Reading (AVERAGE)	1258			1747
Direct Background reading (1)	4		191	
Direct Background reading (2)	3		187	
Direct Background reading (3)	8		180	
Direct Background reading (4)	8		194	
Direct Background reading (5)	4		204	
Direct Background reading (AVERAGE)	5.4		191	
Efficiency = (CPM-Background) / DPM * 100	14%		14%	
MID-DAY SOURCE READING	1226	KKS	KKS	1819
MID-DAY BACKGROUND READING	6		190	
EVENING SOURCE READING	~~1015~~	1306		1764
EVENING BACKGROUND READING	7		174	
Morning check performed by	KLK 0930			
Mid-day check performed by	KKS 1218 74° Hazy			
Afternoon check performed by	JNK			

A/B Phoswich Serial Number 119815/155183

DATE: 7-24-01	PAGE 31 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72 KV			
Battery Check	OK			
Source Check Reading (1)	1216			1869
Source Check Reading (2)	1322		KLK	1803
Source Check Reading (3)	1254			1775
Source Check Reading (4)	1255			1857
Source Check Reading (5)	1301			1823
Source Check Reading (AVERAGE)	1269.6			1825.4
Direct Background reading (1)	4		239	
Direct Background reading (2)	5		215	
Direct Background reading (3)	10		242	
Direct Background reading (4)	7		229	
Direct Background reading (5)	2		159	
Direct Background reading (AVERAGE)	5.6		222.8	
Efficiency = (CPM-Background) / DPM * 100	14.23%		14.43%	
MID-DAY SOURCE READING	1283			1825
MID-DAY BACKGROUND READING	10		206	
EVENING SOURCE READING	1273			1748
EVENING BACKGROUND READING	8		210	
Morning check performed by JAMES KUFFIS 0712	76°F OVERCAST HUMID			
Mid-day check performed by JMK 1200 76°	HAZE HUMID			
Afternoon check performed by	78°F 1744 KLK			

A/B Phoswich Serial Number 119815/155183

DATE: 7-25-01	PAGE 32 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72 kV			
Battery Check	OK			
Source Check Reading (1)	1255			1815
Source Check Reading (2)	1254			1848
Source Check Reading (3)	1204			1955
Source Check Reading (4)	1302			1860
Source Check Reading (5)	1270			1809
Source Check Reading (AVERAGE)	1257			1857
Direct Background reading (1)	4		183	
Direct Background reading (2)	8		183	
Direct Background reading (3)	16		227	
Direct Background reading (4)	10		197	
Direct Background reading (5)	9		202	
Direct Background reading (AVERAGE)	9.4		198.4	
Efficiency = (CPM-Background) / DPM * 100	14.04%		14.94 %	
MID-DAY SOURCE READING	~~1255~~	1235	NA	1773
MID-DAY BACKGROUND READING	7		202	
EVENING SOURCE READING	1239	NA	NA	1729
EVENING BACKGROUND READING	8		182	
Morning check performed by JK 0707 75°	~~JK CLEAR~~ HUMID HAZE			
Mid-day check performed by JK 1145 76°	CLEAR			
Afternoon check performed by JK 1730 78°	P/C			

A/B Phoswich Serial Number 119815/155183

DATE: 7-26-01	PAGE 33 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72			
Battery Check	OK			
Source Check Reading (1)	1309			1726
Source Check Reading (2)	1226			1862
Source Check Reading (3)	1263			1858
Source Check Reading (4)	1315			1896
Source Check Reading (5)	1229			1928
Source Check Reading (AVERAGE)	1268.4			1854
Direct Background reading (1)	1		229	
Direct Background reading (2)	6		198	
Direct Background reading (3)	7		207	
Direct Background reading (4)	4		211	
Direct Background reading (5)	3		197	
Direct Background reading (AVERAGE)	4.2		208.4	
Efficiency = (CPM-Background) / DPM * 100	14.23%		14.825%	
MID-DAY SOURCE READING	1282	NA	NA	1853
MID-DAY BACKGROUND READING	4		187	
EVENING SOURCE READING	1366	NA	NA	1840
EVENING BACKGROUND READING	10		219	
Morning check performed by James Kubeis 0716	74° Rain			
Mid-day check performed by James Kubeis 1204	73° Partly Cloudy			
Afternoon check performed by JK 1730	74° SUNNY			

A/B Phoswich Serial Number 119815/155183

DATE: 7-27-01	PAGE 34 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119815		119815	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72			
Battery Check	OK			
Source Check Reading (1)	1293			1876
Source Check Reading (2)	1168			1925
Source Check Reading (3)	1271		KLK	1860
Source Check Reading (4)	1209			1838
Source Check Reading (5)	1309			1896
Source Check Reading (AVERAGE)	1250			1879
Direct Background reading (1)	8		181	
Direct Background reading (2)	8		211	
Direct Background reading (3)	10		184	
Direct Background reading (4)	10		204	
Direct Background reading (5)	12		184	
Direct Background reading (AVERAGE)	9.6		192.8	
Efficiency = (CPM-Background) / DPM * 100	13.96%		15.19%	
MID-DAY SOURCE READING	1200	NA	NA	1841
MID-DAY BACKGROUND READING	6		209	
EVENING SOURCE READING	MYLAR PERFORATED			
EVENING BACKGROUND READING	NOT USED PM. JK			
Morning check performed by JK 0706 68°F	Sunny			
Mid-day check performed by Rom 1:15p 70°F	Sunny			
Afternoon check performed by	mylar repaired			

A/B Phoswich Serial Number ~~119803/166008~~ 119815/155183

DATE: 7-28-01	PAGE 35 of 35			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.72			
Battery Check	ok			
Source Check Reading (1)	1242			1856
Source Check Reading (2)	1244			1831
Source Check Reading (3)	1224			1900
Source Check Reading (4)	1274			1941
Source Check Reading (5)	1219			1831
Source Check Reading (AVERAGE)	1241			1872
Direct Background reading (1)	13		271	
Direct Background reading (2)	2		216	
Direct Background reading (3)	9		202	
Direct Background reading (4)	6		219	
Direct Background reading (5)	6		194	
Direct Background reading (AVERAGE)	7		220	
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING	ECK			
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by	RM 8:05a Sunny 67°			
Mid-day check performed by	Not used in p.m.			
Afternoon check performed by	NA			

Site: Seneca Army Depot
Project: SEAD-12

Instrument Type	A/B			
AKA	phoswich			
Make	Ludlum			
Model	2224			
Serial Number	KWL ~~419800~~ 119803			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-1-1			
Serial Number	PR166008			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		4/10/2001	
Out of Cal Date	3/31/2003		3/31/2003	
Serial Number	1841-94		1039-92	
Source emission	8880		11100	
Instrument Chan	N/A		N/A	
2-pie Instrument	9.21%			10.70%
2 Sigma Range	765-871			1283-1444
3 Sigma Range	739-897			1243-1485

INSTRUMENT: PHOSWICH #1 HV: 0.65 kV ok

S/N: 119803 / PR 166008 BATTERY: OK

JIG #1

BACKGROUND (α/β)

TIME: 1050

DATE: 6/5/01

1	0 / 188
2	0 / 185
3	0 / 166
4	0 / 190
5	0 / 191
6	0 / 166
7	0 / 171
8	0 / 185
9	0 / 172
10	0 / 166
11	0 / 183
12	0 / 179
13	0 / 148
14	0 / 179
15	0 / 172

Avg = 0/176

σ = 0/13

2σ = 0/26

SOURCE TYPE: Th-230

TIME: 11:30 S/N: 1841-94

DATE: 6/5/01

1	~~301~~ AL 844
2	819
3	845
4	822
5	845
6	816
7	774
8	825
9	782
10	834
11	787
12	779
13	855
14	831
15	811

Avg = 818

σ = 29

2σ = 58

Source

Time: 11:50

Date: 6/5/01

Type: TC-99

S/N: 1039/92

1	1328
2	1313
3	1383
4	1328
5	1394
6	1374
7	1405
8	1356
9	1344
10	1342
11	1373
12	1378
13	1443
14	1406
15	1292

Avg = 1364

σ = 37

2σ = 74

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CLIENT _____ JOB NO. _____ SHEET 3 OF 52

SUBJECT DAILY FUNCTION CHECK BY JRH DATE 6/06/01

CKD. _____ REVISION _____

INSTRUMENT: PHOSWICH #1 BATTERY: OK
S/N: 119803 / PR 166008 HV:

BACKGROUND (α/β) TIME: 0900

1	1 / 178	→ elevated alpha may be residual from photomultiplier washout from Mylar break yesterday
2	0 / 175	
3	0 / 188	
4	0 / 160	Redo gave 0 α
5	0 / 160	Evening 0/167 DR6

SOURCE TYPE: Tc-99 TIME: 0905
S/N: 1039-92

1	1309	Evening 1309 DR6
2	1383	
3	1434	
4	1343	
5	1427 Jeff	

SOURCE TYPE: Th-230 TIME: 0920
S/N: 1841-94

1	831	Evening 804 DR6
2	825	
3	801	
4	783	
5	830	

A/B Phoswich Serial Number 119803/166008

DATE: 6/7/01 PAGE 4 of 52

Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65	~~0.65~~ JRH		0.65
Battery Check	OK		NA	OK
Source Check Reading (1)	787			1343
Source Check Reading (2)	797			1332
Source Check Reading (3)	820			1344
Source Check Reading (4)	799	JRH	JRH	1393
Source Check Reading (5)	822			1308
Source Check Reading (AVERAGE) OK	805			1344 OK
Direct Background reading (1) 0800	α 0		β 186	
Direct Background reading (2)	0		195	
Direct Background reading (3)	1 / 0		182	
Direct Background reading (4) Redid background readings of 1 and got 0 JRH	1 / 0		197	
Direct Background reading (5)	0		170	
Direct Background reading (AVERAGE)	0		186	
Efficiency = (CPM-Background) / DPM * 100	9%		10.4 %	
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING	NOT USED IN AM		NOT USED IN AM	
EVENING SOURCE READING	811 ok			1287 ok
EVENING BACKGROUND READING	0		JRH ~~152~~ 177	
Morning check performed by	JRH 0900			
Mid-day check performed by	NA			
Afternoon check performed by	JRH 1815			

A/B Phoswich Serial Number 119803/166008

DATE: 6/8/01	PAGE 5 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65	0.65		0.65
Battery Check	Ok	Ok		OK
Source Check Reading (1) 760	735 redo			1319
Source Check Reading (2) 780	768			1382
Source Check Reading (3) 787	791			1397
Source Check Reading (4)	757			1341
Source Check Reading (5)	749			1368
Source Check Reading (AVERAGE) all readings	765			1361
Direct Background reading (1) 1720	α 0		β 176	
Direct Background reading (2)	1/0 redo		175	
Direct Background reading (3)	0		164	
Direct Background reading (4)	1/0 redo		161	
Direct Background reading (5)	1/0 redo		192	
Direct Background reading (AVERAGE)	0		173 6	
Efficiency = (CPM-Background) / DPM * 100	9%		10.7%	
MID-DAY SOURCE READING	800			1285
MID-DAY BACKGROUND READING	1		165	
EVENING SOURCE READING	763			1348
EVENING BACKGROUND READING	1		164	
Morning check performed by	JRH 0800			
Mid-day check performed by	JRH 1230			
Afternoon check performed by	DRG 1800			

B.t OK HV 0.65

Dat ok HV 0.65

A/B Phoswich Serial Number 119803/166008

DATE: 6/9/01	PAGE 60 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65	NA		NA
Battery Check	Ok	NA		NA
Source Check Reading (1)	739			1382
Source Check Reading (2)	799			1346
Source Check Reading (3)	831			1361
Source Check Reading (4)	798			1359
Source Check Reading (5)	779			1340
Source Check Reading (AVERAGE) GK	789.2			1357.6 EK
Direct Background reading (1)	1		204	
Direct Background reading (2)	1		181	
Direct Background reading (3)	0		166	
Direct Background reading (4)	0		180	
Direct Background reading (5)	0		165	
Direct Background reading (AVERAGE)	.4		178.8	
Efficiency = (CPM-Background) / DPM * 100	~~GK 8%~~ 9%		~~215.6 EK~~ 11%	
MID-DAY SOURCE READING	NA			
MID-DAY BACKGROUND READING	NA			
EVENING SOURCE READING	NA			
EVENING BACKGROUND READING	NA			
Morning check performed by	JRH 0730			
Mid-day check performed by	Repaired mylar ~ 1/inch.			
Afternoon check performed by	Not used in pm			

Site: Seneca Army Depot
Project: SEAD-12

Instrument Type	A/B			
AKA	phoswich			
Make	Ludlum			
Model	2224			
Serial Number	119803			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-1-1			
Serial Number	PR166008			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		4/10/2001	
Out of Cal Date	3/31/2003		3/31/2003	
Serial Number	1841-94		1039-92	
Source emission	8880		11100	
Instrument Chan	N/A		N/A	
2-pie Instrument	9.21%			10.70%
2 Sigma Range	1022-1119			1442-1566
3 Sigma Range	998-1143			1411-1598

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CLIENT SEAD-12 JOB NO. SHEET 8 OF 52

SUBJECT Phoswich #1 119803 BY DATE 7/9/10

- Tyvar changes at end of last switch. CKD. REVISION

Weather: Sunny, warm, 70's

Background

	x	ϕ
1	3	181
2	4	194
3	6	170
4	2	183
5	4	150
6	2	197
7	4	171
8	3	173
9	4	171
10	3	155
11	1	180
12	2	165
13	4	166
14	5	171
15	0	140

Avg = 3
σ = 1.7
Avg ± 2σ = 0 - 5
Avg ± 3σ = 0 - 8

Avg = 171
σ = 13
Avg ± 2σ = 145 - 197
Avg ± 3σ = 132 - 210

SOURCE

	α (Th-230)	ϕ (Tc-99)
1	1058	1496
2	1026	1469
3	1041	1498
4	1045	1448
5	1066	1483
6	1067	1563
7	1088	1503
8	1069	1527
9	1116	1493
10	1073	1524
11	1110	1467
12	1072	1531
13	1091	1539
14	1063	1530
15	1031	1493

Avg = 1068
σ = 33
Avg ± 2σ = 1002 - 1134
Avg ± 3σ = 969 - 1167

Avg = 1504
σ = 39
Avg ± 2σ = 1426 - 1582
Avg ± 3σ = 1387 - 1621

A/B Phoswich Serial Number 119803/166008

DATE: 10/10/01	PAGE 9 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65		0.65	0.65
Battery Check	OK		OK	OK
Source Check Reading (1)	797			1316
Source Check Reading (2)	332			1364
Source Check Reading (3)	771			1393
Source Check Reading (4)	805	KLK	KLK	1339
Source Check Reading (5)	810			1346
Source Check Reading (AVERAGE)	809			1351.6
Direct Background reading (1)	α 0		β 172	
Direct Background reading (2)	1		186	
Direct Background reading (3)	0		157	
Direct Background reading (4)	0		179	
Direct Background reading (5)	1		203	
Direct Background reading (AVERAGE)	.4 1		179.4	
Efficiency = (CPM-Background) / DPM * 100	* 9.1%		~~17~~ 10.6%	
MID-DAY SOURCE READING	807			1293
MID-DAY BACKGROUND READING	0		177	
EVENING SOURCE READING	831			~~129~~ 1305
EVENING BACKGROUND READING	0		159	
Morning check performed by	JRH 0750			
Mid-day check performed by	JRH 1220			
Afternoon check performed by	DRG 1700			

Bat: OK HV 0.65

Bat. OK HV. 0.65

A/B Phoswich Serial Number 119803/166008

DATE: 6/11/01	PAGE 10 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	OK			
Source Check Reading (1)	794			1345
Source Check Reading (2)	774			1269
Source Check Reading (3)	830			1335
Source Check Reading (4)	777			1319
Source Check Reading (5)	810			1344
Source Check Reading (AVERAGE)	797	NA	NA	1322
Direct Background reading (1)	0		186	
Direct Background reading (2)	0		179	
Direct Background reading (3)	0		188	
Direct Background reading (4)	1		171	
Direct Background reading (5)	0		190	
Direct Background reading (AVERAGE)	0		183	
Efficiency = (CPM-Background) / DPM * 100	8.9 %		10.3 %	
MID-DAY SOURCE READING	772			1330
MID-DAY BACKGROUND READING	0		186	
EVENING SOURCE READING	799			1346
EVENING BACKGROUND READING	0		181	
Morning check performed by	DRG 0750			
Mid-day check performed by	DRG 1230			
Afternoon check performed by	DRG 1715			

Bat: OK HV: 0.65

Bat: OK HV: 0.65

A/B Phoswich Serial Number 119803/166008

DATE: 6/12/01	PAGE 11 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65	0.65		0.65
Battery Check	ok	ok		ok
Source Check Reading (1)	805			1328
Source Check Reading (2)	754			1349
Source Check Reading (3)	829			1364
Source Check Reading (4)	806			1322
Source Check Reading (5)	823			1287
Source Check Reading (AVERAGE)	803			1330
Direct Background reading (1)	α 0		β 187	
Direct Background reading (2)	1		181	
Direct Background reading (3)	1		186	
Direct Background reading (4)	1		180	
Direct Background reading (5)	1		176	
Direct Background reading (AVERAGE)	1		182	
Efficiency = (CPM-Background) / DPM * 100	9%		10.3%	
MID-DAY SOURCE READING	784			1326
MID-DAY BACKGROUND READING	2		177	
EVENING SOURCE READING	792			1360
EVENING BACKGROUND READING	1		160	
Morning check performed by	JRH 0745			
Mid-day check performed by	DRG 1230			
Afternoon check performed by	DRG 1705			

But :OK HU : 0.65

But :OK HU : 0.65

A/B Phoswich Serial Number 119803/166008

DATE: 6/13/01	PAGE 12 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	ok			
Source Check Reading (1)	785			1400
Source Check Reading (2)	796			1400
Source Check Reading (3)	762			1374
Source Check Reading (4)	834			1399
Source Check Reading (5)	761			1387
Source Check Reading (AVERAGE)	788			1392
Direct Background reading (1)	0		163	
Direct Background reading (2)	1		182	
Direct Background reading (3)	1		186	
Direct Background reading (4)	0		177	
Direct Background reading (5)	1		175	
Direct Background reading (AVERAGE)	0.6		176.6	
Efficiency = (CPM-Background) / DPM * 100	9%		11%	
MID-DAY SOURCE READING	NA			
MID-DAY BACKGROUND READING	NA			
EVENING SOURCE READING	NA			
EVENING BACKGROUND READING	NA			
Morning check performed by	EKM/DRG 0655			
Mid-day check performed by	not used in AM			
Afternoon check performed by	not used in PM			

A/B Phoswich Serial Number 119803/166008

DATE: 6-18-01	PAGE 13 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.6			
Battery Check	OK			
Source Check Reading (1)	739	325	1	1592
Source Check Reading (2)	740	341	0	1334
Source Check Reading (3)	719	335	0	1376
Source Check Reading (4)	719 727 KKS	397	0	1375
Source Check Reading (5)	779	294	1	1368
Source Check Reading (AVERAGE)	740.80	~~692~~ 338.4 KKS	0.4	1369
Direct Background reading (1)	A 1	B 121		
Direct Background reading (2)	1	166		
Direct Background reading (3)	0	178		
Direct Background reading (4)	0	146		
Direct Background reading (5)	1	160		
Direct Background reading (AVERAGE)	0.6	164.2		
Efficiency = (CPM-Background) / DPM * 100	8%	11%	NA	
MID-DAY SOURCE READING	NA			
MID-DAY BACKGROUND READING	NA			
EVENING SOURCE READING	NA			
EVENING BACKGROUND READING	NA			
Morning check performed by	HLK			
Mid-day check performed by	not used in AM			
Afternoon check performed by	not used in PM			

A/B Phoswich Serial Number 119803/166008

DATE: 6-19-2001	PAGE 14 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65 kV			
Battery Check	OK			
Source Check Reading (1)	766			1348
Source Check Reading (2)	757			1330
Source Check Reading (3)	729			1308
Source Check Reading (4)	802			1289
Source Check Reading (5)	771			1358
Source Check Reading (AVERAGE)	765			1326.6
Direct Background reading (1)	2	174		
Direct Background reading (2)	0	167		
Direct Background reading (3)	0	140		
Direct Background reading (4)	1	160		
Direct Background reading (5)	0	164		
Direct Background reading (AVERAGE)	0.6	161		
Efficiency = (CPM-Background) / DPM * 100	9%	11%	NA	
MID-DAY SOURCE READING	716	JMK	JMK	1279
MID-DAY BACKGROUND READING	157		157	
EVENING SOURCE READING (*)	764	JMK	JMK	1223 JMK 1300
EVENING BACKGROUND READING	167		167	
Morning check performed by	JAMES KORFIS Both within 2σ			
Mid-day check performed by	" " & within 3σ β			
Afternoon check performed by	JK			

Consistently low Data for β COUNT During AFTERNOON f'n check

A/B Phoswich Serial Number 119803/166008

DATE: 6-20-01			PAGE 15 of 52	
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119806		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65 kV			
Battery Check	ok			
Source Check Reading (1)	800	318	0	1353
Source Check Reading (2)	804	290	1	1287
Source Check Reading (3)	819	311	1	1339
Source Check Reading (4)	825	366	0	1284
Source Check Reading (5)	875	282	1	1307
Source Check Reading (AVERAGE)	825	313	0.6	1314
Direct Background reading (1)	0		169	
Direct Background reading (2)	0		181	
Direct Background reading (3)	1		176	
Direct Background reading (4)	1		165	
Direct Background reading (5)	3		177	
Direct Background reading (AVERAGE)	1		173.6	
Efficiency = (CPM-Background) / DPM * 100	9%		10%	
MID-DAY SOURCE READING	743			1350
MID-DAY BACKGROUND READING	1	~~+95~~ JMK	194	
EVENING SOURCE READING	768			1351
EVENING BACKGROUND READING	0	~~+89~~ JMK	189	
Morning check performed by	ROM 0710			
Mid-day check performed by	JMK 1210			
Afternoon check performed by	JMK			

765 - 871 1283 - 1444

A/B Phoswich Serial Number 119803/166008

DATE: 6/21/01		PAGE 16 of 52			
Source		Th-230		Tc-99	
		Alpha	Beta	Alpha	Beta
Calibration Date		5/30/2001		6/4/1999	
Out of Cal Date		11/29/2001		6/4/2000	
Serial Number		119803		1843-94	
Source emission rate		8880		11100	
Instrument Channel		N/A		N/A	
High Voltage		0.68kV			
Battery Check		OK			
Source Check Reading (1)	782	~~722~~ Just	340	JMK	1373
Source Check Reading (2)	750	~~715~~ Just	302		1295
Source Check Reading (3)	~~780~~	~~780~~ Just	315		1305
Source Check Reading (4)	773	~~699~~ Just	303		1310
Source Check Reading (5)	~~766~~	Just ~~766~~	336		1271
Source Check Reading (AVERAGE)	770	Just ~~736.4~~	319.2		1323
Direct Background reading (1)		0		159	
Direct Background reading (2)		2		172	
Direct Background reading (3)		1		177	
Direct Background reading (4)		3		172	
Direct Background reading (5)		1		168	
Direct Background reading (AVERAGE)		1.4		170	
Efficiency = (CPM-Background) / DPM * 100		9%		10%	
MID-DAY SOURCE READING		765	320	1	1329
MID-DAY BACKGROUND READING		0		201	
EVENING SOURCE READING		776			1413
EVENING BACKGROUND READING		4		183	
Morning check performed by		JMK	0710		
Mid-day check performed by		DOM	1225p		
Afternoon check performed by		JMK	17:35		

- water stain on Mylar

Site: Seneca Army Depot
Project: SEAD-12

Instrument Type	A/B			
AKA	phoswich			
Make	Ludlum			
Model	2224			
Serial Number	119803			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-1-1			
Serial Number	PR166008			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		4/10/2001	
Out of Cal Date	3/31/2003		3/31/2003	
Serial Number	1841-94		1039-92	
Source emission	8880		11100	
Instrument Chan	N/A		N/A	
2-pie Instrument	9.21%			10.70%
2 Sigma Range	1048-1177			1436-1596
3 Sigma Range	1016-1209			1396-1636

INSTRUMENT: PHOSWICH #1
S/N 119803 / PR 166008
JIG #1A

REASON FOR NEW INITIAL FUNCTION CHECK IS A JIG UPGRADE/REPLACEMENT.

Particle: α

Background (α/β)		Source Type: Th 230			SOURCE TYPE: Tc 99		
TIME: 1235		TIME: 1255 S/N: 1841-94			TIME: S/N: 1039-92		
DATE: 22 JUNE 2001		DATE: 22 JUNE 2001			DATE: 22 JUN 2001		
1.	1/163	1.	1087		1	1532	
2.	0/158	2.	1159		2	1539	
3.	1/178	3.	1075		3	1515	
4.	0/153	4.	1125		4	1562	
5	0/179	5.	1091		5	1498	
6	0/167	6.	1168		6	1497	
7	0/168	7.	1111		7	1483	
8	1/182	8.	1112		8	1531	
9	2/186	9.	1110	5:15p	9	1572	5:15p
10	0/181	10.	1095		10	1516	5:31p
11	0/170	11.	1151		11	1539	
12	1/177	12.	1083	5:25p	12	1480	
13	1/179	13.	1130		13	1569	5:35p
14	0/169	14.	1056		14	1424	
15	1/169	15.	1134	5:30p	15	1482	5:37p
Avg:	0.53	Avg:	1113		Avg:	1516	
σ:	0.72	σ:	33		σ:	39	
2σ:	1.44	2σ:	66		2σ:	78	

1047 → 1179 2σ range
1014 → 1212 3σ range

1438 → 1554
1399 → 1633

SENECA ARMY DEPOT
SEAD-12 RI/FS

765-871 2.0

12 55 44 44

A/B Phoswich Serial Number 119803/166008

DATE: 6/22/01 PAGE 19 of 52

Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.68kV			
Battery Check	O/C			
Source Check Reading (1) (Repositioned on jig) 807	~~693~~ KLL			1372
Source Check Reading (2) 808	~~741~~ KLL			1331
Source Check Reading (3) 775	~~760~~ KLL			1392
Source Check Reading (4) 821	~~757~~ KLL			1439
Source Check Reading (5) 789	~~758~~ KLL			1351
Source Check Reading (AVERAGE) 800	~~717.8~~ KLL			1373
Direct Background reading (1)	0		183	
Direct Background reading (2)	0		205	
Direct Background reading (3)	1		183	
Direct Background reading (4)	0		190	
Direct Background reading (5)	1		193	
Direct Background reading (AVERAGE)	0.4 ~~fwk~~		190.8	
Efficiency = (CPM-Background) / DPM * 100	9%		11%	
MID-DAY SOURCE READING	769	N/A	N/A	1410
MID-DAY BACKGROUND READING	1		193	
EVENING SOURCE READING	1110	327	3	1572 new jig
EVENING BACKGROUND READING	0		170	
Morning check performed by	JMK 0730 Both Samples within 20%			
Mid-day check performed by	JMK 1225 Both Samples within 20			
Afternoon check performed by	RSM 5:15p			

A/B Phoswich Serial Number 119803/166008

DATE: 6-23-2001	PAGE 20 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.62			
Battery Check	OK			
Source Check Reading (1)	1118			1517
Source Check Reading (2)	1078			1505
Source Check Reading (3)	1129	N/A	N/A	1544
Source Check Reading (4)	1097			1520
Source Check Reading (5)	1138			1550
Source Check Reading (AVERAGE)	1112			1527.2
Direct Background reading (1)	1		204	
Direct Background reading (2)	0		181	
Direct Background reading (3)	1		172	
Direct Background reading (4)	0		173	
Direct Background reading (5)	0		162	
Direct Background reading (AVERAGE)	0.4		178.4	
Efficiency = (CPM-Background) / DPM * 100	~~0.7~~ JMK 12.5%		12.2%	
MID-DAY SOURCE READING	1066			1512
MID-DAY BACKGROUND READING	~~HLK~~ 0		159	
EVENING SOURCE READING	1126			1532
EVENING BACKGROUND READING	1		175	
Morning check performed by	JMK 0930			
Mid-day check performed by	JMK 1210			
Afternoon check performed by	KLK 1620			

A/B Phoswich Serial Number 119803/166008

DATE: 6/24/01	PAGE 21 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	ok			
Source Check Reading (1)	1115	413	0	1498
Source Check Reading (2)	1129	360	0	1529
Source Check Reading (3)	1064	366	2	1539
Source Check Reading (4)	1092	353	1	1585
Source Check Reading (5)	1028	373	2	1541
Source Check Reading (AVERAGE)	1086	373	5	1538
Direct Background reading (1)	0 / 179			
Direct Background reading (2)	1 / 162			
Direct Background reading (3)	0 / 197			
Direct Background reading (4)	0 / 180			
Direct Background reading (5)	1 / 189			
Direct Background reading (AVERAGE)	0.4 / 181			
Efficiency = (CPM-Background) / DPM * 100	α 12%	β 12%	NA	
MID-DAY SOURCE READING	1087	N/A	N/A	1493
MID-DAY BACKGROUND READING	~~5~~ 2 AL		~~135~~ 165 AL	
EVENING SOURCE READING	1066	N/A	N/A	1449
EVENING BACKGROUND READING	1		160	
Morning check performed by	RDM 0725a			
Mid-day check performed by	JML 1205			
Afternoon check performed by	JML			

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Phoswich Serial Number 119803/166008

DATE: 1/25/01	PAGE 22 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate DPM	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	OK			
Source Check Reading (1)	1051	406	0	1571
Source Check Reading (2)	1021	342	1	1548
Source Check Reading (3)	1102	308	0	1530
Source Check Reading (4)	1026	352	1	1487
Source Check Reading (5)	1042	391	2	1486
Source Check Reading (AVERAGE)	1048	360	1	1524
Direct Background reading (1)	0	148		
Direct Background reading (2)	2	171		
Direct Background reading (3)	0	177		
Direct Background reading (4)	0	173		
Direct Background reading (5)	0	161		
Direct Background reading (AVERAGE)	0	166		
Efficiency = (CPM-Background) / DPM * 100	α 12%		β 12%	
MID-DAY SOURCE READING	1048	N/A	N/A	1540
MID-DAY BACKGROUND READING	0		176	
EVENING SOURCE READING	1054	N/A	N/A	1442
EVENING BACKGROUND READING	0		151	
Morning check performed by	AML	730		
Mid-day check performed by	AML	1200		
Afternoon check performed by	AML	1733		

AM Weather: Sunny, dry, 65°F
Lunch " : Sunny, dry 70° F
PM Weather: Sunny, dry, 73° F

A/B Phoswich Serial Number 119803/166008

DATE: 6/26/01	PAGE 23 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	ok			
Source Check Reading (1)	1046			1489
Source Check Reading (2)	1068			1500
Source Check Reading (3)	1099			1472
Source Check Reading (4)	1027			1494
Source Check Reading (5)	1100			1495
Source Check Reading (AVERAGE)	1068			1490
Direct Background reading (1)	1		181	
Direct Background reading (2)	2		176	
Direct Background reading (3)	0		148	
Direct Background reading (4)	0		169	
Direct Background reading (5)	0		162	
Direct Background reading (AVERAGE)	0.6		167	
Efficiency = (CPM-Background) / DPM * 100	12 %		~~AK DK~~ 11.9 %	
MID-DAY SOURCE READING	1051			1464
MID-DAY BACKGROUND READING	1		145	
EVENING SOURCE READING	1068	N/A	N/A	1521
EVENING BACKGROUND READING	2		159	
Morning check performed by	JRH 0700			
Mid-day check performed by	JMK 1210 ~75° AND SUNNY			
Afternoon check performed by	~~AMC~~ 1740			

Morning: sunny, clear ~ 65°F
Evening: sunny, hot, ~75°F

A/B Phoswich Serial Number 119803/166008

DATE: 6/27/01	PAGE 24 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	OK			
Source Check Reading (1)	1019			1515
Source Check Reading (2)	1070			1517
Source Check Reading (3)	1130			1476
Source Check Reading (4)	1105			1446
Source Check Reading (5)	1026			1504
Source Check Reading (AVERAGE)	1070			1492
Direct Background reading (1)	0		136	
Direct Background reading (2)	1		183	
Direct Background reading (3)	1		154	
Direct Background reading (4)	0		149	
Direct Background reading (5)	0		155	
Direct Background reading (AVERAGE)	0.4		155	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1090			1425
MID-DAY BACKGROUND READING	0		164	
EVENING SOURCE READING	1100			1384
EVENING BACKGROUND READING	5		297	
Morning check performed by	AML 0710		Weather: sunny, warm 70's	
Mid-day check performed by	KLCS 1224			
Afternoon check performed by	KLCS 1727			

A/B Phoswich Serial Number 119803/166008

DATE: 6/28/01	PAGE 25 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.6 kV			
Battery Check	OK			
Source Check Reading (1)	1087			1483
Source Check Reading (2)	1058			1438
Source Check Reading (3)	1062	KLK	KLK	1563
Source Check Reading (4)	1060			1508
Source Check Reading (5)	1079			1527
Source Check Reading (AVERAGE)	1069			1503.8
Direct Background reading (1)	1		163	
Direct Background reading (2)	2		185	
Direct Background reading (3)	5		152	
Direct Background reading (4)	2		145	
Direct Background reading (5)	3		157	
Direct Background reading (AVERAGE)	2.6		160.4	
Efficiency = (CPM-Background) / DPM * 100	12.0		12.1%	
MID-DAY SOURCE READING	1117			1504
MID-DAY BACKGROUND READING	3		165	
EVENING SOURCE READING	1109			1507
EVENING BACKGROUND READING	3		144	
Morning check performed by	KLK 0713			
Mid-day check performed by	AML 1215 Cloudy, 75°F			
Afternoon check performed by	AML 1730 Cloudy, 70°F			

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Phoswich Serial Number 119803/166008

DATE: 6/29/01 PAGE 26 of 52

Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.6 kV			
Battery Check	OL			
Source Check Reading (1)	1044			~~1473~~ 1473
Source Check Reading (2)	1054			1491
Source Check Reading (3)	966			1469
Source Check Reading (4)	1122			1399
Source Check Reading (5)	1114			1570
Source Check Reading (AVERAGE)	1060			1480
Direct Background reading (1)	0		165	
Direct Background reading (2)	2		152	
Direct Background reading (3)	5		176	
Direct Background reading (4)	6		171	
Direct Background reading (5)	1		176	
Direct Background reading (AVERAGE)	2.8		168	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1068			1443
MID-DAY BACKGROUND READING	5		157	
EVENING SOURCE READING	1102*			1380 *
EVENING BACKGROUND READING	2		168	
Morning check performed by	AML 0700 Cloudy 70°F			
Mid-day check performed by	JRH 1125			
Afternoon check performed by	JMK 1524 Cloudy 80°F			

little low 1/16

1/162

* New Mylar was installed 1540 JRH
-Need to check again Monday

PARSONS ENGINEERING SCIENCE

Need to do 15 further check measurements Monday of next shift

A/B Phoswich Serial Number 119803/166008

DATE: 7/9/01			PAGE 27 of 52	
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	3.6 kV			
Battery Check	OK			
Source Check Reading (1)				
Source Check Reading (2)		Source Check		
Source Check Reading (3)			7/9/01	
Source Check Reading (4)		on		
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)	~~3~~ AL		~~181~~ AL	
Direct Background reading (2)	~~4~~ AL		~~194~~ AL	
Direct Background reading (3)				
Direct Background reading (4)	Source		Check	
Direct Background reading (5)	on		7/9/01	
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100	NA		NA	
MID-DAY SOURCE READING	1062	340	~~1465~~ 1451	~~378~~ KL
MID-DAY BACKGROUND READING	KK ~~177~~ 1		147	
EVENING SOURCE READING	1083 ~~1003~~	~~390~~ KK		1437
EVENING BACKGROUND READING	3		182	
Morning check performed by	AML 7/9/01			
Mid-day check performed by				
Afternoon check performed by Sunny 70°F	AML 1745			

A/B Phoswich Serial Number 119803/166008

DATE: 7/10/01			PAGE 28 of 52	
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.6 kV			
Battery Check	OK			
Source Check Reading (1)	1079			1492
Source Check Reading (2)	1031			1455
Source Check Reading (3)	1059	KJL	KJL	1457
Source Check Reading (4)	1024			1518
Source Check Reading (5)	1085			1549
Source Check Reading (AVERAGE)	1056			1494
Direct Background reading (1)	4		183	
Direct Background reading (2)	2		182	
Direct Background reading (3)	3		167	
Direct Background reading (4)	0		166	
Direct Background reading (5)	2		165	
Direct Background reading (AVERAGE)	4		173	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1101			1395
MID-DAY BACKGROUND READING	3/158			
EVENING SOURCE READING	1078			1390
EVENING BACKGROUND READING	?		1411	
Morning check performed by	AML 0700 Cloudy, warm, 70°F			
Mid-day check performed by	RDM 11:50 Sunny 74°F			
Afternoon check performed by	AML 1730 Clear, warm, 78°F			

A/B Phoswich Serial Number 119803/166008

DATE: 7/11/01			PAGE 29 of 52	
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65 kV			
Battery Check	OK			
Source Check Reading (1)	1038			1569
Source Check Reading (2)	1081			1389
Source Check Reading (3)	1123			1416
Source Check Reading (4)	1084			1442
Source Check Reading (5)	1121			1439
Source Check Reading (AVERAGE)	1089			1451
Direct Background reading (1)	7		153	
Direct Background reading (2)	2		166	
Direct Background reading (3)	3		158	
Direct Background reading (4)	1		162	
Direct Background reading (5)	1		184	
Direct Background reading (AVERAGE)	3		165	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1090	RM		1421 RM
MID-DAY BACKGROUND READING	1		172	
EVENING SOURCE READING	1103			1428
EVENING BACKGROUND READING	~~1090~~ 2		165 ~~172~~	RM
Morning check performed by	AMC 0710 warm 70°F sunny			
Mid-day check performed by	AMC 1200 sunny warm 74°F			
Afternoon check performed by	RM 5:00p 75° sunny			

A/B Phoswich Serial Number 119803/166008

DATE:	7/12/01 PAGE 30 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65 KV			
Battery Check	OK			
Source Check Reading (1)	996			1449
Source Check Reading (2)	976			1486
Source Check Reading (3)	1073			1478
Source Check Reading (4)	1021			1443
Source Check Reading (5)	1038			1406
Source Check Reading (AVERAGE)	1021			1452
Direct Background reading (1)	2		166	
Direct Background reading (2)	2		178	
Direct Background reading (3)	5		182	
Direct Background reading (4)	2		195	
Direct Background reading (5)	5		182	
Direct Background reading (AVERAGE)	3		181	
Efficiency = (CPM-Background) / DPM * 100	11 90		11 90	
MID-DAY SOURCE READING	1069			1473
MID-DAY BACKGROUND READING	5		186	
EVENING SOURCE READING	998			1476
EVENING BACKGROUND READING	~~998~~ 3		177	
Morning check performed by	AML, cloudy cool 0700			
Mid-day check performed by	JMK, P/C 70°F			
Afternoon check performed by	JMK, P/C 70°F			

A/B Phoswich Serial Number 119803/166008

DATE: 7/13/01	PAGE 31 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	OK			
Source Check Reading (1)	1118			1473
Source Check Reading (2)	1024			1538
Source Check Reading (3)	1019			1485
Source Check Reading (4)	1014			1459
Source Check Reading (5)	1071			1472
Source Check Reading (AVERAGE)	1049.2			1485.4
Direct Background reading (1)	2		149	
Direct Background reading (2)	5		177	
Direct Background reading (3)	5		166	
Direct Background reading (4)	3		195	
Direct Background reading (5)	4		176	
Direct Background reading (AVERAGE)	3.8		172.6	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1028			1459
MID-DAY BACKGROUND READING	2		183	
EVENING SOURCE READING	1063			1544
EVENING BACKGROUND READING	1		183	
Morning check performed by	AML 0700 Cloudy, warm, 68°			
Mid-day check performed by	KKS 1158			
Afternoon check performed by	KKS 1735 Cloudy, 75°			

A/B Phoswich Serial Number 119803/166008

DATE: 7/14/01	PAGE 32 of 57			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	OK			
Source Check Reading (1)	1013			1522
Source Check Reading (2)	1042			1565
Source Check Reading (3)	1072			1489
Source Check Reading (4)	1031			1495
Source Check Reading (5)	1046			1472
Source Check Reading (AVERAGE)	1041			1509
Direct Background reading (1)	1		159	
Direct Background reading (2)	4		186	
Direct Background reading (3)	1		160	
Direct Background reading (4)	2		144	
Direct Background reading (5)	1		189	
Direct Background reading (AVERAGE)	1.8		168	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1048			1442
MID-DAY BACKGROUND READING	1		151	
EVENING SOURCE READING	NA			
EVENING BACKGROUND READING	NA			
Morning check performed by	JRH 0705 cool rainy			
Mid-day check performed by	S.H. (Jim) ~1145			
Afternoon check performed by	not used in PM			

A/B Phoswich Serial Number 119803/166008

DATE: 7-15-01	PAGE 33 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.64			
Battery Check	OK			
Source Check Reading (1)	1004			1523
Source Check Reading (2)	982			1510
Source Check Reading (3)	1064			1470
Source Check Reading (4)	995			1539
Source Check Reading (5)	1033			1531
Source Check Reading (AVERAGE)	1015.6			1514.6
Direct Background reading (1)	~~77~~ 3		174	
Direct Background reading (2)	8		199	
Direct Background reading (3)	5		160	
Direct Background reading (4)	3		162	
Direct Background reading (5)	5		186	
Direct Background reading (AVERAGE)	4.8		176.2	
Efficiency = (CPM-Background) / DPM * 100	11.4%		12.1%	
MID-DAY SOURCE READING	1014			1422
MID-DAY BACKGROUND READING	5		145	
EVENING SOURCE READING	1022			1418
EVENING BACKGROUND READING	2		142	
Morning check performed by JAMES KURTIS	0715 - P/C 68°F ~~DRY~~ JMK Moderate			
Mid-day check performed by JMK	@ 1208 72°F			
Afternoon check performed by	KLK			

A/B Phoswich Serial Number 119803/166008

DATE: 7/16/01	PAGE 34 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65 KV			
Battery Check	OK			
Source Check Reading (1)	974			1478
Source Check Reading (2)	964			1529
Source Check Reading (3)	1082			1480
Source Check Reading (4)	1061			1511
Source Check Reading (5)	986			1489
Source Check Reading (AVERAGE)	1013			1497
Direct Background reading (1)	4		152	
Direct Background reading (2)	3		173	
Direct Background reading (3)	4		155	
Direct Background reading (4)	1		158	
Direct Background reading (5)	7		169	
Direct Background reading (AVERAGE)	4		161	
Efficiency = (CPM-Background) / DPM * 100	11 %		12 %	
MID-DAY SOURCE READING	1050			1407
MID-DAY BACKGROUND READING	6		176	
EVENING SOURCE READING	1022 ~~967~~ RDM			1401
EVENING BACKGROUND READING	1		165	
Morning check performed by AML 0700	Sunny, 64°F			
Mid-day check performed by AML 1200	Sunny, warm, 73°F			
Afternoon check performed by RDM 5:30	overcast 76°			

A/B Phoswich Serial Number 119803/166008

DATE: 7/17/01	PAGE 35 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65kV			
Battery Check	OK			
Source Check Reading (1)	1057			1454
Source Check Reading (2)	997			1471
Source Check Reading (3)	1057			1414
Source Check Reading (4)	1006	FLK		1446
Source Check Reading (5)	1005			1496
Source Check Reading (AVERAGE)	1024.4			1456.2
Direct Background reading (1)	6		175	
Direct Background reading (2)	3		182	
Direct Background reading (3)	3		192	
Direct Background reading (4)	4		168	
Direct Background reading (5)	1		162	
Direct Background reading (AVERAGE)	3.4		175.8	
Efficiency = (CPM-Background) / DPM * 100	11.5%		11.5%	
MID-DAY SOURCE READING	1074			1459
MID-DAY BACKGROUND READING	4		164	
EVENING SOURCE READING	tomorrow morning fx check will			
EVENING BACKGROUND READING	be used b/c it is popped			
Morning check performed by	~~JMK~~ RM 70° rainy			
Mid-day check performed by	JMK 72° P/C HUMID			
Afternoon check performed by	NA			

mylar popped

A/B Phoswich Serial Number 119803/166008

DATE: 7-18-2001	PAGE 36 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.62kV			
Battery Check	OK			
Source Check Reading (1)	~~1008 972~~	~~270~~		1528
Source Check Reading (2)	1029	314		1450
Source Check Reading (3)	1024	347	JMK	1490
Source Check Reading (4)	1062	320		1421
Source Check Reading (5)	1036	324		1492
Source Check Reading (AVERAGE)	1031.8	252.2		1476.2
Direct Background reading (1)	5		172	
Direct Background reading (2)	3		143	
Direct Background reading (3)	5		185	
Direct Background reading (4)	6		157	
Direct Background reading (5)	4		180	
Direct Background reading (AVERAGE)	4.6		167.4	
Efficiency = (CPM-Background) / DPM * 100	11.6%		11.8%	
MID-DAY SOURCE READING	1027			1464
MID-DAY BACKGROUND READING	1		150	
EVENING SOURCE READING	not used in evening			
EVENING BACKGROUND READING	not used in evening			
Morning check performed by JMK 0730	FOGGY 68°			
Mid-day check performed by JMK 1205	SUNNY 75°			
Afternoon check performed by	N/A			

A/B Phoswich Serial Number 119803/166008

DATE: 7-24-01	PAGE 37 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.60kV			
Battery Check	ok			
Source Check Reading (1)	1025			1364
Source Check Reading (2)	1021			1347
Source Check Reading (3)	1009	KLK 7/24/01	KLK 7/24/01	1373
Source Check Reading (4)	1042			1356
Source Check Reading (5)	1043			1321
Source Check Reading (AVERAGE)	1029			1352.2
Direct Background reading (1)	0		143	
Direct Background reading (2)	2		158	
Direct Background reading (3)	1		168	
Direct Background reading (4)	4		153	
Direct Background reading (5)	4		143	
Direct Background reading (AVERAGE)	2.2		155	
Efficiency = (CPM-Background) / DPM * 100	11.6%		10.7%	
MID-DAY SOURCE READING	not used in AM			
MID-DAY BACKGROUND READING	NA →			
EVENING SOURCE READING	not used in PM			
EVENING BACKGROUND READING	NA →			
Morning check performed by	KLK 0725		humid 76°	
Mid-day check performed by	NA			
Afternoon check performed by	NA			

WILL NOT BE USED IN AM B/C BETA OUT OF 3 SIGMA + THE EFFICIENCY IS LOWER. WILL CHECK AGAIN IN AFTERNOON KLK.

A/B Phoswich Serial Number 119803/166008

DATE: 7/25/01 PAGE 38 of 52

Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	ok			
Battery Check	ok			
Source Check Reading (1)	1000			1410
Source Check Reading (2)	1021			1427
Source Check Reading (3)	1061			1374
Source Check Reading (4)	1005	FLK		1399
Source Check Reading (5)	1043			1398
Source Check Reading (AVERAGE)	1026			1402
Direct Background reading (1)	4		175	
Direct Background reading (2)	6		160	
Direct Background reading (3)	5		160	
Direct Background reading (4)	3		158	
Direct Background reading (5)	6		186	
Direct Background reading (AVERAGE)	4.8 ~~+0~~ FLK		168	
Efficiency = (CPM-Background) / DPM * 100	12%		11%	
MID-DAY SOURCE READING	not used in AM			
MID-DAY BACKGROUND READING	NA →			
EVENING SOURCE READING	not used in PM			
EVENING BACKGROUND READING	NA →			
Morning check performed by 7:15a	cam 75° sunny, humid			
Mid-day check performed by	NA			
Afternoon check performed by	NA			

~~15~~ Probe to be Cooked at + 15
Gam reading statistics ~~re~~ completed

Site: Seneca Army Depot
Project: SEAD-12

Instrument Type	A/B			
AKA	phoswich			
Make	Ludlum			
Model	2224			
Serial Number	119803			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-1-1			
Serial Number	PR166008			
Calibration Date	5/30/2001			
Out of Cal Date	11/29/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		4/10/2001	
Out of Cal Date	3/31/2003		3/31/2003	
Serial Number	1841-94		1039-92	
Source emission	8880		11100	
Instrument Chan	N/A		N/A	
2-pie Instrument	9.21%			10.70%
2 Sigma Range	1036-1093			1334-1477
3 Sigma Range	1022-1107			1299-1513

Jig Recheck after Mylar Replacement on 119803 / PR 166008

8:20a overcast & rainy humid, 72°

10:20a clearing

11:00a sunny, 23°

1:00p Sunny, 74°

	Back α	Back β		Tc-99 β		Th-230 α	
~~8:25a~~ 1	1	169	8:25a	1469	11:05a	1079	1:00p
2	2	158		1357		1068	
3	2	169		1382		1071	
4	4	151		1415		1056	1:20p
5	3	169	10:05a	1382	11:20a	1063	
6	4	159		1428	11:55a	1061	1:40p
7	3	173	10:20a	1353		1062	
8	6	150		1438		1037	3:40p
9	5	153		1416		1085	
10	1	161	10:35a	1372	12:10p	1067	4:00p
11	5	138		1424		1086	
12	3	174		1391		1081	
13	3	165	10:50a	1463	12:20p	1048	
14	2	170		1379		1049	
15	6	160	11:00a	1419		1057	4:15p

A/B Phoswich Serial Number 119803/166008

DATE: ~~BB~~ 7/27/01	PAGE 41 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65kV			
Battery Check	ok			
Source Check Reading (1)	1106			1557
Source Check Reading (2)	1049			1402
Source Check Reading (3)	1106			1420
Source Check Reading (4)	1084			1490
Source Check Reading (5)	1081			1453
Source Check Reading (AVERAGE)	1085			1464
Direct Background reading (1)	3		168	
Direct Background reading (2)	8		187	
Direct Background reading (3)	4		159	
Direct Background reading (4)	2		189	
Direct Background reading (5)	2		148	
Direct Background reading (AVERAGE)	4		170	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING	Not used in		A.m.	
EVENING SOURCE READING	1087			1437
EVENING BACKGROUND READING	1		141	
Morning check performed by	RM 7:10a 68° sunny			
Mid-day check performed by	Not used in a.m.			
Afternoon check performed by	RM 74° 5:25p sunny			

A/B Phoswich Serial Number 119803/166008

DATE: 7/28/01	PAGE 42 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65 kV			
Battery Check	ok			
Source Check Reading (1)	1040			1409
Source Check Reading (2)	1060			1524
Source Check Reading (3)	1019			1447
Source Check Reading (4)	1109			1398
Source Check Reading (5)	1081			1448
Source Check Reading (AVERAGE)	1062			1445
Direct Background reading (1)	7		166	
Direct Background reading (2)	4		178	
Direct Background reading (3)	4		180	
Direct Background reading (4)	4		180	
Direct Background reading (5)	4		168	
Direct Background reading (AVERAGE)	5		174	
Efficiency = (CPM-Background) / DPM * 100	12 %		11 %	
MID-DAY SOURCE READING	1062			1423
MID-DAY BACKGROUND READING	3		154	
EVENING SOURCE READING	1089			1426
EVENING BACKGROUND READING	4		139	
Morning check performed by	RM 67° Sunny 7:30a			
Mid-day check performed by 1300	JMK Sunny 74° F			
Afternoon check performed by	KLK			

A/B Phoswich Serial Number 119803/166008

DATE: 7-29-01	PAGE 43 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.62kV			
Battery Check	OK			
Source Check Reading (1)	1021			1416
Source Check Reading (2)	1083			1467
Source Check Reading (3)	1061			1415
Source Check Reading (4)	1060			1389
Source Check Reading (5)	1116			1376
Source Check Reading (AVERAGE)	1068.2			1412.6
Direct Background reading (1)	5		167	
Direct Background reading (2)	2		161	
Direct Background reading (3)	0		178	
Direct Background reading (4)	3		173	
Direct Background reading (5)	5		163	
Direct Background reading (AVERAGE)	3		168.4	
Efficiency = (CPM-Background) / DPM * 100	11.9%		11.2%	
MID-DAY SOURCE READING	1099	NA	NA	1404
MID-DAY BACKGROUND READING	6		173	
EVENING SOURCE READING	1044	NA	NA	1425
EVENING BACKGROUND READING	2		163	
Morning check performed by JMK 70° F OT 04 Sunny Light Haze				
Mid-day check performed by JMK 1220 P/C 74°				
Afternoon check performed by Rom 4:00p 76° Overcast				

A/B Phoswich Serial Number 119803/166008

DATE: 8/8/01	PAGE 44 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65 V			
Battery Check	O/K			
Source Check Reading (1)	1022			1448
Source Check Reading (2)	1024	RPM	RPM	1398
Source Check Reading (3)	1032			1402
Source Check Reading (4)	1020			1383
Source Check Reading (5)	1109			1431
Source Check Reading (AVERAGE)	1041			RPM ~~1410~~ 1412
Direct Background reading (1)	7		154	
Direct Background reading (2)	4		144	
Direct Background reading (3)	2		165	
Direct Background reading (4)	5		176	
Direct Background reading (5)	5		159	
Direct Background reading (AVERAGE)	4.6		160	
Efficiency = (CPM-Background) / DPM * 100	12%		11%	
MID-DAY SOURCE READING	1119	RPM	RPM	1425
MID-DAY BACKGROUND READING	2		163	
EVENING SOURCE READING	1102	RPM	RPM	1270
EVENING BACKGROUND READING	3		134	
Morning check performed by	RPM 7:42a humid 78° Sunny			
Mid-day check performed by	RPM 11:10a humid 78° Sunny			
Afternoon check performed by	RPM 4:30p humid 84° Sunny			

A/B Phoswich Serial Number 119803/166008

DATE: 8/10/01	PAGE 45 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	ok 0.6			
Battery Check	ok			
Source Check Reading (1)	1053			1369
Source Check Reading (2)	1036			1391
Source Check Reading (3)	1082			1298
Source Check Reading (4)	1050			1375
Source Check Reading (5)	1045			1367
Source Check Reading (AVERAGE)	1053			1360
Direct Background reading (1)	α 5		β 161	
Direct Background reading (2)	5		148	
Direct Background reading (3)	3		179	
Direct Background reading (4)	2		164	
Direct Background reading (5)	8		169	
Direct Background reading (AVERAGE)	4.6		164.2	
Efficiency = (CPM-Background) / DPM * 100	12%		11%	
MID-DAY SOURCE READING	initial	daily check performed		
MID-DAY BACKGROUND READING	NA →			
EVENING SOURCE READING	1062	rm	rm	1309
EVENING BACKGROUND READING	4		166	
Morning check performed by	NA →			
Mid-day check performed by	JRL 1245 WARM HUMID			
Afternoon check performed by	Rm 5:45p 84° humid Sunny			

FN. CHECKS PERFORMED AT MIDDAY

A/B Phoswich Serial Number 119803/166008

DATE: 8/12/01	PAGE 46 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.6			
Battery Check	ok			
Source Check Reading (1)	1068			1409
Source Check Reading (2)	1108			1380
Source Check Reading (3)	1049			1395
Source Check Reading (4)	1068			1450
Source Check Reading (5)	1000			1380
Source Check Reading (AVERAGE)	1058			1403
Direct Background reading (1)	10		177	
Direct Background reading (2)	5		167	
Direct Background reading (3)	1		168	
Direct Background reading (4)	4		177	
Direct Background reading (5)	4		173	
Direct Background reading (AVERAGE)	4.8		172	
Efficiency = (CPM-Background) / DPM * 100	12%		11%	
MID-DAY SOURCE READING	1044	NA	NA	1418
MID-DAY BACKGROUND READING	7		162	
EVENING SOURCE READING	NOT USED		IN PM	
EVENING BACKGROUND READING				
Morning check performed by	JRH 0800 76°F			
Mid-day check performed by	JRH 1214 78°F			
Afternoon check performed by	— NA			

A/B Phoswich Serial Number 119803/166008

DATE: 8/14/01	PAGE 47 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	Ok			
Source Check Reading (1)	1060			1475
Source Check Reading (2)	1042	RDM NA	RDM	1516
Source Check Reading (3)	1037		NA	1554
Source Check Reading (4)	1038			1463
Source Check Reading (5)	1084			1581
Source Check Reading (AVERAGE)	1062			1518
Direct Background reading (1)	4		137	
Direct Background reading (2)	3		174	
Direct Background reading (3)	2		173	
Direct Background reading (4)	5		169	
Direct Background reading (5)	7		173	
Direct Background reading (AVERAGE)	4.2		165	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1045 ~~1238~~ RDM	NA	~~NA~~	1395
MID-DAY BACKGROUND READING	4		151	
EVENING SOURCE READING	NOT USED		IN PM - JRH	
EVENING BACKGROUND READING				
Morning check performed by	RDM 8:25a Sunny 74° humid			
Mid-day check performed by	RDM 12:30p Sunny 76°			
Afternoon check performed by	NA →			

A/B Phoswich Serial Number 119803/166008

DATE: 8/22/01	PAGE 48 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0-65			
Battery Check	ok			
Source Check Reading (1)	1036	/	/	1435
Source Check Reading (2)	1073	/	/	1349
Source Check Reading (3)	1048	/	/	1390
Source Check Reading (4)	1100	/	/	1431
Source Check Reading (5)	1008	/	/	1396
Source Check Reading (AVERAGE)	1053	/	/	1400
Direct Background reading (1)	4		172	
Direct Background reading (2)	2		155	
Direct Background reading (3)	2		152	
Direct Background reading (4)	7		158	
Direct Background reading (5)	2		137	
Direct Background reading (AVERAGE)	3.4		155	
Efficiency = (CPM-Background) / DPM * 100	12%		11%	
MID-DAY SOURCE READING	1036	/	/	1376
MID-DAY BACKGROUND READING	4		153	
EVENING SOURCE READING	NOT USED IN PM			
EVENING BACKGROUND READING				
Morning check performed by	Rom 7:35a 72° Sunny humid			
Mid-day check performed by JRH 1700	not used in pm Rom			
Afternoon check performed by	4 4		Rom	

A/B Phoswich Serial Number 119803/166008

DATE: 8/26/01	PAGE 49 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	ok			
Source Check Reading (1)	1048			1432
Source Check Reading (2)	1041			1375
Source Check Reading (3)	1099			1382
Source Check Reading (4)	1100			1321
Source Check Reading (5)	1057			1356
Source Check Reading (AVERAGE)	1069			1373
Direct Background reading (1)	6		143	
Direct Background reading (2)	3		164	
Direct Background reading (3)	5		178	
Direct Background reading (4)	6		181	
Direct Background reading (5)	2		141	
Direct Background reading (AVERAGE)	4.4		161.4	
Efficiency = (CPM-Background) / DPM * 100	12%		11%	
MID-DAY SOURCE READING	daily initial check done at 1252			
MID-DAY BACKGROUND READING	NA →			
EVENING SOURCE READING	~~1136~~ 1090	308	~~1367~~ 1361	
EVENING BACKGROUND READING		6	168	
Morning check performed by	NA			
Mid-day check performed by 5 Readings	JRH 1252 P. Sunny 78°F			
Afternoon check performed by	KLK			

A/B Phoswich Serial Number 119803/166008

DATE: 8/27/01	PAGE 50 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.7			
Battery Check	OK			
Source Check Reading (1)	1069	299	1	1415
Source Check Reading (2)	1023	1304	4	1419
Source Check Reading (3)	1021	1477 277	6	1423
Source Check Reading (4)	1073	295	4	1366
Source Check Reading (5)	1033	310	4	1427
Source Check Reading (AVERAGE)	1043	497	3.8	1410
Direct Background reading (1)		2	164	
Direct Background reading (2)		1	179	
Direct Background reading (3)		3	172	
Direct Background reading (4)		3	186	
Direct Background reading (5)		4	144	
Direct Background reading (AVERAGE)		2.6	169.4	
Efficiency = (CPM-Background) / DPM * 100		12%	11%	
MID-DAY SOURCE READING	1049	NA	NA	1426
MID-DAY BACKGROUND READING	4		143	
EVENING SOURCE READING	1072	301	2	1454
EVENING BACKGROUND READING	3		177	
Morning check performed by	JRH 0840			
Mid-day check performed by	JRH 1500			
Afternoon check performed by	RHC 1830			

A/B Phoswich Serial Number 119803/166008

DATE: 8/28/01	PAGE 51 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	OK			
Battery Check	0.65			
Source Check Reading (1)	1029	324	4	1388
Source Check Reading (2)	1045	302	3	1468
Source Check Reading (3)	1060	281	3	1472
Source Check Reading (4)	1032	289	3	1410
Source Check Reading (5)	1041 ~~1005~~ KLR	KLR ~~302~~ 295	5	1465
Source Check Reading (AVERAGE)	1041	298	3.6	1440
Direct Background reading (1)	5		162	
Direct Background reading (2)	2		162	
Direct Background reading (3)	6		152	
Direct Background reading (4)	3		148	
Direct Background reading (5)	1		161	
Direct Background reading (AVERAGE)	3.4		157	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	1034	NA	NA	1482
MID-DAY BACKGROUND READING	4		173	
EVENING SOURCE READING	1022	335	5	1417
EVENING BACKGROUND READING	4		158	
Morning check performed by	URH 0725			
Mid-day check performed by	JRH 1235			
Afternoon check performed by	RATIG			

A/B Phoswich Serial Number 119803/166008

DATE: 8/29/01	PAGE 52 of 52			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	5/30/2001		6/4/1999	
Out of Cal Date	11/29/2001		6/4/2000	
Serial Number	119803		1843-94	
Source emission rate	8880		11100	
Instrument Channel	N/A		N/A	
High Voltage	0.65			
Battery Check	ok			
Source Check Reading (1)	1050			1448
Source Check Reading (2)	1046			1413
Source Check Reading (3)	1055			1421
Source Check Reading (4)	1042			1415
Source Check Reading (5)	1080			1515
Source Check Reading (AVERAGE)	1054			1442
Direct Background reading (1)	2		160	
Direct Background reading (2)	4		143	
Direct Background reading (3)	1		157	
Direct Background reading (4)	8		171	
Direct Background reading (5)	2		168	
Direct Background reading (AVERAGE)	3.4		159.8	
Efficiency = (CPM-Background) / DPM * 100	12%		12%	
MID-DAY SOURCE READING	not used in AM			
MID-DAY BACKGROUND READING	NA →			
EVENING SOURCE READING	not used in PM			
EVENING BACKGROUND READING	NA →			
Morning check performed by	JRH 0900 @ Overcast cool			
Mid-day check performed by	NA			
Afternoon check performed by	NA			

SENECA ARMY DEPOT
SEAD-12 RI/FS
06-06-01front

Site: Seneca Army Depot				
Project: SEAD-12				
Team: 1 GREY				
				Page 1 of
Instrument Type	A/B			
AKA	Floor Monitor			
Make	Ludlum			
Model	3260			
Serial Number	138256			
Calibration Date	11/15/2000			
Out of Cal Date	11/14/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-37			
Serial Number	136498			
Calibration Date	11/15/2000			
Out of Cal Date	11/14/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		6/4/1999	
Out of Cal Date	3/31/2003		6/4/2000	
Serial Number	1841-94		1039-92	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
initial instrument efficiency	3.10%			14.00%
2 Sigma Range	220-329			1737-2606

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET _____ OF _____

SUBJECT DAILY FUNCTION CHECK BY EKM DATE 6/06/01

CKD. _____ REVISION _____

:30 AM INSTRUMENT: FLOOR MONITOR METER 138256
S/N: 138256

BACKGROUND (α, β)

1	6 / 599	6.	1 / 625	11.	5 / 619
2	3 / 612	7.	4 / 586	12.	5 / 628 (154)
3	5 / 608	8.	6 / 642	13.	1 / 597
4	1 / 655	9.	5 / 636	14.	5 / 642
5	2 / 656	10	1 / 614	15.	4 / 602

First 5 measurements: Avg (α) = 3.4 Avg (β) = 626
σ(α) = 1.84 σ(β) = 25.02

SOURCE
Type: Th-230
S/N: 1841-94 DNS-9

1	271
2	245
3	252
4	247
5	277
6	271
7	306
8	301
9	250
10	281
11	281
12	268
13	264
14	281
15	323

Avg = 275 σ = 17
2σ = 34

SOURCE
Type: Tc-99
S/N: 1039192 DNS-9

1	2189
2	2187
3	2173
4	2139
5	2181
6	2170
7	2155
8	2173
9	2229
10	2171
11	2102
12	2208
13	2094
14	2252
15	2150

Avg = 2172 σ = 47
2σ = 94

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6-6-01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check				
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)	Initial Function check			
Source Check Reading (4)				
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)				
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)	Initial Function check			
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	275 JRH	1004	NA	2091
MID-DAY BACKGROUND READING	2	673	3	665
EVENING SOURCE READING	375			2208
EVENING BACKGROUND READING	Need to check	4 / 651		
Morning check performed by				
Mid-day check performed by	6/7/01	EKM / JRH		
Afternoon check performed by		JRH		

June 7 morning readings look ok JRH

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/7/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7			
Battery Check	OK			
Source Check Reading (1)	258			2146
Source Check Reading (2)	255			2126
Source Check Reading (3)	264			2136
Source Check Reading (4)	272			2098
Source Check Reading (5)	273			2071
Source Check Reading (AVERAGE) OK	264.4			2115.4 OK
Direct Background reading (1) 0830	5	558 → 619 2nd reading		
Direct Background reading (2)	5	578		
Direct Background reading (3)	2	606		
Direct Background reading (4)	3	581		
Direct Background reading (5)	4	591		
Direct Background reading (AVERAGE)	3.8	595		
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	286			2272 KU: 1.7 Bat OK
MID-DAY BACKGROUND READING	3		588	
EVENING SOURCE READING	361			2316 KU: 1.7 Bat: OK
EVENING BACKGROUND READING	3		629	
Morning check performed by	JRH	0900		
Mid-day check performed by	DRG	1250		
Afternoon check performed by	DRG	1820		

30 cpm higher than 3 sigma approx. Same as 6/6/01 fluctuation is consistent so far.

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 2/8/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7			
Battery Check	OK			
Source Check Reading (1)	247			2073
Source Check Reading (2)	252			1960
Source Check Reading (3)	256			2050
Source Check Reading (4)	212			2065
Source Check Reading (5)	246			2029
Source Check Reading (AVERAGE) oc	242.6			2035 olc
Direct Background reading (1)	7	541		
Direct Background reading (2)	2	557		
Direct Background reading (3)	3	548		
Direct Background reading (4)	3	571		
Direct Background reading (5)	6	551		
Direct Background reading (AVERAGE)	4	554		
Efficiency = (CPM-Background) / DPM * 100	2.7%		13.34%	
MID-DAY SOURCE READING	244			2126 Batt: OK HV: 1.7
MID-DAY BACKGROUND READING	3		692	
EVENING SOURCE READING	238			2215
EVENING BACKGROUND READING	3		711	Batt OK HV- 1.7
Morning check performed by	DRG 0720			
Mid-day check performed by	DRG 1230			
Afternoon check performed by	DRG 1825			

SENECA army DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/9/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 Kv			
Battery Check	OK			
Source Check Reading (1)	~~4~~ 219	~~518~~		1975
Source Check Reading (2)	254			2211
Source Check Reading (3)	215			2163
Source Check Reading (4)	249			2136
Source Check Reading (5)	261			2092
Source Check Reading (AVERAGE)	240			2115
Direct Background reading (1)	4	518		
Direct Background reading (2)	7	565		
Direct Background reading (3)	4	547		
Direct Background reading (4)	6	527		
Direct Background reading (5)	3	524		
Direct Background reading (AVERAGE)	5	536		
Efficiency = (CPM-Background) / DPM * 100	2.6 %		14.2 %	
MID-DAY SOURCE READING	329			2324
MID-DAY BACKGROUND READING	4		659	
EVENING SOURCE READING				2311
EVENING BACKGROUND READING	365		774	
Morning check performed by	DRG 0745			
Mid-day check performed by	DRG 1235			
Afternoon check performed by	JRH 1640			

But: OK HV: 1.7

But: OK HV: 1.7

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/10/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 K.			
Battery Check	OK			
Source Check Reading (1)	268			2200
Source Check Reading (2)	276			2127
Source Check Reading (3)	293			2134
Source Check Reading (4)	270			2157
Source Check Reading (5)	287			2131
Source Check Reading (AVERAGE)	279			2150
Direct Background reading (1)	4	498		
Direct Background reading (2)	1	518		
Direct Background reading (3)	2	516		
Direct Background reading (4)	0	554		
Direct Background reading (5)	4	521		
Direct Background reading (AVERAGE)	2	521		
Efficiency = (CPM-Background) / DPM * 100	3.1%		14.7%	
MID-DAY SOURCE READING (R26 50cpm high as used)	387			2243
MID-DAY BACKGROUND READING	7		721	
EVENING SOURCE READING	324			2318
EVENING BACKGROUND READING	4		663	
Morning check performed by	DR6 0750			
Mid-day check performed by	DR6 1225			
Afternoon check performed by	DR6 1700			

Bat OK HV. 1.7

Bat: OK HV: 1.7

SENECA army DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/21/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7KV			
Battery Check	OK			
Source Check Reading (1)	232			2128
Source Check Reading (2)	220			2198
Source Check Reading (3)	224			2110
Source Check Reading (4)	256			2109
Source Check Reading (5)	246			2179
Source Check Reading (AVERAGE)	236			2145
Direct Background reading (1)	1			615
Direct Background reading (2)	1			592
Direct Background reading (3)	4			635
Direct Background reading (4)	1			576
Direct Background reading (5)	1			659
Direct Background reading (AVERAGE)	2			615
Efficiency = (CPM-Background) / DPM * 100	2.6%		13.8%	
MID-DAY SOURCE READING (70 cpm above 2 sigma)	398			2231
MID-DAY BACKGROUND READING (2nd measurement 348)	3		621	
EVENING SOURCE READING (40 cpm above 2 sigma)	368			2225
EVENING BACKGROUND READING	4		684	
Morning check performed by	DRG 0755			
Mid-day check performed by	DRG 1210			
Afternoon check performed by	DRG 1830			

But OK HV: 1.7

But OK HV: 1.7

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6 JAN 5/12/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 KV			
Battery Check	OK			
Source Check Reading (1)	223			2122
Source Check Reading (2)	224			2181
Source Check Reading (3)	229			2134
Source Check Reading (4)	230			2180
Source Check Reading (5)	219			2201
Source Check Reading (AVERAGE)	225			2164
Direct Background reading (1)	α 2	β 584		
Direct Background reading (2)	2	557		
Direct Background reading (3)	3	581		
Direct Background reading (4)	1	569		
Direct Background reading (5)	8	560		
Direct Background reading (AVERAGE)	3	570		
Efficiency = (CPM-Background) / DPM * 100	2.5%		14.4 %	
MID-DAY SOURCE READING (87 cpm Higher than 2-sigma Rerun 15 pts for Next)	356			2234
MID-DAY BACKGROUND READING	3		664	
EVENING SOURCE READING	393			2315
EVENING BACKGROUND READING	3		707	
Morning check performed by	DRG 0800			
Mid-day check performed by	DRG 1220			
Afternoon check performed by	JRH 1820			

HV: 1.7
Batt: OK

SENECA army DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/13/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 KV			
Battery Check	OK			
Source Check Reading (1)	233			2184
Source Check Reading (2)	246			2156
Source Check Reading (3)	280			2190
Source Check Reading (4)	263			2134
Source Check Reading (5)	246			~~280~~ 2080
Source Check Reading (AVERAGE)	254			
Direct Background reading (1)	α	4	595	β
Direct Background reading (2)		5	581	
Direct Background reading (3)		5	632	
Direct Background reading (4)		1	591	
Direct Background reading (5)		3	609	
Direct Background reading (AVERAGE)		4	602	
Efficiency = (CPM-Background) / DPM * 100		4 DRG	X	
MID-DAY SOURCE READING	374			2317
MID-DAY BACKGROUND READING		4	683	
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by	DRG 0810			
Mid-day check performed by				
Afternoon check performed by				

Bat OK
HV: 1.7

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: ~~12/18/01~~ 6/19/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 kV			
Battery Check	OK			
Source Check Reading (1)	191			
Source Check Reading (2)	190			
Source Check Reading (3)	202			
Source Check Reading (4)	193			
Source Check Reading (5)	195			
Source Check Reading (AVERAGE)	194 →	low - will recheck at lunch		
Direct Background reading (1) (α/β)	1	479		
Direct Background reading (2)	3	502		
Direct Background reading (3)	1	562		
Direct Background reading (4)	0	578		
Direct Background reading (5)	4	547		
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	391			2209
MID-DAY BACKGROUND READING	3 / 686			
EVENING SOURCE READING	374			2333
EVENING BACKGROUND READING	2 / 727			
Morning check performed by	JRH 0730 72°F Warm + Muggy			
Mid-day check performed by	JRH 1230			
Afternoon check performed by	RSM 1650			

- May not have let instrument purge long enough

SENECA army DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7			
Battery Check	ok			
Source Check Reading (1)	245			2083
Source Check Reading (2)	210			2192
Source Check Reading (3)	223			2081
Source Check Reading (4)	248			2071
Source Check Reading (5)	223			2149
Source Check Reading (AVERAGE) ok	230			2115
Direct Background reading (1) α/β	1	637		
Direct Background reading (2)	3	627		
Direct Background reading (3)	5	629		
Direct Background reading (4)	4	614		
Direct Background reading (5)	6	578		
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	331			2198
MID-DAY BACKGROUND READING	1 / 669			
EVENING SOURCE READING	365			2211
EVENING BACKGROUND READING	5 / 645			
Morning check performed by	JRH 0735			
Mid-day check performed by	RDM 1235			
Afternoon check performed by	RDM 5:25P			

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/21/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7			
Battery Check	OK			
Source Check Reading (1)	296			2165
Source Check Reading (2)	309			2232
Source Check Reading (3)	291			2178
Source Check Reading (4)	265			2143
Source Check Reading (5)	287			2162
Source Check Reading (AVERAGE)	290			2176
Direct Background reading (1)	2	629		
Direct Background reading (2)	2	628		
Direct Background reading (3)	2	655		
Direct Background reading (4)	3	631		
Direct Background reading (5)	5	601		
Direct Background reading (AVERAGE)	3	628.8		
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	Not used in AM			
MID-DAY BACKGROUND READING	Not used in AM			
EVENING SOURCE READING	Not used in PM			
EVENING BACKGROUND READING				
Morning check performed by	KKS 0730			
Mid-day check performed by				
Afternoon check performed by				

JEH 1700

JEH ~~1637~~

PARSONS ENGINEERING SCIENCE

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/22/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 kV			
Battery Check	ok			
Source Check Reading (1)	~~283~~ 283	1026	~~283~~ 5	2246
Source Check Reading (2)	271	992	5	2131
Source Check Reading (3)	270	1004	3	2114
Source Check Reading (4)	292	1008	2	2156
Source Check Reading (5)	280	993	3	2201
Source Check Reading (AVERAGE)	279	1005	3.6	2170
Direct Background reading (1)	2	598		
Direct Background reading (2)	7	649		
Direct Background reading (3)	4	604		
Direct Background reading (4)	1	696		
Direct Background reading (5)	4	665		
Direct Background reading (AVERAGE)	3.6	642		
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	325	1014	4	2309
MID-DAY BACKGROUND READING	3757			
EVENING SOURCE READING	NOT USED IN PM JRH 1720			
EVENING BACKGROUND READING				
Morning check performed by	Rom 7:30a			
Mid-day check performed by	JRH 1227			
Afternoon check performed by				

SENECA army DEPOT
SEAD-12 RI/FS

Purge @ 720

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 12/24/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 KV			
Battery Check	OK			
Source Check Reading (1)	211	~~888~~ 12		
Source Check Reading (2)	JRH ~~200~~ 230			2174
Source Check Reading (3)	241			2078
Source Check Reading (4)	217			
Source Check Reading (5)	217			
Source Check Reading (AVERAGE)	223			
Direct Background reading (1)	5	556		
Direct Background reading (2)	3	551		
Direct Background reading (3)	2	581		
Direct Background reading (4)	5	602		
Direct Background reading (5)	2	614		
Direct Background reading (AVERAGE)	3.4	581		
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by	AMC 750			
Mid-day check performed by				
Afternoon check performed by				

The morning check was under 2 Sigma, so we let it purge for the morning & redid the 5 count checks. See the next page for fx check.

PARSONS ENGINEERING SCIENCE KLK

SENECA army DEPOT
SEAD-12 RI/FS

233-432 2111-2302

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/24/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7kV			
Battery Check	ok			
Source Check Reading (1)	261			2128
Source Check Reading (2)	254			2137
Source Check Reading (3)	234			2267
Source Check Reading (4)	251	KLK	KLK	2141
Source Check Reading (5)	240			2035
Source Check Reading (AVERAGE)	248.4			2141.6
Direct Background reading (1)		1	637	
Direct Background reading (2)		2	648	
Direct Background reading (3)		1	601	KLK
Direct Background reading (4)	KLK	0	658	
Direct Background reading (5)		3	624	
Direct Background reading (AVERAGE)		1.4	633.6	
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING	291			~~2144~~ 2191 KLK
EVENING BACKGROUND READING	4/622			
Morning check performed by	KLK			
Mid-day check performed by	initial done in ~~AM~~ afternoon			
Afternoon check performed by	JRH 1525			

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7 kV			
Battery Check	ok			
Source Check Reading (1)	266			2123
Source Check Reading (2)	243			2108
Source Check Reading (3)	248			2115
Source Check Reading (4)	255			2096
Source Check Reading (5)	236			2194
Source Check Reading (AVERAGE)	250			2127
Direct Background reading (1)	0	626		
Direct Background reading (2)	1	602		
Direct Background reading (3)	1	574		
Direct Background reading (4)	3	563		
Direct Background reading (5)	2	626		
Direct Background reading (AVERAGE)	1	598		
Efficiency = (CPM-Background) / DPM * 100			13.8 %	
MID-DAY SOURCE READING	302			2131
MID-DAY BACKGROUND READING	21662			
EVENING SOURCE READING	357			2198
EVENING BACKGROUND READING	3 / 633			
Morning check performed by Sunny 65°F	JRH 0730			
Mid-day check performed by	JRH 1205			
Afternoon check performed by	Rom 5:37p			

- FM was left purging overnight and as a result did not read low

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 4/26/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7			
Battery Check	ok			
Source Check Reading (1)	228			~~2029~~ JRH 2169
Source Check Reading (2)	242			~~2078~~ 2120
Source Check Reading (3)	266			~~2081~~ 2148
Source Check Reading (4)	289			~~2057~~ 2130
Source Check Reading (5)	234			2131
Source Check Reading (AVERAGE)	252			2140
Direct Background reading (1)	2	580		
Direct Background reading (2)	3	600		
Direct Background reading (3)	2	556		
Direct Background reading (4)	4	579		
Direct Background reading (5)	0	580		
Direct Background reading (AVERAGE)	2.2	579		
Efficiency = (CPM-Background) / DPM * 100	2.8 %		14 %	
MID-DAY SOURCE READING	341			2247
MID-DAY BACKGROUND READING	6 / 666			
EVENING SOURCE READING	404			2212
EVENING BACKGROUND READING	4 / 663			
Morning check performed by	JRH 0705			
Mid-day check performed by	JRH 1210			
Afternoon check performed by	JRH 1744			

Left purging overnight

- Morning check - detector was not flush against jig initially - was changed on source check #5 and 1-4 were

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 6/27/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7			
Battery Check	ok			
Source Check Reading (1)	277			2255
Source Check Reading (2)	271			2195
Source Check Reading (3)	261			2210
Source Check Reading (4)	288			2077
Source Check Reading (5)	294			2172
Source Check Reading (AVERAGE)	278			2182
Direct Background reading (1)	6	602		
Direct Background reading (2)	6	660		
Direct Background reading (3)	4	595		
Direct Background reading (4)	3	599		
Direct Background reading (5)	1	615		
Direct Background reading (AVERAGE)	4	614		
Efficiency = (CPM-Background) / DPM * 100	3.0%		14%	
MID-DAY SOURCE READING	326			2158
MID-DAY BACKGROUND READING	3 / 653			
EVENING SOURCE READING	Not used in PM			
EVENING BACKGROUND READING				
Morning check performed by	RPM 07:40 a sunny 70°			
Mid-day check performed by	RPM 12:25 p sunny 78°			
Afternoon check performed by				

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7kV			
Battery Check	OK			
Source Check Reading (1)	364			2248
Source Check Reading (2)	323			2281
Source Check Reading (3)	333			2271
Source Check Reading (4)	339			2197
Source Check Reading (5)	334			2225
Source Check Reading (AVERAGE)	338.6			2244.4
Direct Background reading (1)		1	663	
Direct Background reading (2)		4	681	
Direct Background reading (3)		1	648	
Direct Background reading (4)		4	637	
Direct Background reading (5)		4	637	
Direct Background reading (AVERAGE)		2.8	653.2	
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	function check		done	
MID-DAY BACKGROUND READING	in the ~~morn~~ afternoon. KLK			
EVENING SOURCE READING	320			2264
EVENING BACKGROUND READING	4 1757			
Morning check performed by	not used			
Mid-day check performed by	KLK 1215 74°F			
Afternoon check performed by	JRH 1753			

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 7/16/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check	OL			
Source Check Reading (1)	391			2259
Source Check Reading (2)	360			2293
Source Check Reading (3)	344			2210
Source Check Reading (4)	359			2253
Source Check Reading (5)	368			2328
Source Check Reading (AVERAGE)	365			2270
Direct Background reading (1)		3	679	
Direct Background reading (2)		2	778	
Direct Background reading (3)		4	686	
Direct Background reading (4)		5	709	
Direct Background reading (5)		1	711	
Direct Background reading (AVERAGE)		3	713	
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING	414			2546
MID-DAY BACKGROUND READING	3 / 779			
EVENING SOURCE READING	NOT USED IN PM			
EVENING BACKGROUND READING				
Morning check performed by	AML 0740 Cloudy, warm, 70°F			
Mid-day check performed by	Rom 12:07p sunny 74°F			
Afternoon check performed by	NOT USED IN PM - JRH			

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: ~~7/11/01~~ 7/13/01	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.7			
Battery Check	ok			
Source Check Reading (1)	~~379~~			2219
Source Check Reading (2)	387			2182
Source Check Reading (3)	393			2218
Source Check Reading (4)	410			2180
Source Check Reading (5)	387			2227
Source Check Reading (AVERAGE)				
Direct Background reading (1)	0	654		
Direct Background reading (2)	4	644		
Direct Background reading (3)	3	677		
Direct Background reading (4)	2	654		
Direct Background reading (5)	6	689		
Direct Background reading (AVERAGE)	3	664		
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by	JRH 0741 cool overcast			
Mid-day check performed by	mylar changed at midday			
Afternoon check performed by	not used in afternoon			

purged for ~ 30 minutes

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE: 7/14/2001	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage	1.67			
Battery Check	OK			
Source Check Reading (1)	326			2119
Source Check Reading (2)	356			2105
Source Check Reading (3)	351			2117
Source Check Reading (4)	328			2166
Source Check Reading (5)	300			2070
Source Check Reading (AVERAGE)	328.2	20 ck	20 ck	2115.4
Direct Background reading (1)	6			677
Direct Background reading (2)	4			654
Direct Background reading (3)	1			628
Direct Background reading (4)	2			608
Direct Background reading (5)	4			694
Direct Background reading (AVERAGE)	17/5 =	3.4		652.2
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by				
Mid-day check performed by				
Afternoon check performed by				

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check				
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)				
Source Check Reading (4)				
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)				
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)				
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by				
Mid-day check performed by				
Afternoon check performed by				

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check				
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)				
Source Check Reading (4)				
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)				
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)				
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by				
Mid-day check performed by				
Afternoon check performed by				

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check				
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)				
Source Check Reading (4)				
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)				
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)				
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by				
Mid-day check performed by				
Afternoon check performed by				

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check				
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)				
Source Check Reading (4)				
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)				
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)				
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by				
Mid-day check performed by				
Afternoon check performed by				

SENECA ARMY DEPOT
SEAD-12 RI/FS

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check				
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)				
Source Check Reading (4)				
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)				
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)				
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by				
Mid-day check performed by				
Afternoon check performed by				

A/B Floor Monitor Serial Number 138256/136498 TEAM-1 (GREY)

DATE:	PAGE of			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	11/15/2000		11/15/2000	
Out of Cal Date	11/14/2001		11/14/2001	
Serial Number	138256		138256	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
High Voltage				
Battery Check				
Source Check Reading (1)				
Source Check Reading (2)				
Source Check Reading (3)				
Source Check Reading (4)				
Source Check Reading (5)				
Source Check Reading (AVERAGE)				
Direct Background reading (1)				
Direct Background reading (2)				
Direct Background reading (3)				
Direct Background reading (4)				
Direct Background reading (5)				
Direct Background reading (AVERAGE)				
Efficiency = (CPM-Background) / DPM * 100				
MID-DAY SOURCE READING				
MID-DAY BACKGROUND READING				
EVENING SOURCE READING				
EVENING BACKGROUND READING				
Morning check performed by				
Mid-day check performed by				
Afternoon check performed by				

Site: Seneca Army Depot				
Project: SEAD-12				
Team: 1 GREY				
			Page 1 of	
Instrument Type	A/B			
AKA	Floor Monitor			
Make	Ludlum			
Model	3260			
Serial Number	138256			
Calibration Date	11/15/2000			
Out of Cal Date	11/14/2001			
Probe:	Alpha		Beta	
Make	Ludlum			
Model	43-37			
Serial Number	136498			
Calibration Date	11/15/2000			
Out of Cal Date	11/14/2001			
Source	Th-230		Tc-99	
	Alpha	Beta	Alpha	Beta
Calibration Date	4/10/2001		6/4/1999	
Out of Cal Date	3/31/2003		6/4/2000	
Serial Number	1841-94		1039-92	
Source emission rate	8880dpm		11100dpm	
Instrument Channel	N/A		N/A	
initial instrument efficiency	3.70%			14.00%
2 Sigma Range	233-432			2111-2302

PARSONS MAIN, INC. PARSONS

CLIENT _____ JOB NO. _____ SHEET _____ OF _____

SUBJECT FUNCTION CHECK - END OF DAY BY _____ DATE 6/12/01

Weather - overcast, 70 degrees, humid CKD. _____ REVISION _____

Instrument: Floor Monitor 138256/136498 All units are cpm

	Th-230	1841-94	
1	308	1723	TIME
2	357		
3	327		
4	320		
5	322		
6	307	1729	
7	374		
8	378		
9	360		
10	352		
11	328	1737	
12	332		
13	358		
14	338		
15	368	1743	

	Tc^{99}	1039-92		
1	~~360~~ 341	2219	1744	TIME
2	2166			
3	2240			
4	2223			
5	2239			
6	2226			
7	2203			
8	2285			
9	2233			
10	2140			
11	2193		1756	
12	2216			
13	2186			
14	2264			
15	2233			

Background	α/β		
1	2/658	1802	TIME
2	4/669		
3	5/660		
4	4/634		
5	2/616	1807	
6	4/675		
7	3/679		
8	3/680		
9	3/664		
10	3/655		
11	7/677		
12	1/651	1815	
13	12/680		
14	4/606		
15	5/684	1819	

Average (Th-230): 342
σ: 18.5

Average (Tc^{99}): 2218
σ: 47

~~Average (α+β):~~
~~σ:~~

Average background (α) = 4.13
σ = 2

Average background (β) = 659
σ = 26

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET _____ OF _____

SUBJECT FUNCTION CHECK - MIDDAY BY _____ DATE 6/12/01

Weather mostly Cloudy, 70 degrees, humid. CKD. _____ REVISION _____

Instrument : Floor Monitor 138256 / 136498

Thorium 230 1841-94

1	367	cpm	1236
2	379	cpm	12:38
3	358	cpm	12:39
4	373	cpm	12:41
5	407	cpm	1242
6	364	cpm	1244
7	347	cpm	1245
8	370	cpm	1247
9	378	cpm	1249
10	419	cpm	1300
11	391	cpm	1301
12	370	cpm	1303
13	390	cpm	1305
14	381	cpm	1306
15	420	cpm	1307

Ave : 381 cpm

Tc^{99} 1039-92

1	2199	cpm	1310
2	2221	cpm	
3	2324	cpm	
4	2243	cpm	
5	2300	cpm	
6	2199	cpm	1317
7	2179	cpm	
8	2280	cpm	
9	2188	cpm	
10	2219	cpm	1323
11	2277	cpm	
12	2185	cpm	
13	2250	cpm	
14	2192	cpm	
15	2219	cpm	

Ave : 2232 cpm

Background α / β

1	2 / 668	1331
2	4 / 703	
3	1 / 703	
4	4 / 616	
5	4 / 676	
6	5 / 638	1336
7	3 / 679	
8	6 / 661	
9	4 / 676	
10	5 / 701	1343
11	1 / 666	
12	2 / 657	
13	4 / 697	
14	4 / 672	
15	4 / 685	

Ave : 3.5 / 673

SENECA ARMY DEPOT
SEAD-12 RI/FS
6/4/2001

Site: Seneca Army Depot	
Project: SEAD-12	
Team: 2 BLACK	
	Page 1 of 8
Instrument Type	Micro-Rem
AKA	
Make	Bicron
Model	Micro-Rem
Serial Number	C252A
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Probe	
Make	N/A
Model	N/A
Serial Number	N/A
Calibration Date	N/A
Out of Cal Date	N/A
Source	Cs-137
Source type	Gamma
Calibration Date	4/10/2001
Out of Cal Date	3/31/2003
Serial Number	1845-94
Source emission rate	1768566dpm
Instrument Channel	N/A
2 Sigma Range	441-662

ERIN

INSTRUMENT: MICRO-REM

S/N: C252A

11:30 AM - Background

BATTERY: OK HV: OK

BACKGROUND

1	5	
2	6	
3	7	
4	5	Floor
5	5	
6	6	
7	6	
8	4	
9	7	
10	5	
11	6	WALL
12	5	
13	4	
14	5	
15	4	

Avg: 5.3

σ = 2.31

6/5/01 9:00AM

SOURCE

TYPE: Cs-137

S/N: 1645-94

1	30		600
2	35	source check	500
3	25	re detail	550
4	30	w/ proper	550
5	30	geometry	525
6	30		550
7	30		500
8	30		550
9	30		550
10	35		600
11	30		550
12	30		600
13	30		550
14	30		600
15	30		500

Avg = 30.3

σ = 5.51

Time: 6/5/01

Date: 9:00AM

Bat ok

HV ok

BACKGROUND 6/5/01 9:00AM

S/N: C252A

1	4
2	3
3	4
4	4
5	5
6	3
7	4
8	3
9	3
10	5

Avg = 3.8

σ = 1.95

MICRO-REM Serial Number C252A TEAM-1 (GREY)

DATE: 6/6/01 0910	PAGE 3 OF 8
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	initial function check done
Source Check Reading (2)	
Source Check Reading (3)	
Source Check Reading (4)	KLK
Source Check Reading (5)	
Source Check Reading (AVERAGE)	
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	5
Direct Background reading (3)	4
Direct Background reading (4)	3
Direct Background reading (5)	3
Direct Background reading (AVERAGE)	4
MID-DAY SOURCE READING	not used in morn.
MID-DAY BACKGROUND READING	not used in morning
EVENING SOURCE READING	550
EVENING BACKGROUND READING	5
Morning check performed by	KLK ~~N/A~~ PK
Mid-day check performed by	NA
Evening check performed by	E.Lom

MICRO-REM Serial Number C252A TEAM-1 (GREY)

DATE: 6/7/01	PAGE 4 OF 8
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	550
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	590
Material:	
Material Background reading SCANNING	RLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	7
Direct Background reading (2)	5
Direct Background reading (3)	5
Direct Background reading (4)	6
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	6
MID-DAY SOURCE READING	450
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	ERM
Mid-day check performed by	ERM
Evening check performed by	ERM

1:00 pm

6:30 pm

MICRO-REM Serial Number C252A TEAM-1 (GREY)

DATE: 6/8/01	PAGE 5 OF 8
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	600
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	600
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	7
Direct Background reading (3)	6
Direct Background reading (4)	4
Direct Background reading (5)	7
Direct Background reading (AVERAGE)	6
MID-DAY SOURCE READING	6
MID-DAY BACKGROUND READING	500
EVENING SOURCE READING	600
EVENING BACKGROUND READING	6
Morning check performed by	KLK
Mid-day check performed by	KLK 1230
Evening check performed by	EKM 1830

MICRO-REM Serial Number C252A TEAM-1 (GREY)

DATE: 6/9/01	PAGE 6 OF 8
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	Ok
Battery Check	Ok
Source Check Reading (1)	550
Source Check Reading (2)	550
Source Check Reading (3)	550
Source Check Reading (4)	600
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	560 OK
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	5
Direct Background reading (3)	4
Direct Background reading (4)	5
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	5.2
MID-DAY SOURCE READING	KK 450
MID-DAY BACKGROUND READING	KK 5 JLH
EVENING SOURCE READING	550
EVENING BACKGROUND READING	5
Morning check performed by	JLH 0730
Mid-day check performed by	JRH 1252
Evening check performed by	EKM 1640

MICRO-REM Serial Number C252A TEAM-1 (GREY)

DATE: 6/10/01	PAGE 7 OF 8
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	600
Source Check Reading (4)	550
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	580
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	7
Direct Background reading (2)	4
Direct Background reading (3)	4
Direct Background reading (4)	6
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	550
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	not used in PM
EVENING BACKGROUND READING	NA
0800 Morning check performed by	EKm
1230 Mid-day check performed by	EKm
Evening check performed by	Not used in PM

MICRO-REM Serial Number C252A TEAM-1 (GREY)

DATE: 6/11/01	PAGE 8 OF 8
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	600
Source Check Reading (2)	650
Source Check Reading (3)	600
Source Check Reading (4)	650
Source Check Reading (5)	650
Source Check Reading (AVERAGE)	630
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	6
Direct Background reading (3)	7
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	6
MID-DAY SOURCE READING	NA
MID-DAY BACKGROUND READING	NA
EVENING SOURCE READING	NA
EVENING BACKGROUND READING	NA
0800 Morning check performed by	GRM
Mid-day check performed by	Not used in AM
Evening check performed by	Not used in PM

SENECA ARMY DEPOT
SEAD-12 RI/FS
6/4/2001

Site: Seneca Army Depot	
Project: SEAD-12	
Team: 2 BLACK	
	Page 1 of 48
Instrument Type	**Micro-Rem**
AKA	
Make	Bicron
Model	Micro-Rem
Serial Number	C251A
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Probe:	
Make	N/A
Model	N/A
Serial Number	N/A
Calibration Date	N/A
Out of Cal Date	N/A
Source	**Cs-137**
Source type	**Gamma**
Calibration Date	4/10/2001
Out of Cal Date	3/31/2003
Serial Number	1845-94
Source emission rate	1768566dpm
Instrument Channel	N/A
inst. Efficency	0.02%
2 Sigma Range	277-416

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET 2 OF 48

SUBJECT INITIAL FUNCTION CHECK BY JRH DATE 6/4/01

CKD. _____ REVISION _____

INSTRUMENT: MICRO-REM
S/N: C251A

11:30 AM - Background
BATTERY: OK
SOURCE 6/0/01 TYPE Cs-137 S/N: 1645-94

redone w/ correct geometry

Allison

BACKGROUND

1	6	
2	5	
3	5	Floor
4	6	
5	5	
6	6	
7	6	
8	5	
9	5	
10	4	
11	5	WALL
12	6	
13	7	
14	6	
15	8	

Avg = 5.67
σ = 2.38

6/5/01 9:30am

1	30
2	30
3	30
4	30
5	25
6	30
7	25
8	30
9	25
10	30
11	25
12	30
13	25
14	30
15	30

Avg = 28.3
σ = 5.32

Time & Date: 6/5/01 9:30am

Background

1	4
2	4
3	3
4	4
5	3
6	4
7	3
8	3
9	4
10	3

Avg = 3.5
σ = 1.87

Instrument: Micro-Rem
S/N: C251A

HV = OK
Batt = OK

~~Background~~ Source Cs-137
S/N: 1845-94

Source Check (jig for geometry)

1	300	~~500~~
2	400	
3	300	
4	400	
5	300	
6	300	
7	400	
8	300	
9	400	
10	400	
11	400	
12	300	
13	300	
14	400	
15	300	

Avg = 347
σ = 19

C251A

MICRO-REM Serial Number ~~C252A~~ TEAM-1 (GREY)

DATE: 6/6/01 0915	PAGE 9 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	Initial check done in Morn
Source Check Reading (2)	
Source Check Reading (3)	EM
Source Check Reading (4)	
Source Check Reading (5)	
Source Check Reading (AVERAGE)	
Material:	EM
Material Background reading SCANNING	
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	4
Direct Background reading (2)	3
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	~~5~~ 450
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	~~500~~ 450 EM
EVENING BACKGROUND READING	5
Morning check performed by	Alove
Mid-day check performed by	Alove
Evening check performed by	Elm

6/6/01 out of 2 sig. fig because BAT or geometry was OK EM

1245

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6-7-01	PAGE 5 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	[redacted] EM 400
Source Check Reading (2)	[redacted] EM 350
Source Check Reading (3)	350
Source Check Reading (4)	350
Source Check Reading (5)	350
Source Check Reading (AVERAGE)	360
Material:	
Material Background reading SCANNING	NA
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	4
Direct Background reading (3)	6
Direct Background reading (4)	7
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	6
MID-DAY SOURCE READING	400
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	400
EVENING BACKGROUND READING	5
Morning check performed by	EKM
Mid-day check performed by (1pm)	EKM
Evening check performed by (6:30pm)	EKM

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/8/01	PAGE 7 OF 48		
Source	Cs-137		
Calibration Date	3/20/2001		
Out of Cal Date	9/16/2001		
Serial Number	C251A		
Instrument Channel	N/A		
High Voltage	ok		
Battery Check	ok		
Source Check Reading (1)	① 550	⑥ 500	⑪ 450
Source Check Reading (2)	② 400	⑦ 500	⑫ 500
Source Check Reading (3)	③ 550	⑧ 450	⑬ 500
Source Check Reading (4)	④ 500	⑨ 500	⑭ 550
Source Check Reading (5)	⑤ 500	⑩ 525	⑮ 400
Source Check Reading (AVERAGE)	see initial fx check sheet		
Material:			
Material Background reading SCANNING	KW		
FLAG (= 2X Material Background) SCANNING			
Direct Background reading (1)	① 4	⑥ 4	⑪ 7
Direct Background reading (2)	② 4	⑦ 4	⑫ 5
Direct Background reading (3)	③ 6	⑧ 5	⑬ 6
Direct Background reading (4)	④ 3	⑨ 2	⑭ 6
Direct Background reading (5)	⑤ 5	⑩ 3	⑮ 4
Direct Background reading (AVERAGE)	see initial fx check sheet		
MID-DAY SOURCE READING	not used in mtr		
MID-DAY BACKGROUND READING	not used in mtr		
EVENING SOURCE READING	550		
EVENING BACKGROUND READING	6		
Morning check performed by	KLK		
Mid-day check performed by	NA		
Evening check performed by	EKM 1830		

initial fx check b/c new ~~source~~ jig was made for micro-rems (FLK)

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/9/01	PAGE 8 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500 OK
Material:	
Material Background reading SCANNING	KUK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	4
Direct Background reading (2)	5
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4.6
MID-DAY SOURCE READING	
MID-DAY BACKGROUND READING	Not Used TODAY
EVENING SOURCE READING	
EVENING BACKGROUND READING	
Morning check performed by	JRH 0730
Mid-day check performed by	
Evening check performed by	

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/10/01	PAGE 9 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	550
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	510
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	7
Direct Background reading (2)	5
Direct Background reading (3)	5
Direct Background reading (4)	6
Direct Background reading (5)	3
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	not used in AM
MID-DAY BACKGROUND READING	NA
EVENING SOURCE READING	500
EVENING BACKGROUND READING	4
0800 Morning check performed by	EKM
Mid-day check performed by	NA
1700 Evening check performed by	EKM

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6-11-01	PAGE 10 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	550
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	510
Material:	
Material Background reading SCANNING	ok
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	4
Direct Background reading (2)	4
Direct Background reading (3)	6
Direct Background reading (4)	5
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
0800 Morning check performed by	EKM
1220 Mid-day check performed by	EKM
1240 Evening check performed by	DRG

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/12/01	PAGE 11 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	500
Source Check Reading (2)	550
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	510
Material:	
Material Background reading SCANNING	KVK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	3
Direct Background reading (2)	5
Direct Background reading (3)	4
Direct Background reading (4)	3
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	4
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
0830 Morning check performed by	EKM
1230 Mid-day check performed by	EKM
EM 1730 Evening check performed by	EKM

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/13/01	PAGE 12 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	550
Source Check Reading (2)	500
Source Check Reading (3)	550
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	520
Material:	
Material Background reading SCANNING	KM
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	4
Direct Background reading (3)	5
Direct Background reading (4)	4
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4
MID-DAY SOURCE READING	550
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	not used in PM
EVENING BACKGROUND READING	NA
Morning check performed by	EKM 0700
Mid-day check performed by	EKM 1230
Evening check performed by	NA

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6-18-01	PAGE 13 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	7
Direct Background reading (2)	5
Direct Background reading (3)	~~3~~ 4
Direct Background reading (4)	4.5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	~~AA~~ KK 5.1
MID-DAY SOURCE READING	not used in AM
MID-DAY BACKGROUND READING	NA
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	KKS 1130
Mid-day check performed by	NA
Evening check performed by	KKS 1720

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/19/01	PAGE 19 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	~~ck~~
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	6
Direct Background reading (3)	3
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	4.8 σ=2.2
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	550
EVENING BACKGROUND READING	5
Morning check performed by	KKS
Mid-day check performed by	RSM 12:23p
Evening check performed by	KKS 1657

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6-20-01	PAGE 15 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	Ok
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	550
Source Check Reading (4)	550
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	520
Material:	
Material Background reading SCANNING	KUK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	4
Direct Background reading (3)	3
Direct Background reading (4)	5
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4.2
MID-DAY SOURCE READING	510
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	RJM 0710
Mid-day check performed by	JMK 1247
Evening check performed by	KKS 1720

C251A

MICRO-REM Serial Number ~~C252A~~ TEAM-1 (GREY)

DATE: 6/21/01	PAGE 16 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C252A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:		
Material Background reading SCANNING	KK	
FLAG (= 2X Material Background) SCANNING		
Direct Background reading (1)	4
Direct Background reading (2)	4
Direct Background reading (3)	5
Direct Background reading (4)	3
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	JRH 0710
Mid-day check performed by	Rom 12:30
Evening check performed by	JMK 1715

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/22/01	PAGE 7 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KUL
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5.5
Direct Background reading (2)	5.0
Direct Background reading (3)	4.5
Direct Background reading (4)	5.0
Direct Background reading (5)	5.0
Direct Background reading (AVERAGE)	5.0
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5.0
EVENING SOURCE READING	500
EVENING BACKGROUND READING	6.0
Morning check performed by	7:05a RJM
Mid-day check performed by	12:30p RJM
Evening check performed by	5:10p RJM

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/23/01	PAGE 13 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	o/c
Battery Check	o/c
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KUK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	3
Direct Background reading (3)	6
Direct Background reading (4)	6
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	500
EVENING BACKGROUND READING	4
Morning check performed by	RDM 0815a
Mid-day check performed by	RDM 12:08p
Evening check performed by	RDM 4:11 p

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/24/01	PAGE 19 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	~~4~~ 500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	4
Direct Background reading (2)	5
Direct Background reading (3)	3
Direct Background reading (4)	5
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4.2
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	4
Morning check performed by	Rom 0715a
Mid-day check performed by	Rom 1205p
Evening check performed by	Rom 3:23p

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/25/01	PAGE 20 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	4
Direct Background reading (2)	3
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4.2
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	600
EVENING BACKGROUND READING	4
Morning check performed by	ROM 0710 60-70 SUNNY
Mid-day check performed by	ROM 12:05p
Evening check performed by	ROM 5:33p

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/26/01	PAGE 21 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	450
Source Check Reading (AVERAGE)	490
Material:	
Material Background reading SCANNING	KCK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	4
Direct Background reading (3)	4
Direct Background reading (4)	4.5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	4.5
MID-DAY SOURCE READING	600
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	600
EVENING BACKGROUND READING	5
Morning check performed by	KKS - clear, 68°F, dry
Mid-day check performed by	RDM 12:05p
Evening check performed by	AML 1740

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/27/01	PAGE 22 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	506
Source Check Reading (2)	500
Source Check Reading (3)	550
Source Check Reading (4)	500
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	526
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	4
Direct Background reading (3)	4
Direct Background reading (4)	6
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	4.8
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	AML 0710 Weather: Warm Sunny 70°F
Mid-day check performed by	RDM 12:25 Sunny 73°F
Evening check performed by	JRH 1735

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/28/01	PAGE 23 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage OK	OK
Battery Check OK	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	510
Material:	
Material Background reading SCANNING	KU
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	7
Direct Background reading (3)	6.5
Direct Background reading (4)	6.5
Direct Background reading (5)	7
Direct Background reading (AVERAGE)	6.6
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	ICICS 68°F, Sunny, Dew Factor = 80%
Mid-day check performed by	RM 12:12p
Evening check performed by	KLK

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/29/01	PAGE 24 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	OK
Source Check Reading (1)	600
Source Check Reading (2)	550
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	530
Material:	
Material Background reading SCANNING	K|K
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	7
Direct Background reading (3)	7
Direct Background reading (4)	6
Direct Background reading (5)	7
Direct Background reading (AVERAGE)	7
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5.5 kcs
EVENING SOURCE READING	550
EVENING BACKGROUND READING	4
Morning check performed by	RM 07:10 a Hazy, Sunny 70°
Mid-day check performed by	kcs 1120
Evening check performed by	JMK 1526 HOT/HUMID

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 6/9/01	PAGE 25 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	550
Source Check Reading (2)	550
Source Check Reading (3)	500
Source Check Reading (4)	550
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	540
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	50
Direct Background reading (2)	5.0
Direct Background reading (3)	5.0
Direct Background reading (4)	5.0
Direct Background reading (5)	5.0
Direct Background reading (AVERAGE)	5.0
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	6
Morning check performed by	KKS 0830 sunny; clear; 70°F
Mid-day check performed by	KKS 1150
Evening check performed by	AML 1750 sunny 70°F

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 8/10/01	PAGE 26 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage OK	OK
Battery Check OK	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	4
Direct Background reading (3)	4
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	4.6
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	60
EVENING BACKGROUND READING	4
Morning check performed by KKS	cloudy, humid, 70°
Mid-day check performed by KKS	NA
Evening check performed by Rom	Sunny 78°

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/11/01	PAGE 27 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage OK	OK
Battery Check OK	OK
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	600
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	600
Material:	
Material Background reading SCANNING	ICUC
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	5
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	550
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	600
EVENING BACKGROUND READING	5
Morning check performed by KKS	Sunny, 68°, 80% Humidity
Mid-day check performed by KKS	NA
Evening check performed by KKS	Sunny, 78°,

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/12/01	PAGE 28 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage OK	OK
Battery Check new batterys installed – OK	OK
Source Check Reading (1)	550
Source Check Reading (2)	550
Source Check Reading (3)	550
Source Check Reading (4)	550
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	550
Material:	
Material Background reading SCANNING	
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	5
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	600
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	550
EVENING BACKGROUND READING	5
Morning check performed by JCKS	60°F, Sunny, Dry
Mid-day check performed by	JCH 1150
Evening check performed by	JMK

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/13/01	PAGE 29 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage OK	OK
Battery Check OK	OK
Source Check Reading (1)	550
Source Check Reading (2)	550
Source Check Reading (3)	550
Source Check Reading (4)	550
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	550
Material:	
Material Background reading SCANNING	ICW
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	5
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	550
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	500
EVENING BACKGROUND READING	6.5
Morning check performed by KKS	68°F, Partly Cloudy, dry
Mid-day check performed by	KLK 70°F
Evening check performed by	KLK 70°F 1730

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/14/01	PAGE 30 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage HV	
Battery Check OK	
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500

Material:		
Material Background reading SCANNING	full	
FLAG (= 2X Material Background) SCANNING		

Direct Background reading (1)	5
Direct Background reading (2)	5
Direct Background reading (3)	6
Direct Background reading (4)	4
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5

MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	KLCS 0710 60°F, Cloudy, Humid
Mid-day check performed by	JRH 1210
Evening check performed by	JMK 1700

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/15/01	PAGE 31 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	550
Source Check Reading (2)	600
Source Check Reading (3)	500
Source Check Reading (4)	560
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	560
Material:	
Material Background reading SCANNING	
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	5
Direct Background reading (3)	5
Direct Background reading (4)	4
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4.8
MID-DAY SOURCE READING	600
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	600
EVENING BACKGROUND READING	5
Morning check performed by JK	0715
Mid-day check performed by AML	1200 Sunny, warm 72°f
Evening check performed by AML	1530 Sunny ~ 75°F

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/16/01	PAGE 32 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	6
Direct Background reading (3)	5
Direct Background reading (4)	7
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	6
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by	KKS 0707 PCloudy, 65°
Mid-day check performed by	JRH 1210
Evening check performed by	JRH 1710

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/17/01	PAGE 33 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check OK	OK
Source Check Reading (1)	550
Source Check Reading (2)	550
Source Check Reading (3)	600
Source Check Reading (4)	550
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	560
Material:	
Material Background reading SCANNING	
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	4
Direct Background reading (3)	4
Direct Background reading (4)	5
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	6
EVENING SOURCE READING	5
EVENING BACKGROUND READING	600
Morning check performed by JMK	7-17-2001 RAIN 70° 07:20
Mid-day check performed by RDM	Overcast 70° 11:54a
Evening check performed by AML	1710 overcast 70°

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/18/01	PAGE 34 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage OK	ok
Battery Check OK	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	550
Source Check Reading (4)	550
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	~~530~~ 520
Material:	
Material Background reading SCANNING	FLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	4
Direct Background reading (2)	4
Direct Background reading (3)	5
Direct Background reading (4)	4
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	4.2
MID-DAY SOURCE READING	520
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	600
EVENING BACKGROUND READING	5
Morning check performed by 0730 KKS	67°F, Foggy
Mid-day check performed by AMC	1200 72°F Sunny
Evening check performed by AML	1540 73°F Sunny

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7-23-2001	PAGE 35 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	Ok
Source Check Reading (1)	8
Source Check Reading (2)	6
Source Check Reading (3)	5
Source Check Reading (4)	4
Source Check Reading (5)	5
Source Check Reading (AVERAGE)	5.6
Material:	
Material Background reading SCANNING	
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	550
Direct Background reading (2)	550
Direct Background reading (3)	600
Direct Background reading (4)	550
Direct Background reading (5)	600
Direct Background reading (AVERAGE)	570
MID-DAY SOURCE READING	6
MID-DAY BACKGROUND READING	500
EVENING SOURCE READING	5
EVENING BACKGROUND READING	550
Morning check performed by	JK 0720 Humid 74° PS HAZE
Mid-day check performed by	KES 1215 Humid 75° PS Haze
Evening check performed by	KLL

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7-24-01	PAGE 36 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	600
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	600

Material:		
Material Background reading SCANNING	KLK	
FLAG (= 2X Material Background) SCANNING		

Direct Background reading (1)	4
Direct Background reading (2)	6
Direct Background reading (3)	5
Direct Background reading (4)	4
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	5

MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	600
EVENING BACKGROUND READING	4
Morning check performed by JMK 0713	76° CLOUDY HUMID
Mid-day check performed by KKS 1157	76° cloudy Humid
Evening check performed by KKS 1740	78° cloudy Humid

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/25/01	PAGE 37 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	55
Source Check Reading (2)	50
Source Check Reading (3)	55
Source Check Reading (4)	60
Source Check Reading (5)	50
Source Check Reading (AVERAGE)	54
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	6
Direct Background reading (3)	6
Direct Background reading (4)	5
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	6
MID-DAY SOURCE READING	60
MID-DAY BACKGROUND READING	4
EVENING SOURCE READING	60
EVENING BACKGROUND READING	4
Morning check performed by	0700 Rom Humid, sunny, 75°
Mid-day check performed by	1145 KKS 76° Humid, sunny
Evening check performed by	Rom 5:35p 78° Humid overcast

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/26/01	PAGE 38 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	5
Direct Background reading (3)	6
Direct Background reading (4)	6
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5.4
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	500
EVENING BACKGROUND READING	5
Morning check performed by KLS	74°F, Showers
Mid-day check performed by KLS	73°F, Sunny
Evening check performed by RDM	74°F Sunny

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/27/01	PAGE 39 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	500
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	4
Direct Background reading (3)	6
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	550
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	550
EVENING BACKGROUND READING	5
Morning check performed by	Rom 68° Sunny 7:10a
Mid-day check performed by	Rom 70° Sunny 12:43p
Evening check performed by	Rom 74° Sunny 5:23p

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/28/01	PAGE 40 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	550
Source Check Reading (2)	550
Source Check Reading (3)	550
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	570
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	5
Direct Background reading (3)	4
Direct Background reading (4)	4
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	550
MID-DAY BACKGROUND READING	5
EVENING SOURCE READING	550
EVENING BACKGROUND READING	5
Morning check performed by	Ron Sunny 7:30a 67°
Mid-day check performed by	KKS 12:24 Sunny dry 70°
Evening check performed by	Ron Sunny 74° 1600

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/29/01	PAGE 41 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	600
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	600
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	6
Direct Background reading (3)	6
Direct Background reading (4)	6
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	6
MID-DAY SOURCE READING	600
MID-DAY BACKGROUND READING	6
EVENING SOURCE READING	600
EVENING BACKGROUND READING	5
Morning check performed by	KLS, 0723, 70°F, Sunny, dry
Mid-day check performed by	KLS, 1217, 72°F, P. Cloudy, dry
Evening check performed by	JMK 1540 P/C, Dry

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 7/30/01	PAGE 42 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	600
Source Check Reading (2)	550
Source Check Reading (3)	550
Source Check Reading (4)	550
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	550
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	8
Direct Background reading (3)	6
Direct Background reading (4)	7
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	6.4
MID-DAY SOURCE READING	daily check done at 1330
MID-DAY BACKGROUND READING	NA
EVENING SOURCE READING	not used in PM
EVENING BACKGROUND READING	NA
Morning check performed by	KLK 1330
Mid-day check performed by	NA
Evening check performed by	NA

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 8/8/01	PAGE 43 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	500
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	540
Material:	
Material Background reading SCANNING	KUK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	6
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	7
Direct Background reading (AVERAGE)	5.6
MID-DAY SOURCE READING	500
MID-DAY BACKGROUND READING	6
EVENING SOURCE READING	NOT USED IN PM - JRH
EVENING BACKGROUND READING	
Morning check performed by	JRH 0820 sunny humid hot
Mid-day check performed by	RM 11:10a Sunny humid 78°
Evening check performed by	NA

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 8/10/01	PAGE 44 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	Ok
Battery Check	Ok
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	600
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	600
Material:	
Material Background reading SCANNING	KK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	5
Direct Background reading (2)	6
Direct Background reading (3)	6
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5.4
MID-DAY SOURCE READING	Initial Done at Midday
MID-DAY BACKGROUND READING	
EVENING SOURCE READING	600
EVENING BACKGROUND READING	6
Morning check performed by	NA
Mid-day check performed by	Rom 80° mostly sunny, humid 12:47p
Evening check performed by	Rom 84° sunny humid 5:45p

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 8/22/01	PAGE 45 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	600
Source Check Reading (4)	600
Source Check Reading (5)	600
Source Check Reading (AVERAGE)	600
Material:	
Material Background reading SCANNING	n/k
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	6
Direct Background reading (2)	6
Direct Background reading (3)	5
Direct Background reading (4)	5
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	5.6
MID-DAY SOURCE READING	600
MID-DAY BACKGROUND READING	7
EVENING SOURCE READING	NOT USED IN PM
EVENING BACKGROUND READING	
Morning check performed by	RJM Sunny 7:35a 72° humid
Mid-day check performed by JRH 1700	not used in pm
Evening check performed by	" "

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 8/26/01	PAGE 46 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	o/c
Battery Check	ok
Source Check Reading (1)	600
Source Check Reading (2)	600
Source Check Reading (3)	550
Source Check Reading (4)	550
Source Check Reading (5)	550
Source Check Reading (AVERAGE)	570

Material:		
Material Background reading SCANNING	KK	
FLAG (= 2X Material Background) SCANNING		

Direct Background reading (1)	6
Direct Background reading (2)	4
Direct Background reading (3)	6
Direct Background reading (4)	5
Direct Background reading (5)	5
Direct Background reading (AVERAGE)	5.2

MID-DAY SOURCE READING	Not used in AM
MID-DAY BACKGROUND READING	NA
EVENING SOURCE READING	not used in PM
EVENING BACKGROUND READING	NA
Morning check performed by	JRH 1230
Mid-day check performed by	~~NOT PERFORMED BUT CHECK~~
Evening check performed by	ON 8/27 ok

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 8.27.01	PAGE 47 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	OK
Battery Check	OK
Source Check Reading (1)	600
Source Check Reading (2)	500
Source Check Reading (3)	500
Source Check Reading (4)	500
Source Check Reading (5)	560
Source Check Reading (AVERAGE)	520
Material:	
Material Background reading SCANNING	KJC
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	7
Direct Background reading (2)	4
Direct Background reading (3)	6
Direct Background reading (4)	6
Direct Background reading (5)	4
Direct Background reading (AVERAGE)	5.4
MID-DAY SOURCE READING	KJC
MID-DAY BACKGROUND READING	KJC
EVENING SOURCE READING	550
EVENING BACKGROUND READING	5
Morning check performed by	KJC 1620
Mid-day check performed by	NA
Evening check performed by	KJC 1815

Morning Check done at 1620

MICRO-REM Serial Number C251A TEAM-1 (GREY)

DATE: 8/28/01	PAGE 48 OF 48
Source	Cs-137
Calibration Date	3/20/2001
Out of Cal Date	9/16/2001
Serial Number	C251A
Instrument Channel	N/A
High Voltage	ok
Battery Check	ok
Source Check Reading (1)	~~564~~ ok .. 500
Source Check Reading (2)	550
Source Check Reading (3)	600
Source Check Reading (4)	500
Source Check Reading (5)	500
Source Check Reading (AVERAGE)	530
Material:	
Material Background reading SCANNING	KLK
FLAG (= 2X Material Background) SCANNING	
Direct Background reading (1)	4
Direct Background reading (2)	5
Direct Background reading (3)	4
Direct Background reading (4)	6
Direct Background reading (5)	6
Direct Background reading (AVERAGE)	5
MID-DAY SOURCE READING	Not used in AM
MID-DAY BACKGROUND READING	NA
EVENING SOURCE READING	- 550
EVENING BACKGROUND READING	7
Morning check performed by	JRL 0730
Mid-day check performed by	NA
Evening check performed by	KLK 1630

SENECA ARMY DEPOT
SEAD-12 RI/FS
6/4/2001

Site: Seneca Army Depot		
Project: SEAD-12		
Team: 2 BLACK		
		Page 1 of 58
Instrument Type	**Beta**	**Gross Gamma**
AKA	**Pancake G-M**	**Pancake G-M**
Make	Ludlum	Ludlum
Model	3	3
Serial Number	61457	61457
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Probe	**Gross Gamma**	**Gross Gamma**
Make	Ludlum	Ludlum
Model	44-9	44-9
Serial Number	PR026657	PR026657
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Source	**Tc-99**	**Cs-137**
Source type	**Alpha**	**Gamma**
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2001	3/31/2001
Serial Number	1039-92	1845-94
Source emission rate	11100 dpm	1768506 dpm
Instrument Channel	N/A	N/A
initial instrument efficiency	0.05	0.01
2 Sigma Range	355-671	11887-15580

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET 2 OF 58

SUBJECT Initial function check BY DRG DATE 6/4/01

CKD. _____ REVISION _____

Instrument GM Pancake

S/N 61459

11:15 AM

Battery OK Cs-137

Background		Tc-99	
1	20		500
2	20		450
3	30		600
4	20	Floor readings	400
5	20		600
6	20		550
7	30		500
8	20		400
9	20		400
10	30		400
11	35	Wall readings	500
12	30		600
13	20		450
14	20		600
15	20		550
Average	= 2367		KMK 6.4.01

σ = 4.86

Source	Type S/N
1	12,000
2	14,000
3	13,500
4	14,000
5	15,000
6	13,500
7	14000
8	13000
9	14000
10	14500
11	15000
12	12000
13	13000
14	14500
15	14000
Average	

Pancake G-M Serial Number ~~61402/54751~~ 61457/026657 KLK

DATE:	6/5/01	PAGE 3 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage		
Battery Check		
Source Check Reading (1)		check
Source Check Reading (2)		
Source Check Reading (3)		KLK
Source Check Reading (4)		
Source Check Reading (5)		
Source Check Reading (AVERAGE)		
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)		
Direct Background reading (2)		
Direct Background reading (3)		
Direct Background reading (4)		
Direct Background reading (5)		
Direct Background reading (AVERAGE)		
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING		
MID-DAY BACKGROUND READING		
EVENING SOURCE READING	200	10000
EVENING BACKGROUND READING	20	20
Morning check performed by	NA	NA
Mid-day check performed by	NA	NA
Evening check performed by	KLK	KLK

6/6/01 was offset for geometry

Pancake G-M Serial Number 61457 ~~61403/51754~~

DATE: 6/6/01		PAGE 4 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	—	—
Battery Check	✓	✓
Source Check Reading (1)	200	10000
Source Check Reading (2)	300	10000
Source Check Reading (3)	300	12000
Source Check Reading (4)	200	10000
Source Check Reading (5)	300	10000
Source Check Reading (AVERAGE)	260	10400
Material:		EKM
Scan Background reading (only 1)		
Direct Background reading (1)	10	20
Direct Background reading (2)	20	20
Direct Background reading (3)	40	20
Direct Background reading (4)	20	15
Direct Background reading (5)	10	20
Direct Background reading (AVERAGE)	20	19
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	EKM	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	6000	14000
MID-DAY BACKGROUND READING	20	20
EVENING SOURCE READING	600	15000
EVENING BACKGROUND READING	30	30
Morning check performed by	EKM	EKM
Mid-day check performed by	JRH	JRH
Evening check performed by	DRC	DRC

poor geometry JRH

BAT
oil
OK
OK

Pancake G-M Serial Number 61403/51751

DATE: 6/7/01		PAGE 5 OF 58
Source	Tc-99	Cs-137
Source Type	~~Alpha~~ Beta	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	~~OK~~	
Battery Check	OK OK	OK
Source Check Reading (1)	600	15000
Source Check Reading (2)	600	15000
Source Check Reading (3)	500	15000
Source Check Reading (4)	600	15000
Source Check Reading (5)	600	15000
Source Check Reading (AVERAGE)	580 OK	15000 OK
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1) 0810	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	20	NA
Direct Background reading (4)	30	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	24	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500 OK	14000 OK
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500 OK	15000 OK
EVENING BACKGROUND READING	20	NA
Morning check performed by	JRH 0900	NA
Mid-day check performed by	JRH 1245	NA
Evening check performed by	JRH 1805	NA

Pancake G-M Serial Number 61403/51751

DATE: 6/4/01		PAGE 6 OF 58
Source	Tc-99	Cs-137
Source Type	~~Alpha~~ ~~Beta~~	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.05
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15000
Source Check Reading (2)	600	15000
Source Check Reading (3)	500	15000
Source Check Reading (4)	500	15000
Source Check Reading (5)	500	15000
Source Check Reading (AVERAGE)	520 OK	15000 OK
Material:	NA	NA
Scan Background reading (only 1)	NA	NA
Direct Background reading (1) 0755	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	30	NA
Direct Background reading (4)	30	NA
Direct Background reading (5)	20	NA
Direct Background reading (AVERAGE)	24	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	EJK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	450	14000
MID-DAY BACKGROUND READING	20	20
EVENING SOURCE READING	500	13000
EVENING BACKGROUND READING	20	20
Morning check performed by	EJK	NA
1230 Mid-day check performed by	GKM	EKM
1815 Evening check performed by	EKM	EKM

Pancake G-M Serial Number 61457/26657

DATE: 6/9/01		PAGE 7 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	— NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15000
Source Check Reading (2)	400	14000
Source Check Reading (3)	500	15000
Source Check Reading (4)	500	14000
Source Check Reading (5)	500	14000
Source Check Reading (AVERAGE)	480	14400
Material:	NA	NA
Scan Background reading (only 1)	NA	NA
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	20	NA
Direct Background reading (4)	30	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	24	NA
Efficiency (= (CPM-Background) / DPM	NA	NA
FLAG (= 2X Background) SCANNING	NA	NA
FLAG (= 2X Background) DIRECT	NA	NA
MID-DAY SOURCE READING	400	14000
MID-DAY BACKGROUND READING	20	20
EVENING SOURCE READING	400	15000
EVENING BACKGROUND READING	20	20
Morning check performed by	JKL 0752	NA
Mid-day check performed by	EKM 1245	NA
Evening check performed by	EKM 1640	NA

Pancake G-M Serial Number 61457/26657

DATE: 6/10/01		PAGE 8 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	— NA	— NA
Battery Check	OK	OK
Source Check Reading (1)	400	14000
Source Check Reading (2)	450	16000
Source Check Reading (3)	400	15000
Source Check Reading (4)	400	15000
Source Check Reading (5)	450	15000
Source Check Reading (AVERAGE)	420	15000
Material:	NA	NA
Scan Background reading (only 1)	NA	NA
Direct Background reading (1)	30	30
Direct Background reading (2)	20	20
Direct Background reading (3)	20	20
Direct Background reading (4)	20	20
Direct Background reading (5)	20	20
Direct Background reading (AVERAGE)	22	22
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	FLAT	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	600	15000
MID-DAY BACKGROUND READING	20	20
EVENING SOURCE READING	~~20~~ ~~20~~ 500	15000
EVENING BACKGROUND READING	20	20
0800 Morning check performed by	EKM	EKM
1230 Mid-day check performed by	EKM	EKM
1700 Evening check performed by	EKM	EKM

Pancake G-M Serial Number 61457/26657

DATE: 6/11/01		PAGE 9 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	— NA	— NA
Battery Check	OK	OK
Source Check Reading (1)	600	16000
Source Check Reading (2)	500	15000
Source Check Reading (3)	600	16000
Source Check Reading (4)	500	16000
Source Check Reading (5)	500	14000
Source Check Reading (AVERAGE)	540	15400
Material:	FUR	
Scan Background reading (only 1)		
Direct Background reading (1)	20	20
Direct Background reading (2)	20	20
Direct Background reading (3)	15	15
Direct Background reading (4)	30	30
Direct Background reading (5)	30	30
Direct Background reading (AVERAGE)	23	23
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	FUR	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	16000
MID-DAY BACKGROUND READING	20	20
EVENING SOURCE READING	450	EM 16000 15000
EVENING BACKGROUND READING	30	30
0800 Morning check performed by	EKM	EKM
1230 Mid-day check performed by	JRH	JRH
1830 Evening check performed by	EKM	EKM

Pancake G-M Serial Number 61457/26657

DATE: 6/12/01		PAGE 10 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	– NA	– NA
Battery Check	ok	ok
Source Check Reading (1)	400	14000
Source Check Reading (2)	400	15000
Source Check Reading (3)	500	14000
Source Check Reading (4)	400	15000
Source Check Reading (5)	400	15000
Source Check Reading (AVERAGE)	420	14600
Material:	EK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	20
Direct Background reading (2)	30	30
Direct Background reading (3)	20	20
Direct Background reading (4)	20	20
Direct Background reading (5)	15	15
Direct Background reading (AVERAGE)	21	21
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	EK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	EM ~~600~~ 500	15000
MID-DAY BACKGROUND READING	20	20
EVENING SOURCE READING	600	15000
EVENING BACKGROUND READING	20	20
0830 Morning check performed by	EKm	EKm
1230 Mid-day check performed by	EKm	EKm
1730 Evening check performed by	EKM	EKM

Pancake G-M Serial Number 61457/26657

DATE: 6/13/01		PAGE 1 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	- NA	- NA
Battery Check	OK	OK
Source Check Reading (1)	1000	14000
Source Check Reading (2)	400	15000
Source Check Reading (3)	400	14000
Source Check Reading (4)	500	14000
Source Check Reading (5)	600	14000
Source Check Reading (AVERAGE)	500	14200
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	10	10
Direct Background reading (2)	30	30
Direct Background reading (3)	20	20
Direct Background reading (4)	10	10
Direct Background reading (5)	20	20
Direct Background reading (AVERAGE)	18	18
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	400	15000
MID-DAY BACKGROUND READING	20	20
EVENING SOURCE READING	not used in PM	NA
EVENING BACKGROUND READING	NA	NA
Morning check performed by	EKM 0700	EKM 0700
Mid-day check performed by	EKM 1230	EKM 1230
Evening check performed by	NA	NA

Pancake G-M Serial Number 61457/26657

DATE: 6/18/01		PAGE 12 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	~~a~~ NA	NA
Battery Check	OK	OK
Source Check Reading (1)	~~450~~ 450	15,000
Source Check Reading (2)	750	15,000
Source Check Reading (3)	400	15,000
Source Check Reading (4)	450	14,500
Source Check Reading (5)	400	15,000
Source Check Reading (AVERAGE)	490	14900
Material:	KMK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	~~20~~
Direct Background reading (2)	27	
Direct Background reading (3)	15	JMK
Direct Background reading (4)	10	
Direct Background reading (5)	10	
Direct Background reading (AVERAGE)	16.4	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KMK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	N/D not used in AM	N/D
MID-DAY BACKGROUND READING	N/D	N/D
EVENING SOURCE READING	~~20~~ at 440	JMK ~~20~~ 15000
EVENING BACKGROUND READING	20	20
Morning check performed by	JMK 0930	JMK 0930
Mid-day check performed by	N/A	N/A
Evening check performed by	JMK 1736hrs	JMK 1736

51457/26657

Pancake G-M Serial Number ~~61403/51751~~ KK

DATE: 6/19/01		PAGE 13 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	550	14,500
Source Check Reading (2)	500	15,000
Source Check Reading (3)	600	14,500
Source Check Reading (4)	500	14,500
Source Check Reading (5)	550	14,500
Source Check Reading (AVERAGE)	540	14,600
Material:	KK	
Scan Background reading (only 1)		
Direct Background reading (1)	30	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	20	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	40	NA
Direct Background reading (AVERAGE)	26 $\sigma = 5$	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	not used in AM	NA
MID-DAY BACKGROUND READING	NA	NA
EVENING SOURCE READING	15,000	~~15,000~~ Ram
EVENING BACKGROUND READING	20	~~20~~
Morning check performed by	Ram & KKS	KK
Mid-day check performed by	NA	
Evening check performed by	JRH 1650	

Pancake G-M Serial Number ~~61403/51751~~ 61457/26657

DATE: 6/20/01		PAGE 19 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	550	15 K
Source Check Reading (2)	500	14.5 K
Source Check Reading (3)	550	14.5 K
Source Check Reading (4)	550	14 K
Source Check Reading (5)	550	14.5 K
Source Check Reading (AVERAGE)	540	14.5 k
Material:	KJK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	20	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	20	NA
Direct Background reading (AVERAGE)	20	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KJK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	NOT USED IN AM	NA
MID-DAY BACKGROUND READING	~~JE~~ KJK	NA
EVENING SOURCE READING	400	15K
EVENING BACKGROUND READING	10	10
Morning check performed by	KJK	NA
Mid-day check performed by	NA	NA
Evening check performed by	NA	KKS 1720

Pancake G-M Serial Number 61457/26657

DATE: 6/21/01		PAGE 15 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	Cs-137: 15000	Tc-99: 500
Source Check Reading (2)	15000	500
Source Check Reading (3)	15000	500
Source Check Reading (4)	15000	500
Source Check Reading (5)	15000	500
Source Check Reading (AVERAGE)	15000	500
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	10	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	10	NA
Direct Background reading (AVERAGE)	16	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	20 JRM	5 RDM
MID-DAY BACKGROUND READING	16,000	500
EVENING SOURCE READING	15,000	500
EVENING BACKGROUND READING	20	NA
Morning check performed by	JRM 0715	
Mid-day check performed by	RDM 12:35p	KLK
Evening check performed by	RDM 5:30p	

Pancake G-M Serial Number 61457/26657

DATE: 6/22/01		PAGE 16 OF 58
Source	~~Tc-99~~ Cs-137	~~Cs-137~~ Tc-99
Source Type	Alpha	Gamma ROM
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	ok NA	NA
Battery Check	ok	NA
Source Check Reading (1)	16,000	600
Source Check Reading (2)	15,000	500
Source Check Reading (3)	15,000	600
Source Check Reading (4)	15,000	500
Source Check Reading (5)	15,000	500
Source Check Reading (AVERAGE)	15,200	540
Material:	KUK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	30	NA
Direct Background reading (3)	30	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	20	NA
Direct Background reading (AVERAGE)	24	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KUK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	15,000	500
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	15,000	500
EVENING BACKGROUND READING	20	NA
Morning check performed by	ROM 7:05 a	/
Mid-day check performed by	ROM 12:25 p	KUK
Evening check performed by	ROM 5:10 p	

Pancake G-M Serial Number 61457/26657

DATE: 6/23/01		PAGE 7 OF 58
Source	~~Tc-99~~ Cs-137	~~Cs-137~~ Tc-99 2 om.
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	~~ok~~ NA	NA
Battery Check	ok	ok
Source Check Reading (1)	15,000	600
Source Check Reading (2)	15,000	500
Source Check Reading (3)	15,000	600
Source Check Reading (4)	15,000	500
Source Check Reading (5)	15,000	500
Source Check Reading (AVERAGE)	15,000	540
Material:	NKK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	30	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	24	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	15,000	500
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	16,000	500
EVENING BACKGROUND READING	20	NA
Morning check performed by	Rom 0800a	
Mid-day check performed by	Rom 12:0p	KLK
Evening check performed by	Rom 04:12p	

Pancake G-M Serial Number 61457/26657

DATE: 6/24/01		PAGE 18 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	Ok	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:		KWL
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	KWL
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KWL	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	30	NA
Morning check performed by	RDM 0715a	
Mid-day check performed by	RDM 12:00p	KWL
Evening check performed by	RDM 3:23p	

Pancake G-M Serial Number 61457/26657

DATE: 6/25/21		PAGE 9 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	N/A	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	
Material:	KVK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	30	
Direct Background reading (4)	30	KVK
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KVK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	RDM 7:10 @ 72° SUNNY	
Mid-day check performed by	RDM 12:00p	KVK
Evening check performed by	RDM 5:30p	

Pancake G-M Serial Number 61457/26657

DATE: 6/26/01		PAGE 20 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	N/A	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14,500
Source Check Reading (2)	500	14,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	500	17,000
Source Check Reading (5)	500	14,500
Source Check Reading (AVERAGE)	500	14,200
Material:	KW	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	15	
Direct Background reading (3)	15	KW
Direct Background reading (4)	15	
Direct Background reading (5)	15	
Direct Background reading (AVERAGE)	16	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KW	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	14,000 JME
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	~~14,000~~ 500	~~14,000~~ JME 14,500
EVENING BACKGROUND READING	20	20
Morning check performed by	KKS weather - clear, dry, 68°F	
Mid-day check performed by	KKS "	KW
Evening check performed by	JME	

Pancake G-M Serial Number 61457/26657

DATE: 5/27/01		PAGE 21 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	~~OK~~ RLF NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	RS 15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:		RLF
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	RLF
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		RLF
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	RDM 07:05a Sunny 70	
Mid-day check performed by	RDM 12:32p Sunny 78	RLF
Evening check performed by	JRH 1735	

Pancake G-M Serial Number 61457/26657

DATE: 6/28/01		PAGE 22 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	14,500
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	14,900
Material:	KWK	
Scan Background reading (only 1)		
Direct Background reading (1)	200	
Direct Background reading (2)	150	
Direct Background reading (3)	200	KWK
Direct Background reading (4)	200	
Direct Background reading (5)	200	
Direct Background reading (AVERAGE)	190	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KWK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	~~14,500~~ 1 KWK
EVENING SOURCE READING	500	14,500
EVENING BACKGROUND READING	20	NA
Morning check performed by	KKS	68°F, Clear, Hazy
Mid-day check performed by	Rom 12:10	Overcast
Evening check performed by	AML 1730	cloudy 70°F

Pancake G-M Serial Number 61457/26657

DATE: 6/29/01		PAGE 23 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	400	16,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	480	15,200
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	KLK
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		KLK
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	DOM 07:10a Hazy Sunny 70	
Mid-day check performed by	KKS 1130	KLK
Evening check performed by	JRH 1541	

Pancake G-M Serial Number 61457/26657

DATE: 7/9/01		PAGE 24 OF 158
Source	~~Tc-99~~	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	
Battery Check	Yes	15,000
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	550	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	510	15,000
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	30	KLK
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	550	15,000
MID-DAY BACKGROUND READING	20	~~15,00~~ KLK
EVENING SOURCE READING	550	NA
EVENING BACKGROUND READING	20	15,000
Morning check performed by	ICKS 0800	
Mid-day check performed by	AML 1150	KLK
Evening check performed by	KICS 1748	

Pancake G-M Serial Number 61457/26657

DATE: 7/10/01		PAGE 25 OF 58
Source	~~Tc-99~~	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	~~15,000 kcpm~~
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:	KK	
Scan Background reading (only 1)		
Direct Background reading (1)	30	NA NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	30	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	26	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	14,000
MID-DAY BACKGROUND READING	20	~~N~~ NA
EVENING SOURCE READING	500	14,000
EVENING BACKGROUND READING	20	NA
Morning check performed by KKS	cloudy, humid, 70°	
Mid-day check performed by KKS	1215	KK
Evening check performed by RDM	5:30p 75° sunny	

Pancake G-M Serial Number 61457/26657

DATE: 7/11/01		PAGE 26 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14,000
Source Check Reading (2)	400	14,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	400	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	500	14,000
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	30	
Direct Background reading (2)	30	
Direct Background reading (3)	20	KLK
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	~~208~~ KLK 26	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY ~~SOURCE~~ Background READING	20	NA
MID-DAY ~~BACKGROUND~~ Source READING	500 KLS	14,000
EVENING SOURCE READING	500	14,000
EVENING BACKGROUND READING	20	NA
Morning check performed by KLS	68° F, Sunny, 80% Humidity	
Mid-day check performed by KLS	KLK	KLK
Evening check performed by KLK		

Pancake G-M Serial Number 61457/26657

DATE: 7/12/01		PAGE 27 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	— NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	500	
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	30	
Direct Background reading (3)	20	KLK
Direct Background reading (4)	20	
Direct Background reading (5)	30	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	14000
MID-DAY BACKGROUND READING	20	~~500~~ KLK
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by KKS	60°F, Sunny, Dry	
Mid-day check performed by	IRH @ 1150	KLK
Evening check performed by	AMC 1735	

Pancake G-M Serial Number 61457/26657

DATE: 7/13/01		PAGE 28 OF 58
Source	~~Tc-99~~	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14,000
Source Check Reading (2)	500	14,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	500	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	500	14,000
Material:	KLL	
Scan Background reading (only 1)		
Direct Background reading (1)	20	~~NR 14,000~~
Direct Background reading (2)	20	
Direct Background reading (3)	20	KLL
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	22	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLL	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	14000
MID-DAY BACKGROUND READING	~~20~~	NA
EVENING SOURCE READING	500	14,000
EVENING BACKGROUND READING	~~KLL~~ ~~15~~ KLL	NA
Morning check performed by RCS	68°F, Partly Cloudy, dry	
Mid-day check performed by	JMK 70° PC dry	KLL
Evening check performed by	KLL 70°	

Pancake G-M Serial Number 61457/26657

DATE: 7/14/01		PAGE 29 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	~~OK~~ NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:	KW	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	KW
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KW	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	Not used in PM	NA
EVENING BACKGROUND READING	NA	NA
Morning check performed by RDM	overcast rainy 68°	
Mid-day check performed by RDM	overcast 68°	KW
Evening check performed by	NA	

Pancake G-M Serial Number 61457/26657

DATE: 7/15/01		PAGE 30 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	30	
Direct Background reading (3)	20	
Direct Background reading (4)	30	
Direct Background reading (5)	30	
Direct Background reading (AVERAGE)	26	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	40	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by KKS	0720 68°F, P.Cloudy, Mod. Humidity	
Mid-day check performed by AML	1200 77°F, Sunny, warm	
Evening check performed by AML	1530 "	

Pancake G-M Serial Number 61457/26657

DATE:	7/16/01	PAGE 31 OF 58
Source	~~Tc-99~~	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15000
Source Check Reading (2)	500	15000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:	KW	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	KW
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KW	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	KKS 0708 65°F, P.Sunny	KW
Mid-day check performed by	KKS 1203 73°F, P.Sunny	
Evening check performed by	JRH 1711	

Pancake G-M Serial Number 61457/26657

DATE: 7/17/01		PAGE 32 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:	KK	
Scan Background reading (only 1)		
Direct Background reading (1)	30	~~500~~ KK
Direct Background reading (2)	30	~~500~~ KK
Direct Background reading (3)	30	~~500~~ KK
Direct Background reading (4)	30	~~500~~ KK
Direct Background reading (5)	30	~~500~~ KK
Direct Background reading (AVERAGE)	30	~~500~~ KK
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by KKS 0720	68°F, Rain	
Mid-day check performed by AMC 1200	68°F Cloudy	KK
Evening check performed by KKS 718	73° Humid	

Pancake G-M Serial Number 61457/26657

DATE: 3/12/01		PAGE 33 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	400	15000
Source Check Reading (2)	500	14000
Source Check Reading (3)	500	14000
Source Check Reading (4)	500	15000
Source Check Reading (5)	400	15000
Source Check Reading (AVERAGE)	460	14600
Material:	CWL	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	CWL
Direct Background reading (4)	20	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	CWL	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	not used in AM	NA
MID-DAY BACKGROUND READING	NA	NA
EVENING SOURCE READING	not used in PM	NA
EVENING BACKGROUND READING	NA	NA
Morning check performed by	AM @ 1330 foggy 64°F	
Mid-day check performed by	NA	CWL
Evening check performed by	NA	

61457

Pancake G-M Serial Number ~~61403/51751~~ KK

DATE: 7/23/01		PAGE 34 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14,000
Source Check Reading (2)	500	14,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	500	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	500	14,000
Material:	KK	
Scan Background reading (only 1)		
Direct Background reading (1)	30	
Direct Background reading (2)	20	
Direct Background reading (3)	20	KK
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	14,000
EVENING BACKGROUND READING	20	NA
Morning check performed by 0730 KKS	74°F, Sunny, Humid	
Mid-day check performed by 1230 KKS	74°F, P. Sunny, Hazy	KK
Evening check performed by 1543 KKS	78°F Mostly Cloudy, Hazy	

61457

Pancake G-M Serial Number ~~61403~~/51751

DATE: 7/24/01		PAGE 35 OF 58
Source	~~Tc-99~~	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	14,800
Material:	NA	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	30	KWK
Direct Background reading (4)	20	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	22	
Efficiency (= (CPM-Background) / DPM	~~20 KS~~	
FLAG (= 2X Background) SCANNING	KWK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by KKS	0730 76°29°F, Humid, Sunny	
Mid-day check performed by KKS	1159 76°F, Cloudy, Humid	KWK
Evening check performed by KKS	1740 78°F, Cloudy, Humid	

61457

Pancake G-M Serial Number ~~61403~~/51751

DATE: 7/25/01		PAGE 36 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	500	14,800
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	30	
Direct Background reading (2)	30	
Direct Background reading (3)	30	
Direct Background reading (4)	30	KLK
Direct Background reading (5)	30	
Direct Background reading (AVERAGE)	30	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by KKS	0710 sunny, 76°F, humid	
Mid-day check performed by KKS	1148 sunny 76°F Humid	KLK
Evening check performed by KKS	5:35p overcast 78°F Humid	

61457

Pancake G-M Serial Number ~~61403~~/51751

DATE: 7/26/01		PAGE 37 OF 58
Source	~~Tc-99~~	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	~~OKKS~~	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:		
Scan Background reading (only 1)	KKS	
Direct Background reading (1)	30	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	30	KKS
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KKS	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	~~55~~ KKS 500	15,000
MID-DAY BACKGROUND READING	30	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by KKS	0715 Showers, 74°	
Mid-day check performed by KKS	1204 Sunny, 73°	KKS
Evening check performed by Rom	5:20, Sunny 74°	

Pancake G-M Serial Number 61403/51751

DATE: 7/27/01		PAGE 38 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	
Battery Check	ok	
Source Check Reading (1)	600	16000
Source Check Reading (2)	500	16000
Source Check Reading (3)	500	15000
Source Check Reading (4)	500	15000
Source Check Reading (5)	500	16000
Source Check Reading (AVERAGE)	520	15600
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	16000
EVENING BACKGROUND READING	20	NA
Morning check performed by	Ron 68° sunny	7:10a
Mid-day check performed by	Ron 70° sunny	12:45p
Evening check performed by	Ron 74° sunny	5:25p

Pancake G-M Serial Number 61403/51751

DATE: 7/28/01		PAGE 39 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:	KW	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	KW
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KW	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	Rom GP Sunny 7:30a	
Mid-day check performed by	KKS 1218 sunny, dry 70°	KW
Evening check performed by	Rom Sunny 1600 74°	

Pancake G-M Serial Number ~~61403~~ 61457/51751

DATE: 7/29/01		PAGE 40 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	16,000
MID-DAY BACKGROUND READING	30	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	KKS, 0727, 70° Sunny, dry	
Mid-day check performed by	KKS 1217, 72°, P. Cloudy, dry	
Evening check performed by	JMK, 1540, 74° P/C dry	

Pancake G-M Serial Number 61457/26657

DATE: 7/30/01		PAGE 41 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	ok
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	16,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,200
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	
Direct Background reading (5)	30	
Direct Background reading (AVERAGE)	22	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	14,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	Rom 7:15a ~~Sunny~~ overcast	70°
Mid-day check performed by	Rom 12:00p overcast	70°
Evening check performed by	Rom 5:05p overcast	76°

Pancake G-M Serial Number 61457/26657

DATE: 7/31/01		PAGE 42 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	ok
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	400	14,000
Source Check Reading (4)	400	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	460	14,400
Material:		
Scan Background reading (only 1)	KLL	
Direct Background reading (1)	30	
Direct Background reading (2)	20	
Direct Background reading (3)	10	
Direct Background reading (4)	20	KLL
Direct Background reading (5)	10	
Direct Background reading (AVERAGE)	18	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLL	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	40	NA
Morning check performed by	RDM 72° Sunny humid	
Mid-day check performed by	RDM 74° Sunny	KLL
Evening check performed by	KLL 76 Sunny	

Pancake G-M Serial Number 61457/26657

DATE: 8/1/01		PAGE 43 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	400	14,000
Source Check Reading (2)	500	14,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	400	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	460	14,000
Material:	VVL	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	10	
Direct Background reading (4)	30	VVL
Direct Background reading (5)	10	
Direct Background reading (AVERAGE)	18	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	VVL	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	400	14,000
EVENING BACKGROUND READING	10	NA
Morning check performed by	RDM 7:15 am Sunny	72° humid
Mid-day check performed by	RDM 12:50 p Sunny	78° humid
Evening check performed by	RDM 4:35 p Sunny	83° humid

Pancake G-M Serial Number 61457/26657

DATE: 8/8/01		PAGE 44 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	ok
Source Check Reading (1)	500	14000
Source Check Reading (2)	400	14000
Source Check Reading (3)	500	14000
Source Check Reading (4)	500	15000
Source Check Reading (5)	500	15000
Source Check Reading (AVERAGE)		14400
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	10	
Direct Background reading (3)	20	
Direct Background reading (4)	10	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	16	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	Pam 78° humid	Sunny
Mid-day check performed by	Pam 75° humid	Sunny
Evening check performed by	Pam 84° humid	Sunny

Pancake G-M Serial Number 61457/26657

DATE: 6/9/01		PAGE 45 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14000
Source Check Reading (2)	500	14000
Source Check Reading (3)	500	14000
Source Check Reading (4)	500	14000
Source Check Reading (5)	500	14000
Source Check Reading (AVERAGE)	500	14000
Material:	KWL	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	10	
Direct Background reading (3)	30	KWL
Direct Background reading (4)	20	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KWL	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	30	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	RDM 7:45a Sunny	humid 78°
Mid-day check performed by	RDM 11:45a Sunny	humid 80°
Evening check performed by	JRH 1810	May rain

Pancake G-M Serial Number 61457/26657

DATE: 8/10/01		PAGE 46 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	500	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	506	14,400
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	10	
Direct Background reading (3)	30	
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	22	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	400	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	RMM 8:00a Overcast humid 80°	
Mid-day check performed by	RMM 12:47p mostly sunny humid 80°	
Evening check performed by	RMM 84° 5:45p Sunny humid	

Pancake G-M Serial Number 61457/26657

DATE: 8/11/01		PAGE 47 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	Ok	OK
Source Check Reading (1)	500	15000
Source Check Reading (2)	400	14000
Source Check Reading (3)	500	14000
Source Check Reading (4)	500	14000
Source Check Reading (5)	500	14000
Source Check Reading (AVERAGE)	480	14200
Material:	KW	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	16	
Direct Background reading (3)	20	KW
Direct Background reading (4)	20	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	18	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KW	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	14000
EVENING BACKGROUND READING	20	NA
Morning check performed by	RM 8:35a Sunny	78°
Mid-day check performed by	PM 11:57a Sunny	78°
Evening check performed by	JRH 1800 Sunny	82°

Pancake G-M Serial Number 61457/26657

DATE: 6/12/01		PAGE 48 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	400	14,000
Source Check Reading (2)	400	14,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	500	14,000
Source Check Reading (5)	400	14,000
Source Check Reading (AVERAGE)	440	14,000
Material:	KWK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	30	
Direct Background reading (3)	20	
Direct Background reading (4)	30	KWK
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KWK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	14000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	NOT USED AFTER 1400	
EVENING BACKGROUND READING		
Morning check performed by	Rom 10:25a overcast 78°	
Mid-day check performed by	JRM 1400	NA
Evening check performed by	NA	NA

batteries changed after check

Pancake G-M Serial Number 61457/26657

DATE: 5/23/01		PAGE 49 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	N/A	NA
Battery Check	ok	ok
Source Check Reading (1)	400	15,000
Source Check Reading (2)	500	14,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	400	15,000
Source Check Reading (AVERAGE)	460	14,600
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	10	
Direct Background reading (4)	20	
Direct Background reading (5)	10	
Direct Background reading (AVERAGE)	16	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15000
MID-DAY BACKGROUND READING	30	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	JRH 8:00a 76°	Partly Sunny humid
Mid-day check performed by	JRH 1315	Sunny Warm
Evening check performed by	JRH 1610	NA

Pancake G-M Serial Number 61457/26657

DATE: 8/14/01		PAGE 50 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	500	15000
Source Check Reading (2)	500	15000
Source Check Reading (3)	500	15000
Source Check Reading (4)	400	14000
Source Check Reading (5)	400	15000
Source Check Reading (AVERAGE)	460	14800
Material:	KWK	
Scan Background reading (only 1)		
Direct Background reading (1)	10	
Direct Background reading (2)	20	
Direct Background reading (3)	30	
Direct Background reading (4)	20	KWK
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KWK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	14,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	400	14000
EVENING BACKGROUND READING	30	NA
Morning check performed by	RDM 8:10a Sunny	74° humid
Mid-day check performed by	RDM 12:30p Sunny	76°
Evening check performed by	JEH 1700 Sunny	80°F

Pancake G-M Serial Number 61457/26657

DATE: 8/20/01		PAGE 51 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	400	14,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	480	14,400
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	30	
Direct Background reading (2)	30	
Direct Background reading (3)	20	
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	~~20~~ 500 Rom	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	Rom 9:30a sunny, humid 73°	
Mid-day check performed by	RH 1227 sunny humid 78°	
Evening check performed by	Rom 4:15p sunny, humid 79°	

Pancake G-M Serial Number 61457/26657

DATE: 8/21/01		PAGE 52 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	500	14,000
Source Check Reading (2)	400	15,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	400	14,000
Source Check Reading (5)	400	14,000
Source Check Reading (AVERAGE)	440	14,200
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	22	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	Rom 7:55a overcast	73° humid
Mid-day check performed by	Rom 12:20p overcast	75°
Evening check performed by	Rom 5:35p sunny	78°

Pancake G-M Serial Number 61457/26657

DATE: 8/22/01		PAGE 53 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14,000
Source Check Reading (2)	400	15,000
Source Check Reading (3)	500	14,000
Source Check Reading (4)	500	14,000
Source Check Reading (5)	500	14,000
Source Check Reading (AVERAGE)	480	14,200
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	30	
Direct Background reading (4)	20	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	22	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	RDM Sunny 7:35a	72° humid
Mid-day check performed by	RDM Sunny 3:15p	78° hum. d
Evening check performed by	RDM Sunny 6:35p	78°

Pancake G-M Serial Number 61457/26657

DATE: 8/23/01		PAGE 54 OF 58
Source	Tc-99	Cs-137
Source Type	~~Alpha~~ Beta	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	16000
Source Check Reading (2)	400	15000
Source Check Reading (3)	500	15000
Source Check Reading (4)	500	15000
Source Check Reading (5)	400	15000
Source Check Reading (AVERAGE)	460	15200
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	30	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	NA
Morning check performed by	JCH 0820	NA
Mid-day check performed by	RDM 12:35p 76°	Overcast humid
Evening check performed by	RDM 5:05p 76°	Part Sunny humid

Pancake G-M Serial Number 61457/26657

DATE: 8/26/01		PAGE 55 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	— NA	— NA
Battery Check	ok	OK
Source Check Reading (1)	520	15000
Source Check Reading (2)	400	15000
Source Check Reading (3)	500	14000
Source Check Reading (4)	400	14000
Source Check Reading (5)	500	14000
Source Check Reading (AVERAGE)	460	14400
Material:		
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	
Direct Background reading (5)	40	
Direct Background reading (AVERAGE)	24	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	not used in AM	
MID-DAY BACKGROUND READING	NA	
EVENING SOURCE READING	not used in PM	
EVENING BACKGROUND READING	NA	
Morning check performed by	KLK	
Mid-day check performed by		
Evening check performed by		

Pancake G-M Serial Number 61457/26657

DATE: 8·27·01		PAGE 56 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	~~14000~~ KLK
Source Check Reading (1)	500	15000
Source Check Reading (2)	500	14000
Source Check Reading (3)	600	14000
Source Check Reading (4)	600	14000
Source Check Reading (5)	500	14000
Source Check Reading (AVERAGE)	540	14200
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	40	
Direct Background reading (3)	30	
Direct Background reading (4)	40	KLK
Direct Background reading (5)	40	
Direct Background reading (AVERAGE)	34	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	400	15000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	KLK 0840	
Mid-day check performed by	JRH 1500	KLK
Evening check performed by	KLK 1800	

Pancake G-M Serial Number 61457/26657

DATE: 8-28-01		PAGE 57 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	500	14000
Source Check Reading (2)	500	14000
Source Check Reading (3)	500	14000
Source Check Reading (4)	400	14000
Source Check Reading (5)	400	14000
Source Check Reading (AVERAGE)	460	14,000
Material:	KW	
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	20	
Direct Background reading (4)	20	KW
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KW	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	600	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	JRH 0730	
Mid-day check performed by	[illegible] 1230	KW
Evening check performed by	[illegible] 2016	

Pancake G-M Serial Number 61457/26657

DATE: 8.29.01		PAGE 58 OF 58
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	4/3/2001	4/3/2001
Out of Cal Date	9/30/2001	9/30/2001
Serial Number	61457	61457
Source emission rate	0.05	0.01
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	14000
Source Check Reading (2)	500	14000
Source Check Reading (3)	500	14000
Source Check Reading (4)	400	14000
Source Check Reading (5)	500	14000
Source Check Reading (AVERAGE)	480	14000
Material:		
Scan Background reading (only 1)	KLK	
Direct Background reading (1)	20	
Direct Background reading (2)	20	
Direct Background reading (3)	40	
Direct Background reading (4)	20	KLK
Direct Background reading (5)	60	
Direct Background reading (AVERAGE)		
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING		
MID-DAY BACKGROUND READING	KLK	
EVENING SOURCE READING		
EVENING BACKGROUND READING		KLK
Morning check performed by	KLK	
Mid-day check performed by	NA	
Evening check performed by	NA	

SENECA ARMY DEPOT
SEAD-12 RI/FS
KK ~~8/4/2001~~ 6-5-2001

Site: Seneca Army Depot		
Project: SEAD-12		
Team: 2 BLACK		
		Page 1 of 17
Instrument Type	Beta	Gross Gamma
AKA	Pancake G-M	Pancake G-M
Make	Ludlum	Ludlum
Model	3	3
Serial Number	61390	61390
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Probe	Gross Gamma	Gross Gamma
Make	Ludlum	Ludlum
Model	44-9	44-9
Serial Number	PR019247	PR019247
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Source	Tc-99	Cs-137
Source type	Alpha	Gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2001	3/31/2001
Serial Number	1039-92	1845-94
Source emission rate	1768566dpm	11100dpm
Instrument Channel	N/A	N/A
initial instrument efficiency	5.00%	1.00%
2 Sigma Range	340-760	7166-13301

PARSONS MAIN, INC.

PARSONS

CLIENT _____ JOB NO. _____ SHEET _____ OF _____

SUBJECT INITIAL FUNCTION CHECK BY EKM DATE 6/5/01

1" from surface CKD. _____ REVISION [redacted]

Instrument: PANCAKE GM BAT: OK 10:00AM

S/N: 61390

	BACKGROUND	Tc-99	SOURCE Cs-137
1	40	~~Tc-99~~ 650	15000
2	20	400	10000
3	20	500	10000
4	20	450	10000
5	20	600	9000
6	20	700	9000
7	20	600	9500
8	30	750	10000
9	20	500	9000
10	30	600	10000
11	30	400	10000
12	20	450	11500
13	20	500	11500
14	20	600	10000
15	25	550	9000

Avg = 23.67
σ = 4.87

Avg = 10233.3
σ = 101.16

Pancake G-M Serial Number ~~61403/61754~~ 61390 KLK

DATE: 6-6-01		PAGE 3 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	— KLK	— KLK
Battery Check	✓	✓
Source Check Reading (1)	350	EKM ~~2400~~ 10000
Source Check Reading (2)	350	12000
Source Check Reading (3)	400	10000
Source Check Reading (4)	400	10000
Source Check Reading (5)	350	10000
Source Check Reading (AVERAGE)	370	10400
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	20
Direct Background reading (2)	20	20
Direct Background reading (3)	20	20
Direct Background reading (4)	30	20
Direct Background reading (5)	20	30
Direct Background reading (AVERAGE)	22	22
Efficiency (= (CPM-Background) / DPM	KLK	
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	not used	KLK
MID-DAY BACKGROUND READING	in AM	
EVENING SOURCE READING	not used	
EVENING BACKGROUND READING	in PM	
Morning check performed by	EKM	EKM
Mid-day check performed by	KLK	
Evening check performed by		

SENECA ARMY DEPOT
SEAD-12 RI/FS
7-10front page

Site: Seneca Army Depot		
Project: SEAD-12		
Team: 2 BLACK		
		Page 4 of 17
Instrument Type	Beta	Gross Gamma
AKA	Pancake G-M	Pancake G-M
Make	Ludlum	Ludlum
Model	3	3
Serial Number	61390	61390
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Probe	Gross Gamma	Gross Gamma
Make	Ludlum	Ludlum
Model	44-9	44-9
Serial Number	PR019247	PR019247
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Source	Tc-99	Cs-137
Source type	Alpha	Gamma
Calibration Date	4/10/2001	4/10/2001
Out of Cal Date	3/31/2001	3/31/2001
Serial Number	1039-92	1845-94
Source emission rate	1768566dpm	11100dpm
Instrument Channel	N/A	N/A
initial instrument efficiency	5.00%	1.00%
2 Sigma Range	6876-19357	370-680

PARSONS MAIN, INC.

Ludlum Model 3 (Pancake GM)

PARSONS

CLIENT Initial Function Check - S/N 61390 JOB NO. _____ SHEET 5 OF 17

SUBJECT Calibration Source Cs-137 + Tc 99 BY KICS DATE 7/10/01

Weather, Partly Cloudy, Humid, 70° CKD. _____ REVISION _____

	Cs-137	Tc-99	Bkgd
1)	16,000	500	30
2)	16,000	500	30
4)	16,000	500	30
5)	16,000	500	30
6)	16,000	500	30
7)	16,000	500	30
8)	16,000	500	30
9)	16,000	500	30
10)	16,000	500	30
11)	16,000	500	30
12)	16,000	500	30
13)	16,000	500	30
14)	16,000	500	30
15)	16,000	500	30

KICS 7-10-01

Pancake G-M Serial Number 61403/51751

DATE: 7/10/01		PAGE 6 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	~~[illegible]~~	KLK
Battery Check	OK	16,000
Source Check Reading (1)	500	16,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	16,000
Source Check Reading (4)	500	16,000
Source Check Reading (5)	500	16,000
Source Check Reading (AVERAGE)	500	
Material:	~~[illegible]~~	KLK
Scan Background reading (only 1)		
Direct Background reading (1)	30	
Direct Background reading (2)	20	
Direct Background reading (3)	30	
Direct Background reading (4)	30	
Direct Background reading (5)	20	
Direct Background reading (AVERAGE)		
Efficiency (= (CPM-Background) / DPM	~~[illegible]~~	
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	16,000
MID-DAY BACKGROUND READING	30	— KLK
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	30	— KLK
Morning check performed by KLK	cloudy, Humid, 70°	~~[illegible]~~ KLK
Mid-day check performed by AML	clear, warm 74°F	
Evening check performed by Pam	Sunny, 78° 5:33p	

Pancake G-M Serial Number 61403/51751

DATE: 7/11/01		PAGE 7 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	KLK
Battery Check	ok	
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	16,000
Source Check Reading (3)	500	16,000
Source Check Reading (4)	500	16,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,600
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	20	KLK
Direct Background reading (3)	20	
Direct Background reading (4)	20	
Direct Background reading (5)	30	
Direct Background reading (AVERAGE)	22	
Efficiency (= (CPM-Background) / DPM	KLK	
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	KLK
EVENING SOURCE READING	500	15,000
EVENING BACKGROUND READING	20	KLK
Morning check performed by	RDM 7:22am Sunny 72°	KLK
Mid-day check performed by	KLK	
Evening check performed by	RDM 5:10p Sunny, 75°	

61390

Pancake G-M Serial Number ~~64400/51764~~ KLK

DATE: 7/12/01		PAGE 8 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage		KLK
Battery Check	OK	OK
Source Check Reading (1)	500	16,000
Source Check Reading (2)	500	16,000
Source Check Reading (3)	500	16,000
Source Check Reading (4)	500	16,000
Source Check Reading (5)	500	16,000
Source Check Reading (AVERAGE)	500	16,000
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	20	16,000
Direct Background reading (2)	20	16,000
Direct Background reading (3)	30	16,000
Direct Background reading (4)	20	16,000
Direct Background reading (5)	20	16,000
Direct Background reading (AVERAGE)	22	16,000
Efficiency (= (CPM-Background) / DPM		KLK
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	14000
MID-DAY BACKGROUND READING	20	KLK
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	KLK
Morning check performed by KKS	60° Sunny D.J	KLK
Mid-day check performed by	JRH 1200	
Evening check performed by	KLK	

Ran 7.12.01

61390

Pancake G-M Serial Number ~~01403/81751~~ KLK

DATE: 7/13/01		PAGE 9 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	— KLK	— KLK
Battery Check	OK	OK
Source Check Reading (1)	600	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	520	15,000
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	20	N/A
Direct Background reading (2)	20	N/A
Direct Background reading (3)	20	N/A
Direct Background reading (4)	20	N/A
Direct Background reading (5)	20	N/A
Direct Background reading (AVERAGE)	20	
Efficiency (= (CPM-Background) / DPM	N/A	
FLAG (= 2X Background) SCANNING		KLK
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15000
MID-DAY BACKGROUND READING	40	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	40	NA
Morning check performed by KKS	68°F, Partly cloudy, dry	
Mid-day check performed by	KLK 70°F	KLK
Evening check performed by	JRM 1735 75°F	

61390

Pancake G-M Serial Number ~~61403/51751~~ KUK

DATE: 7/14/01		PAGE 10 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	600	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	600	15,000
Source Check Reading (5)	600	15,000
Source Check Reading (AVERAGE)		15,000
Material:		KUK
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	20	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	20	NA
Direct Background reading (AVERAGE)	20	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		KUK
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	600	14,500
EVENING BACKGROUND READING	20	NA
Morning check performed by	KKS 0716 60° cloudy, Humid	
Mid-day check performed by	KKS 1148	KUK
Evening check performed by	JJK 1700	

61390

Pancake G-M Serial Number ~~61403/51751~~ KLK

DATE: 7/15/01		PAGE 11 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	NA
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:	KLK	
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	20	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	20	NA
Direct Background reading (AVERAGE)	20	NA
Efficiency (= (CPM-Background) / DPM	NA	
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	20	NA
Morning check performed by	KKS 0720 68°, P. cloudy, dry Mod Humidity	
Mid-day check performed by	AML 1200 70°F, Sunny, warm	
Evening check performed by	AML 1530 "	

61390

Pancake G-M Serial Number ~~61403/51751~~ KK

DATE: 7/16/01		PAGE 12 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:		KK
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	30	NA
Direct Background reading (4)	30	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	26	NA
Efficiency (= (CPM-Background) / DPM		KK
FLAG (= 2X Background) SCANNING		
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	15,000
MID-DAY BACKGROUND READING	30	NA
EVENING SOURCE READING	500	16,000
EVENING BACKGROUND READING	30	NA
Morning check performed by	KKS 0708 P. Cloudy	70°
Mid-day check performed by	KKS 1200 P. Cloudy	75°
Evening check performed by	KKS 1735 P. Cloudy	73°

61390

Pancake G-M Serial Number ~~61403/51751~~ KLK

DATE: 7/17/01		PAGE 13 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	Ok	Ok
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	15,000
Source Check Reading (3)	500	15,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	15,000
Source Check Reading (AVERAGE)	500	15,000
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	20	500
Direct Background reading (2)	30	500
Direct Background reading (3)	20	500
Direct Background reading (4)	20	500 KLK
Direct Background reading (5)	30	500
Direct Background reading (AVERAGE)		500
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		KLK
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	16000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	~~15~~ 15,000
EVENING BACKGROUND READING	20	~~15,000~~ kcps
Morning check performed by KKS 0720	68°F, Rain	
Mid-day check performed by RDM	11:55a overcast 70°	KLK
Evening check performed by KKS 1718	73° Humid	

61390

Pancake G-M Serial Number ~~61403/5175T~~ KLK

DATE: 7/18/01		PAGE 14 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	16000
Source Check Reading (2)	600	15000
Source Check Reading (3)	500	15000
Source Check Reading (4)	500	16000
Source Check Reading (5)	600	15000
Source Check Reading (AVERAGE)	540	15400
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	20	
Direct Background reading (2)	30	
Direct Background reading (3)	30	KLK
Direct Background reading (4)	20	
Direct Background reading (5)	30	
Direct Background reading (AVERAGE)	26	
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING	KLK	
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	not used in AM	NA
MID-DAY BACKGROUND READING	NA	NA
EVENING SOURCE READING	500	16,000
EVENING BACKGROUND READING	20	NA
Morning check performed by AML 0739 ~~foggy~~ 64°F		
Mid-day check performed by		KLK
Evening check performed by RAM	Sunny 74°F	

61390
Pancake G-M Serial Number ~~61403/51751~~ KLK

DATE: 7/25/01		PAGE 15 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	Rsm ~~DL~~ NA	NA
Battery Check	Ok	OK
Source Check Reading (1)	500	16,000
Source Check Reading (2)	600	16,000
Source Check Reading (3)	600	16,000
Source Check Reading (4)	500	16,000
Source Check Reading (5)	500	16,000
Source Check Reading (AVERAGE)	540	16,000
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	40	NA
Direct Background reading (3)	30	NA
Direct Background reading (4)	20	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	28	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		KLK
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	Not used	
MID-DAY BACKGROUND READING	Rsm	KLK
EVENING SOURCE READING	KLK	
EVENING BACKGROUND READING		
Morning check performed by	Rsm 75° sunny, humid	7:30a
Mid-day check performed by	Not used	NA
Evening check performed by	Not used	NA

61390

Pancake G-M Serial Number ~~61403/51751~~ KUK

DATE: 7/27/01		PAGE 6 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	ok	OK
Source Check Reading (1)	500	15,000
Source Check Reading (2)	500	16,006
Source Check Reading (3)	500	16,000
Source Check Reading (4)	500	16,000
Source Check Reading (5)	500	16,000
Source Check Reading (AVERAGE)	500	15,800
Material:		KUK
Scan Background reading (only 1)		
Direct Background reading (1)	20	NA
Direct Background reading (2)	20	NA
Direct Background reading (3)	20	NA
Direct Background reading (4)	30	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	24	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		KUK
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	not used in AM	NA
MID-DAY BACKGROUND READING	NA	NA
EVENING SOURCE READING	500	16,000
EVENING BACKGROUND READING	20	
~~Morning~~ check performed by	Ron sunny 71° 11:30	
Mid-day check performed by	Initial check done at Lunch	
Evening check performed by	KKS 1608 74°F	NA

61390

Pancake G-M Serial Number ~~81403/51751~~ KLK

DATE: 7/29/01		PAGE 17 OF 17
Source	Tc-99	Cs-137
Source Type	Alpha	Gamma
Calibration Date	1/30/2001	1/30/2001
Out of Cal Date	7/29/2001	7/29/2001
Serial Number	61390	61390
Source emission rate	5.00%	1.00%
Instrument Channel	N/A	N/A
High Voltage	NA	NA
Battery Check	OK	OK
Source Check Reading (1)	500	16,000
Source Check Reading (2)	500	16,000
Source Check Reading (3)	500	16,000
Source Check Reading (4)	500	15,000
Source Check Reading (5)	500	16,000
Source Check Reading (AVERAGE)	500	16,000
Material:		KLK
Scan Background reading (only 1)		
Direct Background reading (1)	30	NA
Direct Background reading (2)	30	NA
Direct Background reading (3)	30	NA
Direct Background reading (4)	30	NA
Direct Background reading (5)	30	NA
Direct Background reading (AVERAGE)	30	NA
Efficiency (= (CPM-Background) / DPM		
FLAG (= 2X Background) SCANNING		KLK
FLAG (= 2X Background) DIRECT		
MID-DAY SOURCE READING	500	16,000
MID-DAY BACKGROUND READING	20	NA
EVENING SOURCE READING	500	15000
EVENING BACKGROUND READING	30	NA
Morning check performed by	KKS. 0724, 70° F, Sunny, dry	NA
Mid-day check performed by	Ram 1215sp 72° ~~Sunny~~.	overcast
Evening check performed by	NA	NA

APPENDIX O

INTERPRETATION OF GAMMA SPECTROSCOPY RESULTS

This appendix presents the methodology for the interpretation of the SEAD-12 gamma spectroscopy results. In-situ gamma spectroscopy was performed using a Universal Radiation Spectrum Analyzer (URSA). While the URSA software can readily identify radionuclides based on the gamma energies that are detected in the field, the identification may be complicated by the fact that radionuclides commonly share (or have similar) photon energies. As a result, the software may identify a number of radionuclides, both man-made and naturally-occurring, as being present in the source material, and the user is left to determine those that may actually be present. In order to differentiate between man-made or artificially enhanced radioactive materials and naturally-occurring radioactive materials, it is important to consider the following:

- Decay characteristics of man-made or artificially enhanced radioactive materials;
- Decay characteristics of naturally-occurring radioactive materials such as uranium and thorium, and their associated decay series;
- The variability of naturally-occurring radioactive materials in the environment; and,
- Other survey measurements that may provide additional evidence to support the identification of a particular radionuclide;
- The known history of the location of where the measurement was collected.

Sections O.1-O.3 provide background information on the radioactive materials that may influence the identification of radionuclides based on gamma spectroscopy. **Sections O.4** and **O.5** discuss the methodology and issues associated with the interpretation of spectroscopy results. **Sections O.6** and **O.7** address identification issues specific to the SEAD-12 gamma spectroscopy results.

O.1 MAN-MADE RADIOACTIVE MATERIALS

The primary man-made radionuclide of concern (ROC) at SEAD-12 is Pu-239. As it is primarily an alpha emitter, Pu-239 in small amounts is often difficult to directly detect in the field due to the limited range of alpha particles. However, the presence of Pu-239 associated with weapons grade plutonium is often indirectly determined by investigating the presence of Am-241. Am-241 is the decay product of Pu-241, which is present in small amounts in weapons grade plutonium. As it emits gamma radiation in addition to alpha particles, Am-241 is more readily detectable than Pu-239 under field conditions. Like several other transuranic radionuclides, Am-241 emits a photon at ~14 keV; however, it also emits a photon at 59.5 keV, which distinguishes it from other radionuclides. In addition, the Am-241 activity in a given amount of weapons grade plutonium

will begin to exceed that of Pu-239 within five years of processing because of the relatively short half-life of Pu-241.

Other gamma-emitting man-made ROCs at SEAD-12 include Co-57 (6.4 keV @ 50%, 122 keV @ 85%, and 136 keV @ 11%), Co-60 (1173 and 1333 keV @ 100%), and Cs-137/Ba-137m (32 keV @ 8%, 661 keV @ 90%). These radionuclides have photon emissions that are readily detectable and can be easily identified based on multiple photon energies.

O.2 ARTIFICIALLY ENHANCED URANIUM

When uranium ore is refined, most of the decay products and naturally-occurring thorium that may be present are removed to produce a purified metal, which consists almost entirely of U-235, U-234, and U-238. The *short-term progeny* begins growing back in, and within a few months the Th-234, Pa-234m, and Pa-234 progeny of U-238 and the Th-231 progeny of U-235 will be back at equilibrium. However, the remainder of the progeny (i.e., the *long-term progeny*) will not be present in significant concentrations for hundreds to thousands of years. (This is not true of processed thorium metal, for which significant progeny will be present in only a few years.) As a result, the presence of artificially enhanced uranium can be determined by the presence or absence of these long-term progeny.

The refinement process results in enriched uranium and depleted uranium. Enriched uranium (EU) has increased U-235 and U-234 activity. The increased concentration of U-235 in the materials is typically expressed in the weight percent of U-235 and can vary widely based on the projected use of the material being produced. The enrichment of U-235 is the intent of the enrichment process. The U-234 activity in EU is increased more than the U-235 activity, although it remains an extremely small portion of the uranium mass, and can typically be ignored in most calculations of uranium mass. The activity in enriched uranium is discussed further in the Health Physics Manual of Good Practices for Uranium Facilities (EGG-2530). Depleted uranium (DU) is the waste product from the enrichment process. DU has reduced activity fractions for U-235 and U-234, and an increased activity fraction for U-238. DU may be present at various nuclear and military facilities since it is often used for shielding, shell casings, and counter weights.

When evaluating the potential presence of artificially enhanced uranium contamination, it is useful to consider both the relative U-238, U-235, and U-234 ratios and the relative parent-progeny ratios. The presence and activities of long-term progeny can be used to determine if a sample is distinguishable from ambient background data. The short-term progeny are helpful in estimating the activity of the parent radionuclide where the parent is difficult to measure directly. For example, short-lived Th-234, which is in equilibrium with U-238, emits several photons under 100 keV. Th-234 serves as an indicator for U-238, which is primarily an alpha emitter and

does not have any distinguishing photon emissions. By examining the relative activities of the uranium isotopes (or the indicators when the uranium parent cannot easily be directly measured), the nature of the uranium present (enriched, depleted, or natural) can be determined. The activity concentrations (or lack thereof) of the long-term progeny can then be used to verify that determination.

O.3 NATURALLY-OCCURRING URANIUM AND THORIUM

U-238/U-235 and Th-232 are typically found together in nature. The ambient background radioactivities of building materials are typically related to the rock/soil type associated with the material. NCRP Report 94, "Exposure of the Population in the United States and Canada from Natural Background Radiation," provides an overview of natural radiation sources (NCRP, 1994). Typically Th-232 concentrations (i.e., radioactivity per gram of material) in natural materials are greater than or equal to U-238 concentrations. Natural materials that may have a higher U-238 activity include:

- carbonate based rocks,
- beach sand,
- quartz, and
- arkose.

There is significant variability in the uranium and thorium concentrations in rocks and soils and thus in building materials, as noted in NCRP Report 94. The values in that report are averages and the concentration varies widely so it is important to have local background data.

As shown in **Table O-1**, several radionuclides in the uranium and thorium natural decay series have similar gamma emission energies. As a result, the spectra obtained from these series will overlap significantly when using a NaI-based spectrometry system because of its low energy resolution. However, this overlap does not present a significant problem unless the combined uranium and thorium series background is naturally elevated and results in a low minimum detectable activity (MDA) for ROCs with low-energy gamma emissions.

Table O-2 summarizes the peak identification for the SEAD-12 materials used for background subtraction, and provides an example of the variability observed in different background materials. Th-232 series decay products generally had higher activities than decay products associated with the U-238 or U-235 decay series. The background activities listed in **Table O-2** that exceed the $DCGL_W$s demonstrate the variability that is present in background. The Am-241 identification of porcelain background is an example of a misidentification by the software and isdiscussed further in **Section O.7**. This type of misidentification is caused by the overlap of the

gamma energy peaks associated with the U-238, U-235, and Th-232 decay series at both the 13 keVand 60 keV energy levels, which are also associated with Am-241.

O.4 ASSESSING THE POTENTIAL FOR IDENTIFIED SPECTRAL PEAKS BEING ASSOCIATED WITH AMBIENT BACKGROUND

During the identification process, a typical background spectrum is subtracted directly from the spectra for the material being evaluated. However, it is possible to obtain radiation peak identifications associated with natural background after the typical background spectrum has been subtracted. This is because of factors such as the variability of background, statistical variability associated with counting statistics, and variations in geometry and instrument efficiency.

An example of natural background identification is when gamma peaks associated with long-term uranium or thorium progeny are observed and there is no source of these specific materials at the site, except for the ambient background. The most common long-term progeny observed in a spectral analysis after background subtraction is Pb-210, which is not associated with artificially enhanced uranium sources. If the Pb-210 activity is elevated it is reasonable to assume that there may also be naturally elevated U-238/Th-234 activity.

When assessing the relative projected activity ratios (and thus the expected relative spectral peak identification data), it is important to recognize the impact of chemical properties such as material solubility and radon diffusion on the relative activity concentrations.

In a soil/ore body (i.e., any source of uranium and/or thorium) or in building materials containing natural radioactive sources, more soluble radionuclides may be transported by groundwater movement away from the parent radionuclides, altering the original activity ratios between parent and decay product. These altered activity ratios may cause the activity concentrations for the remaining, less-soluble radionuclides to appear elevated when in fact they are not, or they may cause a misidentification of what is actually a background material. The potential impact of migration may be addressed by reviewing the background data from similar materials to determine if activity ratios have been altered. Inside the majority of the SEAD-12 structures, the transport of more soluble radionuclides out of concrete and other building materials due to groundwater is not a concern because the structures are not subject to groundwater flow. Seasonal flooding was observed in the lower level of Building 812; however, the likelihood of a significant impact on the natural activity ratios in the building ratios is low.

When assessing the activity of progeny beyond radon, it is important to recognize that some fraction of the radon may escape into the air and then decay at a distant location. The relative fraction of radon escaping from a fine layer of dust on a building surface will be higher than the relative faction that escapes from a deep soil or concrete matrix. As a result, radon and its decay

products may have reduced activities relative to the parent due to the diffusion of radon from the matrix for materials with high surface to mass ratios. This concern is most applicable to the radon isotope (Rn-222) and the decay products that are associated with U-238 series. The radon isotopes associated with the two other natural decay chains (Rn-219 in the U-235 series and Rn-220 in the Th-232 series) have relatively short half-lives (i.e., 3.96 and 55.6 seconds, respectively), reducing the potential for diffusion.

O.5 RADIONUCLIDE IDENTIFICATION

In order to improve the resolution on the peaks of interest, sample spectra were analyzed by the URSA software after background was subtracted. Where multiple background files were applicable to the sample, the sample spectrum was analyzed with each and the results were used to select the most appropriate background. The process of background subtraction is displayed graphically in **Figures O-4** to **O-7**. The first spectrum, **Figure O-4**, is the original spectrum collected in the field with the URSA system (in this case, sample 14 at Building. 804, Room 1, grid 13). **Figure O-5** is the representative background spectrum for cinder block, the material present at the sampling location. **Figure O-6** displays the sample spectrum after background subtraction, and **Figure O-7** displays the peaks that are identified by the URSA software.

The final identification of energy peaks, based on the radionuclides tentatively identified by the URSA software, was completed using a weight-of-evidence approach. The additional factors assessed were:

- The appropriate relative fraction of the peak assigned to each identification based on the confirmatory peaks;
- The known relative ratios of radionuclides based on known relationships, such as progeny or natural relative isotopic ratios;
- The known relative ratios of radionuclides based on the ingrowth (e.g., the ingrowth of Am-241 in weapons grade plutonium) of radionuclides; and,
- The likelihood of the material being present (based on historical information, other survey results, etc).

Where there were multiple identifications of peaks that could not be resolved based on other data, it became necessary to assume different alternatives for the identification, and then determine the limiting, or worst-case scenario. The worst-case radionuclide was then used in subsequent analysis.

Refer to **Appendix L** (Procedure GD-MCA-R-001) for specific information and procedures for using the URSA gamma spectroscopy system.

O.6 SPECIFIC IDENTIFICATIONS

Table O-3 provides a summary of the gamma spectroscopy data for samples potentially having activity concentrations elevated above the $DCGL_W$s (also refer to **Tables 4-25**, **4-26**, and **5-5**). In addition, **Table O-3** also presents the data for the samples from survey areas that had potentially elevated data identified during the Phase I or II surveys. Spectroscopy data for samples where only energy peaks of long-term progeny of naturally-occurring radionuclides were identified are not included in **Table O-3**.

Table O-3 presents the basis for radionuclide identification and conclusions on the sample based on that identification. Bolded results indicate radionuclides that appear to exceed the $DCGL_W$ values and require further action (e.g., additional evaluations or remediation). The applicable smoothing factor (i.e., number of points used in assessing if a result is a peak, as discussed in **Appendix L**) and the type of peak identification analysis used by the software are listed for each analysis. The criteria for identifying peaks using the full-width half-maximum (FWHM) analysis is that the FWHM must be less 10% for the primary peak and 20% for the confirmatory peak for an identification to be valid. The "Analysis Notes" listed in the last column of **Table O-3** are discussed in **Section O.7**.

A limited number of the locations exceed the $DCGL_W$s for the survey areas based on the gamma spectroscopy data and they are marked in bold in **Table O-3** and summarized below:

- *Building 804, room 1, grid 13, location c10 (sample number 14)*
  This measurement, which was located on a cinder block wall, indicated the presence of localized contamination in excess of the U-235 $DCGL_W$. However, this activity does not exceed the $DCGL_{EMC}$ of 233 dpm/100cm^2 for U-235. In addition, direct alpha and beta measurements for the survey area are within $DCGL_W$s; and there are no scanning exceedences associated with the survey area. This evidence suggests that the elevated U-235 activity is naturally-occurring.
- *Building 819, room 12, grid 23, location c28 (sample number 67)*
  This measurement, which is located on a cinder block wall, indicated the presence of localized contamination in excess of the U-235 and Ra-226 $DCGL_W$. As discussed in Note 5 below, this activity may be associated with other radionuclides and part of the ambient natural background. Although the Ra-226 measurement is greater than both the $DCGL_W$ and $DCGL_{EMC}$ of 2080 dpm/100cm^2, direct alpha measurements for the room do not exceed the $DCGL_W$s. The presence of another member of the U-238 decay chain (Pb-214) suggests that the elevated Ra-226 activity is naturally-occurring. Although the U-235 measurement is greater than both the $DCGL_W$ and $DCGL_{EMC}$ of 233 dpm/100cm^2, direct alpha measurements for the room do not

exceed the $DCGL_W$s. The presence of another member of the U-235 decay chain (Bi-211) suggests that the elevated U-235 activity is naturally-occurring.

- *Building 819, room 5, grid 11, location c13 (sample number 82)*
  This measurement, which is located on a wood surface over a cinder block wall, indicated the presence of localized contamination in excess of the Ra-226 $DCGL_W$. This activity does not exceed the $DCGL_{EMC}$ of 2080 dpm/100 cm^2 for Ra-226. In addition, direct alpha measurements for the survey area are within background, direct beta measurements are within $DCGL_W$s, and there are no scanning exceedences associated with the survey area. This evidence suggests that the elevated Ra-226 activity is naturally-occurring or, as discussed in Note 5 below, is likely to be associated with other radionuclides and part of the ambient natural background.
- *Building 819, room 5, grid 12, location c14 (sample location 83)*
  This measurement, which is located on a wood surface over a cinder block wall, indicated the presence of localized contamination in excess of the Ra-226 $DCGL_W$. This measured activity, 1764 dpm/100 cm^2, does not exceed the $DCGL_{EMC}$ of 2080 dpm/100 cm^2 for Ra-226. In addition, direct alpha measurements for the survey area are within background, direct beta measurements are within $DCGL_W$s, and there are no scanning exceedences associated with the survey area. In addition, other members of the U-238 decay chain (Pb-214, Pb-210) have been identified. This evidence suggests that the elevated Ra-226 activity is naturally-occurring, or, as discussed in Note 5 below, this activity is associated with other radionuclides and part of the ambient natural background.

The spectra identified in **Table O-3** that are not specifically addressed above appear to be part of ambient background and/or below the $DCGL_W$s based on the analysis. These peaks simply demonstrate the variability of natural background and do not represent activity in excess of the $DCGL_W$.

The peaks that are part of natural background include various misidentifications associated with Pu-239 (Samples 30, 59, 65, 70, 83, 92, and 102) and Am-241 (Samples 70, 71, and 102). The absence of energy peaks associated with Am-241 for all the Pu-239 identifications (except in Samples 70 and 102) confirms that the identification of Pu-239 in those samples is not correct. It is important to recognize that Sample 102 is a background sample from Building 2104, where no contamination would have been present. It is likely that the peaks that are identified as being associated with Am-241 and Pu-239 are in fact associated with naturally-occurring radionuclides. In addition, the alpha and beta survey data collected at Sample 70 are not indicative of contamination as they do not exceed typical background levels. Analysis Notes 4 and 6 further address the potential identification of these peaks associated with Pu-239 or Am-241.

O.7 RADIONUCLIDE IDENTIFICATION ANALYSIS NOTES

The "Analysis Notes" in **Table O-3** (1 through 6) correspond to the following respective notes below. The notes are associated with the spectroscopy samples that required interpretation of the energy peaks (i.e., peaks with several possible identifications). The notes are as follows:

Note 1. U-238 Series Progeny

Th-234 (half-life of 24.1 days) is a short-lived direct decay product of U-238. As the two radionuclides are in secular equilibrium, the Th-234 activity can be used to determine the U-238 activity. The variability of natural background in materials (e.g., concrete, cinder block, porcelain) can be significant and the background that is subtracted from the sample spectra is only an approximation of the ambient background. The primary method to determine if a U-238/Th-234 energy peak is the result of a natural background source or an artificially enhanced uranium source is to examine the presence or absence of natural decay products. As discussed in **Section O.2**, Ra-226 and subsequent decay products are removed from a U-238 source during the refinement process, and would not be present in significant amounts in an instance of artificially enhanced U-238 contamination. An indicator that shows that the U-238/Th-234 energy peak is associated with natural background is the presence of U-238 series decay products at similar activities beyond Ra-226. Typically Pb-210 is one of the more easily identified peaks and is generally greater than or similar to the activity of any identified Th-234 peaks.

There can be some variability in the relative activities of the natural decay products as a result of differences in radium, thorium, and uranium solubility, and the escape of radon. It is important to note that this type of variability may be seen in decay products of all of the natural decay series, regardless of sample material type.

Note 2. Th-232 Series Progeny

The presence of elevated Th-232 progeny (e.g., Tl-208) indicates that the elevated Th-232 series is most likely part of natural background. Since the Th-232 decay product Th-228 emits photons in the 84 keV range, an overestimate of the Th-234 (which emits photons at ~ 92 keV) activity concentration may occur as a result of the overlap of the two natural sources. Th-232 is present in ambient background typically at activities greater than U-238 in granite-based soils and at least at the same level for most soils and rock matrices. This material appears consistent with natural background.

The U-238 progeny may not have been identified in this case because of interferences, statistical variability, and the potential that these activities have been lowered by the escape of the radon from near surface materials.

Note 3. U-235 Series Progeny

Another method used to determine if a U-238 identification was the result of a natural or artificially enhanced uranium source was to examine the decay products in the U-235 decay chain beyond Pa-231. U-235 activity in a natural source is about 4.5% of the U-238 activity. An artificially enhanced uranium source would not have significant amounts of the decay products associated with the U-235 decay chain.

Note 4. Pu-239

The identification of Pu-239 by the URSA software is incorrect, as verified by the relative lack of Am-241 in the samples. If Pu-239 were present, Am-241 would be present at a higher activity than was observed in the sample based on the relatively short half-life of the Pu-241 parent and when weapons material would have been stored on base. In addition, the low-energy peak observed at ~13 keV, identified as Pu-239, is common with several naturally-occurring radionuclides, including U-238, U-235, and Th-232. Likewise, the ~60 keV energy peak, identified as Am-241, is also associated with the naturally-occurring radionuclides Pa-234 and Th-234.

Note 5. Ra-226

Although an elevated level of Ra-226 was identified in these samples, it is likely that this result is indicative of the variability in natural background rather than a source of contamination. The Ra-226 measurements are is below the $DCGL_{EMC}$ of 2080 dpm/100 cm^2 for Ra-226. In addition, direct alpha measurements for the survey area are within background, direct beta measurements are within $DCGL_W$s, and there are no scanning exceedences associated with the survey area. This evidence suggests that the elevated Ra-226 activity is naturally-occurring.

It is also possible that a portion of the activity identified as Ra-226 is associated with U-235, which produces a gamma at ~186 keV. U-235 emits this photon about 50% of the time and Ra-226 about 3% so there is an amplification of the projected count rate by a factor of at least 10 when it is interpreted as Ra-226 rather than U-235. Consequently, U-235 energy peaks may be mistaken as Ra-226.

Note 6. Am-241

It has been determined that the presence of Am-241 has been misidentified based on the identification of Pb-210, Th-234, and U-238. The identification of these radionuclides indicates the presence of the naturally-occurring U-238 decay chain. As such, the ~60 keV peak identified with Am-241 is likely associated with naturally-occurring Th-234, which has a 63 keV (3.5%)

confirmation peak. The U-238 activity appears to be consistent with natural background, per Analysis Notes 1, 2, and 3. It should also be noted that this sample is from a background building where weapons-related contamination is not expected and not probable.

REFERENCES

ICRP Publication 38, Radionuclide Transformations: Energy and Intensity of Emissions. Annals of the ICRP Vol. 11-13, 1983.

NCRP Report No. 94, Exposure of the Population in the United States and Canada from Natural Background Radiation, 1988.

NCRP Report No. 93, Ionizing Radiation Exposure of the Population of the United States, 1987.

Health Physics Manual of Good Practices for Uranium Facilities, DE88-013620, U.S. DOE, June 1988.

Figure O-1 U-238 Serial Decay

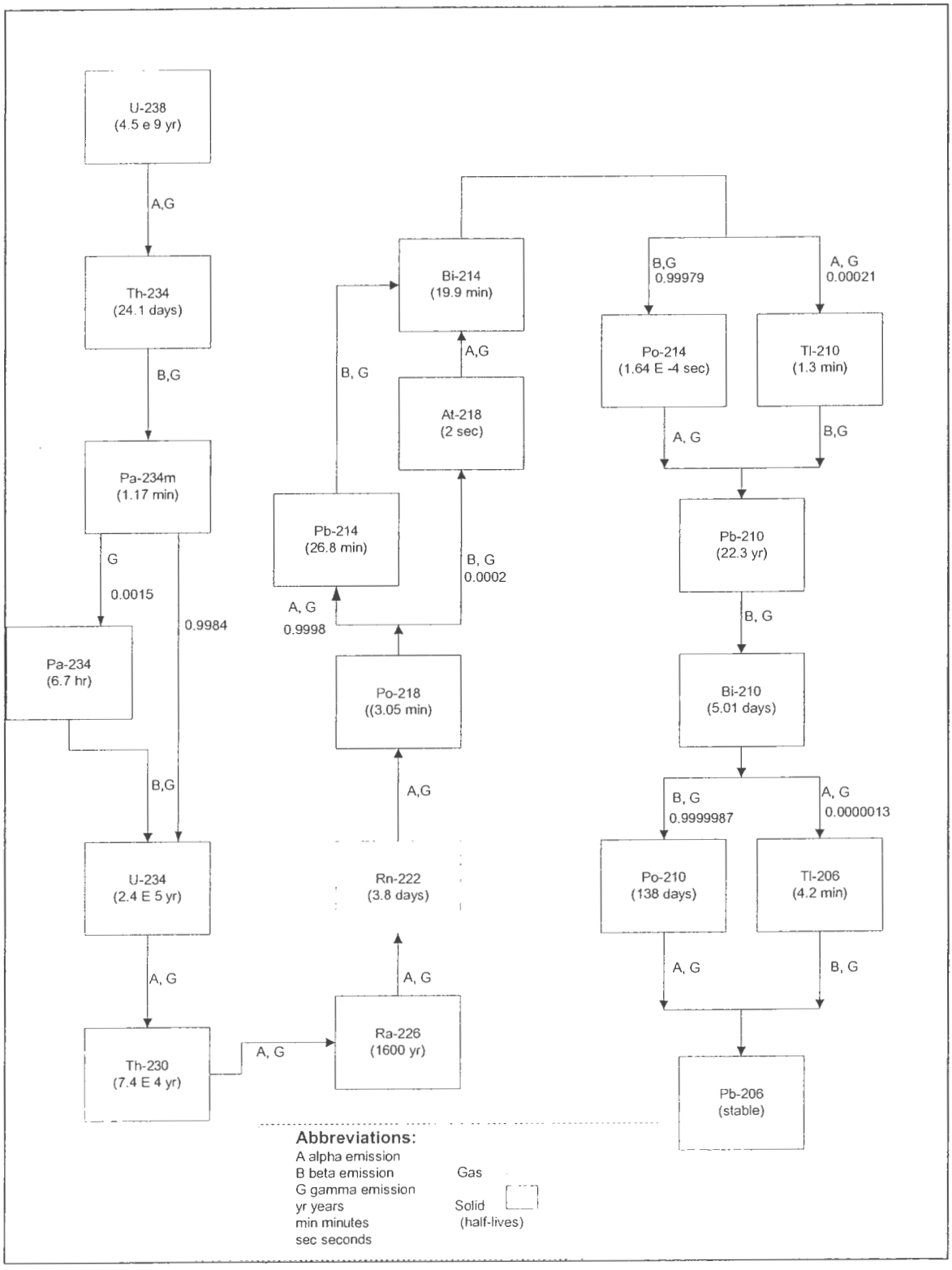


Figure O-2 U-235 Serial Decay

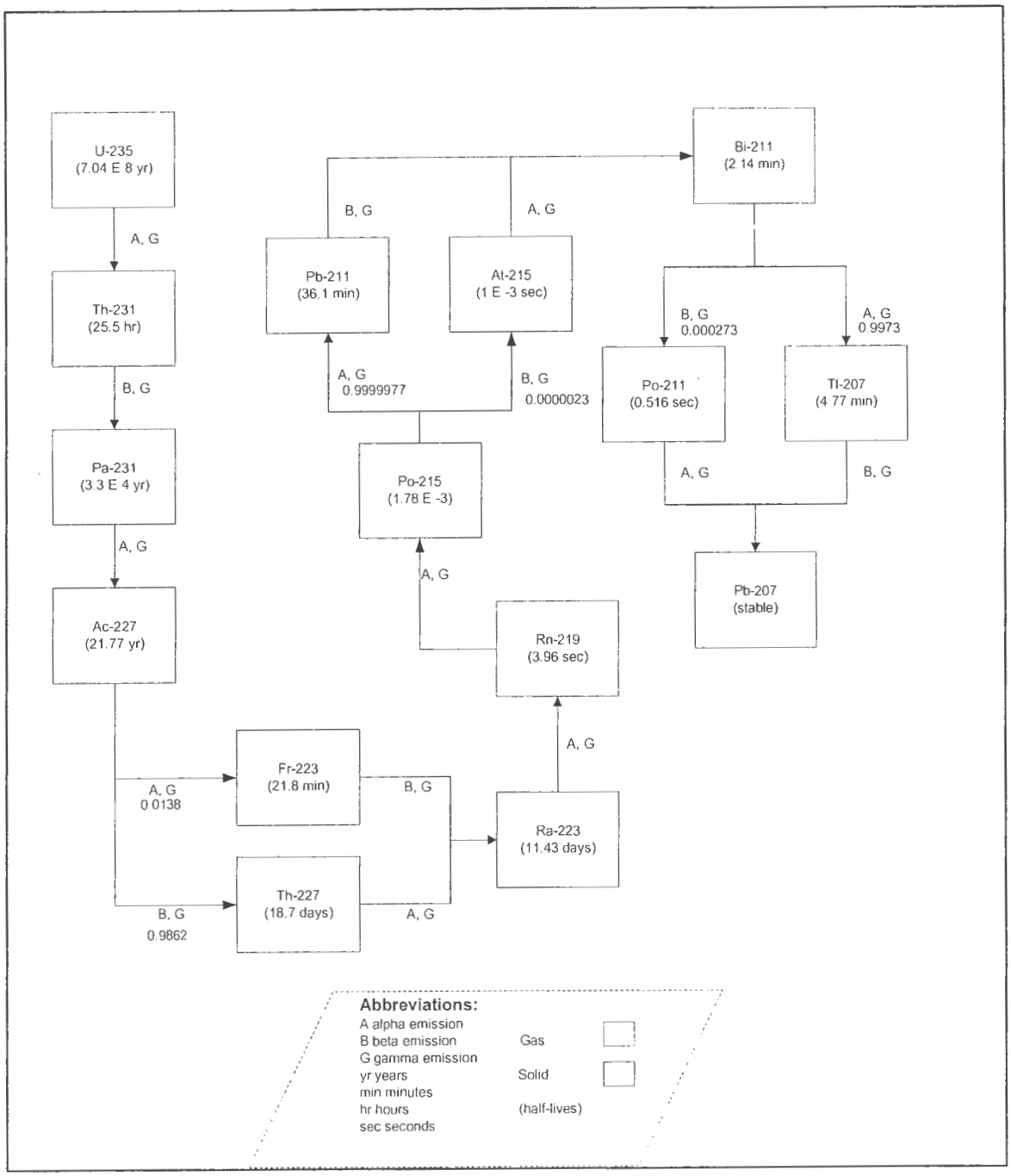


Figure O-3 Th-232 Serial Decay

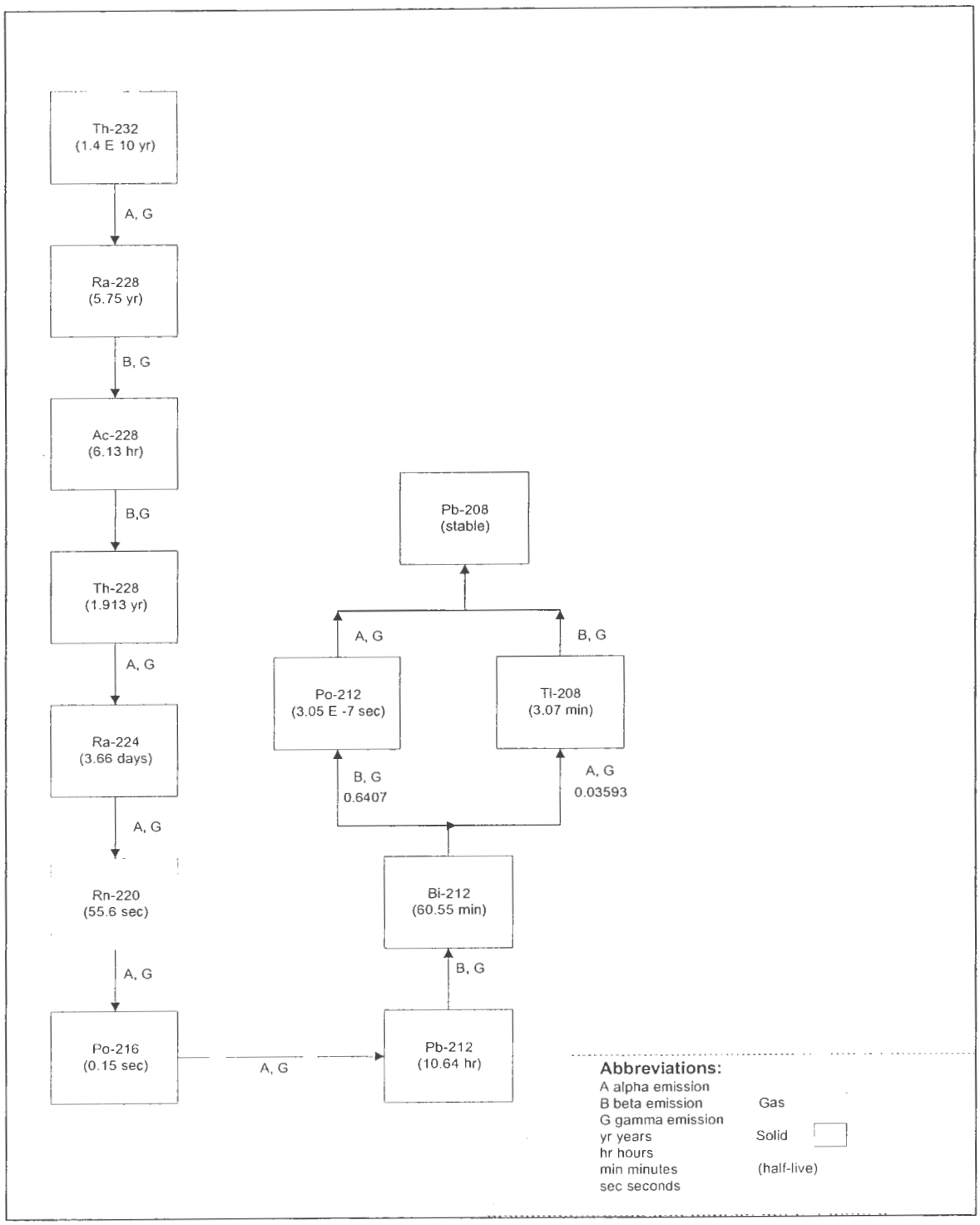


Figure O-4 - Raw Spectrum Bldg. 804. Rm. 1 (Location 14)

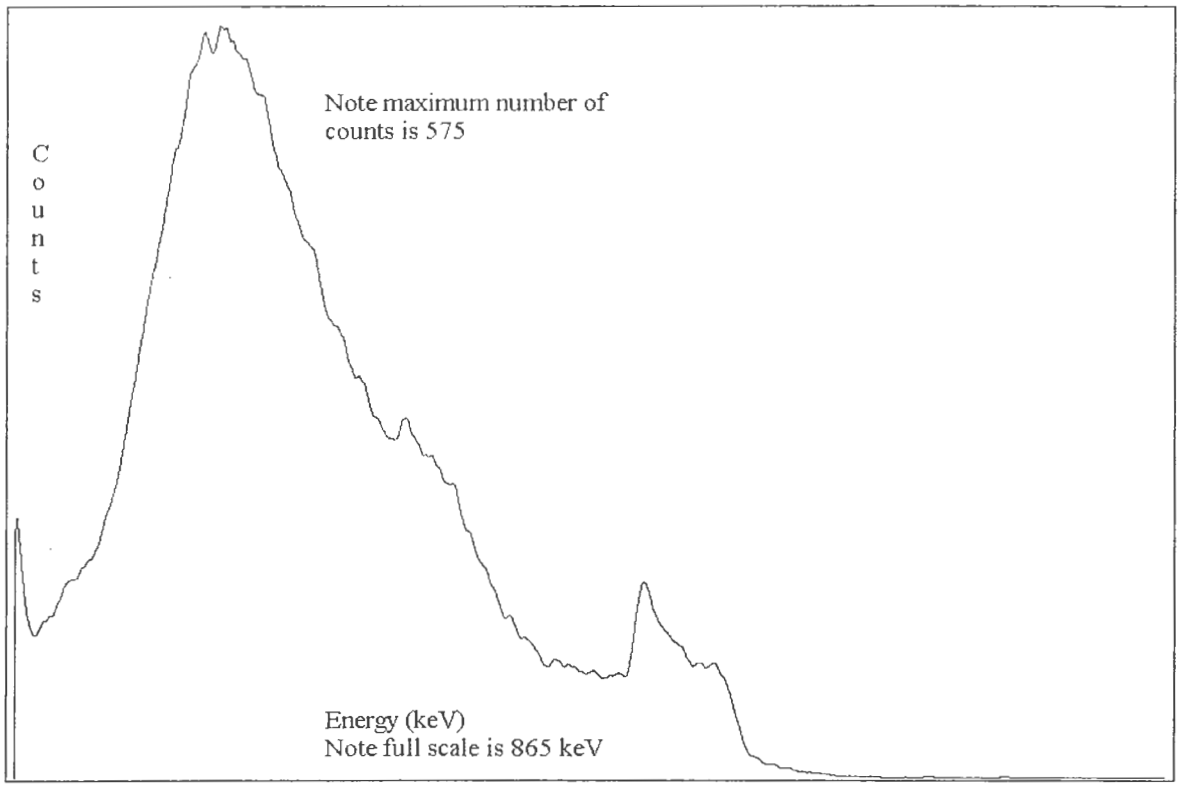


Figure O-5 - Cinder Block Background Spectrum

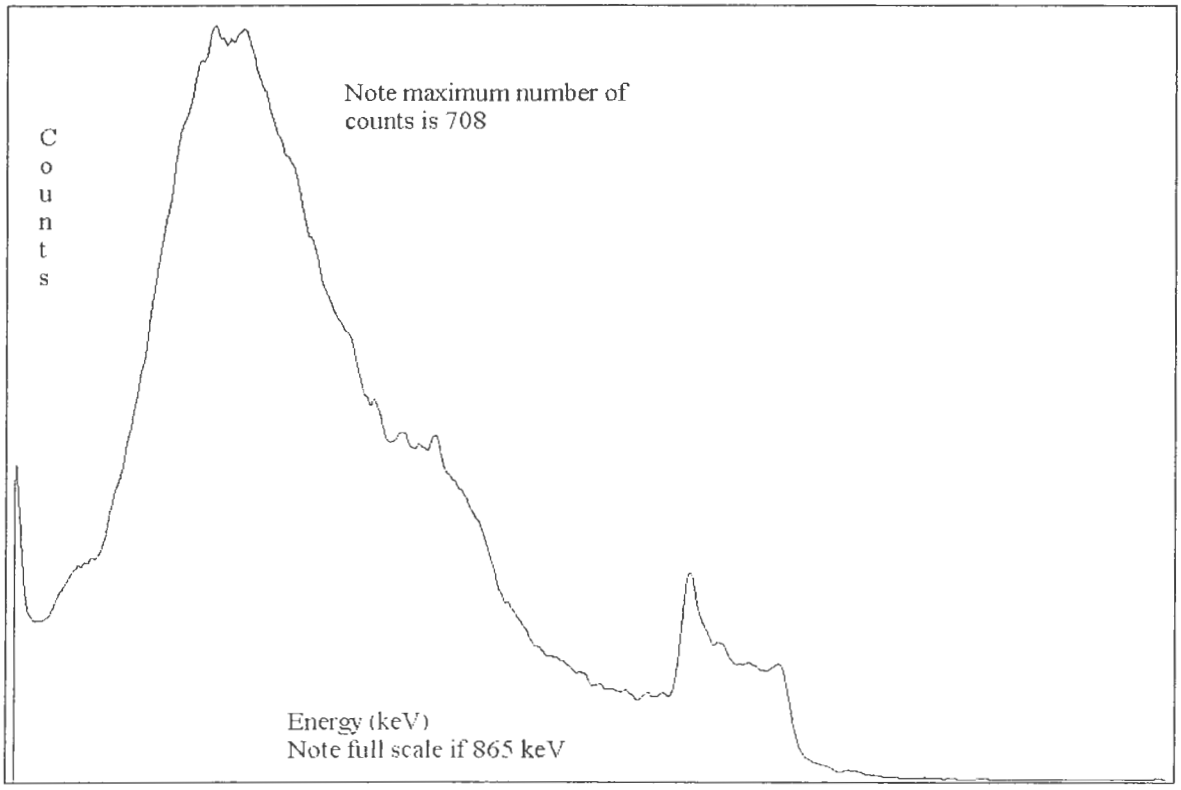


Figure O-6 – Bldg. 804 Rm. 1 Spectrum, after Background Subtraction

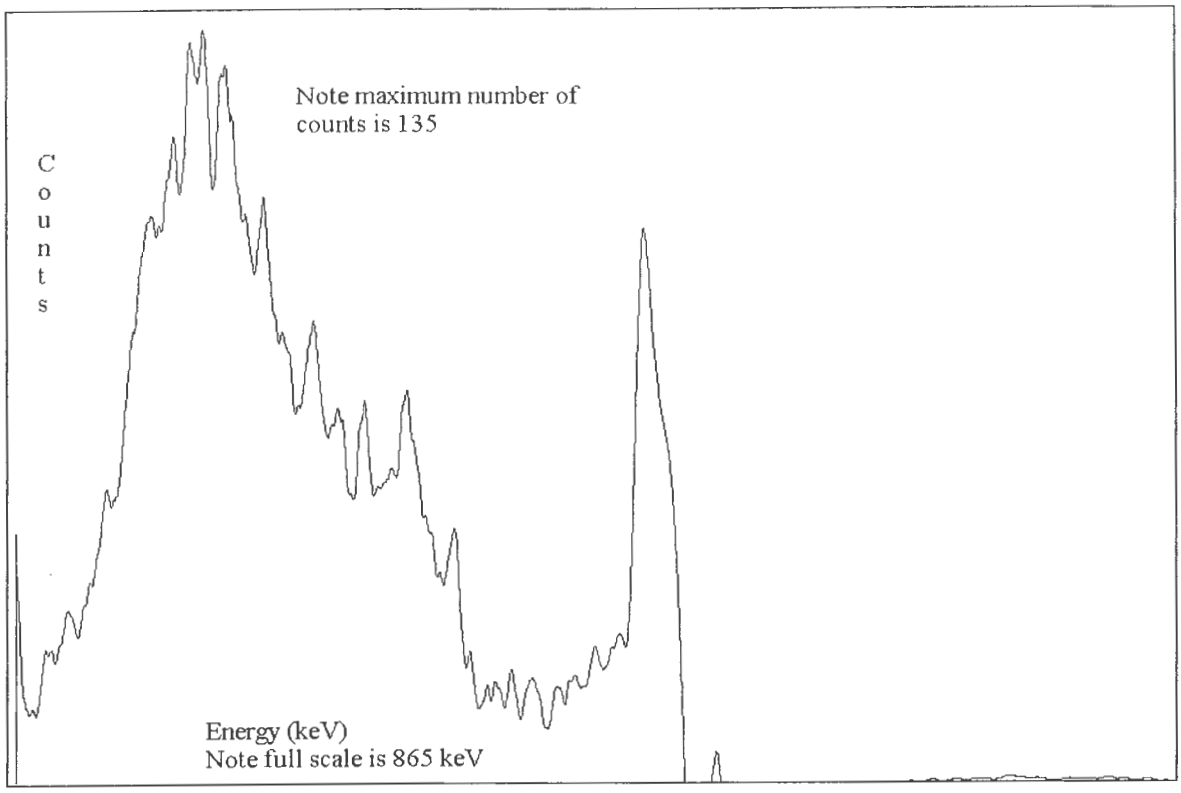


Figure O-7 - Bldg. 804 Rm. 1 Peak Identification

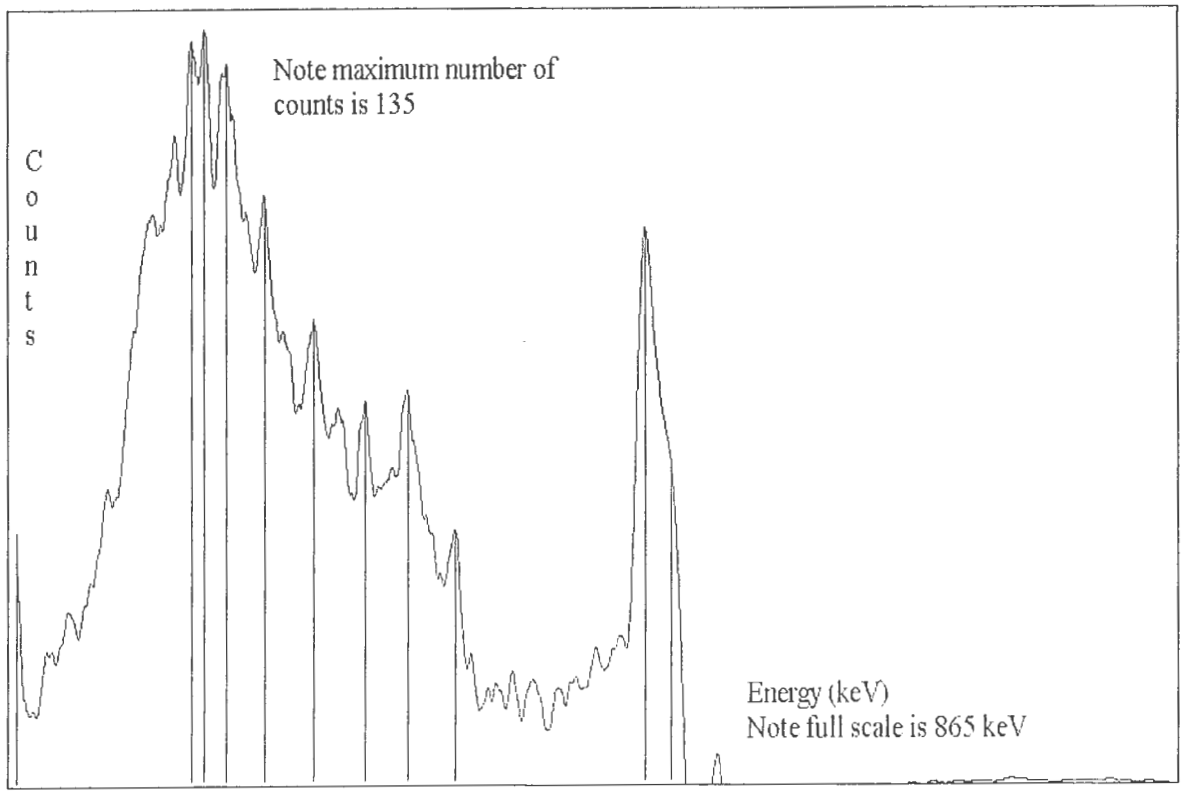


Table O-1
Naturally-Occurring Radionuclides
SEAD-12 Building Report
Seneca Army Depot Activity

Radionuclide	Parent	Source	Gamma/ X-Ray Emission Energies (MeV)
Th-232	primordial	natural (activity is typically 1 to 4 times the U-238 activity)	
Ra-228	Th-232	Th-232	
Ac-228	Ra-228	Th-232	0.34 – 0.96
Th-228	Ac-228	Th-232	0.08
Ra-224	Th-228	Th-232	0.24
Rn-220 (gas)	Ra-224	Th-232	
Po-218	Rn-220	Th-232	
Pb-212	Po-218	Th-232	0.24 – 0.3
Bi-212	Pb-212	Th-232	0.04 - 1.7
Po-212	Bi-212	Th-232	
Tl-208	Bi-212	Th-232	.5 – 2.6
U-235	primordial	natural (in natural uranium about 4.5% to 5% of U-238 activity)	0.14 – 0.2
Th-231	U-235	U-235	0.03 – 0.08
Pa-231	Th-231	U-235	0.02 –0.08
Ac-227	Pa-231	U-235	0.02 – 0.09
Th-227	Ac-227	U-235	0.05 – 0.31
Fr-223	Ac-227	U-235	0.05 – 0.24
Ra-223	Th-227/ Fr-223	U-235	1.5 – 0.33
Rn-219 (gas)	Ra-223	U-235	0.27 - 0.4
Po-215	Rn-219	U-235	
Pb-211	Po-215	U-235	0.410 – 0.83
At-215	Po-215	U-235	
Bi-211	Pb-211/ At-215	U-235	0.35
Po-211	Bi-211	U-235	0.57 – 0.9
Tl-207	Bi-211	U-235	
U-238	primordial	natural	
Th-234	U-238	U-238	0.063, 0.093
Pa-234m	Th-234	U-238	0.765(0.3%), 1.00 (0.6%)
U-234	Pa-234m	U-238	0.053 (0.2%)
Th-230	U-234	U-238	0.068(0.6%)
Ra-226	Th-230	U-238	0.186
Rn-222 (gas)	Ra-226	U-238	
Po-210	Rn-222	U-238	
Pb-214	Po-210	U-238	0.295, 0.352
Bi-214	Pb-214	U-238	0.609, 1.12, 1.76
Po-214	Bi-214	U-238	
Pb-210	Bi-214	U-238	0.047
Bi-210	PB-210	U-238	
Po-210	Bi-210	U-238	

Table O-2
Background Materials Peak Identification
SEAD-12 Building Report
Seneca Army Depot Activity

Background Number	Sample Material	Radionuclides Identified	Peak Energy (keV)	2nd Peak Energy (keV)	Upper Bound Peak Activity (dpm/100 cm^2)	$DCGL_W$ (dpm/100 cm^2)
1	Cinder Block	Pb-210	46.15		2155	NA
		U-235	185.2	96.93	115	145
2	Ceramic Block	Th-228	81.11		4038	NA
		Ra-223	81.11	269.5	123	NA
3	Concrete Floor	U-235	185.4	96.93	124	145
		Th-228	85.62		2049	NA
		Pb-210	49.5		669	NA
4	Metal Floor	Th-234	92.14	63.29	251	152
5	Porcelain	U-235	186.7	96.93	162	145
		Am-241	55.65	13.9	92	40
		Th-234	93.15	63.29	165	152
6	Wood	Pb-210	50.41		849	NA

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified	Peak Activity (dpm) [a]	ID Type (Energy or FWHM) [b]	Peak Energy (keV) [c]	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100cm²) [d]	Decay Series	Upper Bound Peak Activity (dpm/100 cm²) [e]	DCGL$_w$ [f]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [g]
14	804-1-C10.usf	cinder block	36	Pb-210	788	E +/- 6 keV	46.58		622	Uranium	933	No DCGL	NA [g]	
	45 minute count time		36	Pb-210	117	E +/- 6 keV	51.51		92	Uranium	139	No DCGL	NA	
			36	Pb-210	847	FWHM	43.72		669	Uranium	1003	No DCGL	NA	
			36	Pb-210	788	FWHM	46.58		622	Uranium	933	No DCGL	NA	
			36	U-235	185	FWHM	187.9	96.93	146	Actinium	219	145	Y	
			24	Pb-210	1420	E +/- 6 keV	43.96		1121	Uranium	1681	No DCGL	NA	
			24	Pb-210	1250	E +/- 6 keV	46.76		987	Uranium	1480	No DCGL	NA	
			24	Pb-210	1010	E +/- 6 keV	50.72		797	Uranium	1196	No DCGL	NA	
			24	U-235	81	E +/- 6 keV	185.9	96.93	64	Actinium	96	145	N	
			24	Pb-210	1250	FWHM	46.76		987	Uranium	1480	No DCGL	NA	
			16	Pb-210	1720	E +/- 6 keV	43.78		1358	Uranium	2037	No DCGL	NA	
			16	Pb-210	1450	E +/- 6 keV	46.95		1145	Uranium	1717	No DCGL	NA	
			16	Pb-210	1020	E +/- 6 keV	50.9		805	Uranium	1208	No DCGL	NA	
			16	Pb-210	1450	FWHM	46.95		1145	Uranium	1717	No DCGL	NA	
With the exception of U-235 activity, the conclusion is that this spectrum is representative of background with some elevated naturally occurring materials. There is the possibility that the localized U-235 concentration is slightly above the DCGLw. The maximum number of counts collected at a single energy after background subtraction was 140 (3.1 cpm).														
17	804-2-C6.usf	glass	36	Pb-210	561	E +/- 6 keV	51.14		443	Uranium	664	No DCGL	NA	
	60 minute count time		24	Pb-210	775	E +/- 6 keV	50.96		612	Uranium	918	No DCGL	NA	
			24	Th-234	717	E +/- 6 keV	96.16	63.29	566	Uranium	849	152	Y	1
			24	U-235	68	E +/- 6 keV	190	96.93	54	Actinium	81	145	N	
			24	Th-234	717	FWHM	96.16	63.29	566	Uranium	849	152	Y	1
			16	Pb-210	404	E +/- 6 keV	50.53		319	Uranium	478	No DCGL	NA	
			16	Th-234	708	E +/- 6 keV	97.16	63.29	559	Uranium	838	152	Y	1
			16	U-235	57	E +/- 6 keV	189.2	96.93	45	Actinium	67	145	N	
			16	Th-234	708	FWHM	97.16	63.29	559	Uranium	838	152	Y	
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on note 1. The maximum number of counts collected at a single energy after background subtraction was 100 (1.7 cpm).														
18	804-3a-C1.usf	floor tile w/ concrete base	24	Th-234	449	E +/- 6 keV	94.65	63.29	354	Uranium	532	152	NA	
	60 minute count time		24	Th-234	449	FWHM	94.65	63.29	354	Uranium	532	152	NA	
			16	Pu-239	901	E +/- 6 keV	16.87		711	Weapons PU	1067	41	NA	
			16	U-233	1020	E +/- 6 keV	16.87		805	Uranium	1208	No DCGL	NA	
			16	U-238	451	E +/- 6 keV	16.87		356	Uranium	534	152	NA	
			16	Am-241	103	E +/- 6 keV	57.59	13.9	81	Weapons PU	122	40	NA	
			16	Tl-208	515	E +/- 6 keV	70.07	277.4	407	Thorium	610	No DCGL	NA	
			16	Th-234	562	E +/- 6 keV	95.65	63.29	444	Uranium	665	152	Y	2
			16	Th-234	562	FWHM	95.65	63.29	444	Uranium	665	152	Y	2
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on Note 2. The maximum number of counts collected at a single energy after background subtraction was 200 (3.3 cpm).														

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified	Peak Activity (dpm) [a]	ID Type (Energy or FWHM) [b]	Peak Energy (keV) [c]	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100 cm^2) [d]	Decay Series	Upper Bound Peak Activity (dpm/100 cm^2) [e]	DCGL$_w$ [f]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [g]
22	804-5A-C5.usf	cinder block	24	Ra-223	96	E +/- 6 keV	82.86	269.5	76	Actinium	114	No DCGL	NA	
	60 minute count time		24	Th-228	3130	E +/- 6 keV	82.86		2471	Thorium	3706	No DCGL	NA	
			24	Th-234	770	E +/- 6 keV	95.65	63.29	608	Uranium	912	152	Y	1, 2, & 3
			24	Ra-223	96	FWHM	82.86	269.5	76	Actinium	114	No DCGL	NA	
			24	Th-228	3130	FWHM	82.86		2471	Thorium	3706	No DCGL	NA	
			24	Th-234	770	FWHM	95.65	63.29	608	Uranium	912	152	Y	1, 2, & 3
			16	Pb-210	847	E +/- 6 keV	52.36		669	Uranium	1003	No DCGL	NA	
			16	Th-234	1003	E +/- 6 keV	96.66	63.29	792	Uranium	1188	152	Y	1, 2, & 3
			16	U-235	30	E +/- 6 keV	179.9	96.93	24	Actinium	36	145	N	
			16	Th-228	4140	FWHM	83.62		3268	Thorium	4902	No DCGL	NA	
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on Notes 1, 2, and 3. The maximum number of counts collected at a single energy after background subtraction was 160 (2.7 cpm).														
27	805-1-C4.usf	concrete	24	Pb-210	1200	E +/- 6 keV	44.02		947	Uranium	1421	No DCGL	NA	
	45 minute count time		24	Pb-210	1600	E +/- 6 keV	44.02		1263	Uranium	1895	No DCGL	NA	
			24	Th-228	376	E +/- 6 keV	79.1		297	Thorium	445	No DCGL	NA	
			24	Th-234	559	E +/- 6 keV	95.91	63.29	441	Uranium	662	152	Y	1 & 2
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on Notes 1 and 2. The maximum number of counts collected at a single energy after background subtraction was 220 (4.9 cpm).														
29	805-1-C6.usf	concrete	16	Th-228	4010	E +/- 6 keV	79.85		3166	Thorium	4748	No DCGL	NA	
	45 minute count time		16	Th-228	5410	E +/- 6 keV	80.36		4271	Thorium	6406	No DCGL	NA	
			16	Th-234	1350	E +/- 6 keV	94.65	63.29	1066	Uranium	1599	152	Y	2
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on Note 2. The maximum number of counts collected at a single energy after background subtraction was 210 (4.7 cpm).														
30	806-1-c1.usf	wood over	36	Pu-239	91	E +/- 6 keV	13.9		72	Weapons PU	108	41	Y	4
	60 minute count time	concrete floor	36	U-233	103	E +/- 6 keV	13.9		81	NA	122	No DCGL	NA	
			36	U-238	46	E +/- 6 keV	13.9		36	Uranium	54	152	N	
			36	Pb-210	329	E +/- 6 keV	41.1		260	Uranium	390	No DCGL	NA	
			36	Pb-210	1180	E +/- 6 keV	45.61		932	Uranium	1397	No DCGL	NA	
			36	Pu-239	91	FWHM	13.9		72	Weapons PU	108	41	Y	4
			36	Pb-210	1180	FWHM	45.61		932	Uranium	1397	No DCGL	NA	
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials. Pu-239 is a misidentification believed based on the lack of Am-241 which would exist in higher activity given the age of the weapons material stored on base (see Note 4). The circa 60 keV peak associated with Am-241 shows 68 dpm, this is associated with the Th-234, which has a 63 keV (3.5%) confirmation peak as well as 93 keV peak (4%). Further the indicated Pu-239 peak should show a Am-241 activity of between 240 and 364 dpm, if they were real. The maximum number of counts collected at a single energy after background subtraction was 85 (1.4 cpm).															
38	810-1-c3.usf	concrete	24	Th-228	4000	E +/- 6 keV	87.38		3158	Thorium	4736	No DCGL	NA	
	45 minute count time		24	Th-234	894	E +/- 6 keV	87.38	63.29	706	Uranium	1059	152	Y	2
			24	Th-228	4000	FWHM	87.38		3158	Thorium	4736	No DCGL	NA	
			24	Th-234	894	FWHM	87.38	63.29	706	Uranium	1059	152	Y	2
			16	Th-228	1450	E +/- 6 keV	87.13		1145	Thorium	1717	No DCGL	NA	
			16	Th-234	325	E +/- 6 keV	87.13	63.29	257	Uranium	385	152	Y	2
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on Note 2. The maximum number of counts collected at a single energy after background subtraction was 340 (7.6 cpm).														

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified [a]	Peak Activity (dpm) [b]	ID Type (Energy or FWHM) [b]	Peak Energy (keV) [c]	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100 cm^2) [d]	Decay Series	Upper Bound Peak Activity (dpm/100 cm^2) [e]	DCGL$_W$ [f]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [iv]
49	815-15-c3.usf	cinder block	24	Ac-228	470	FWHM	96.66	336	371	Thorium	557	No DCGL	NA	
	45 minute count time		24	Pb-212	95	FWHM	242.9	78.67	75	Thorium	112	No DCGL	NA	
			16	Th-234	870	E +/- 6 keV	96.66	63.29	687	Uranium	1030	152	Y	2
Conclusion is that this spectrum is representative of background, based on Note 2. The maximum number of counts collected at a single energy after background subtraction was 90 (2 cpm).														
54	816-10-c4.usf	wood	16	Th-234	839	E +/- 6 keV	91.64	63.29	662	Uranium	993	152	Y	1, 2, & 3
	75 minute count time		16	U-235	4	E +/- 6 keV	191	96.93	3	Actinium	5	145	N	
			16	Th-234	839	FWHM	91.64	63.29	662	Uranium	993	152	Y	1, 2, & 3
			16	Co-57	19	FWHM	126.3	136.5	15	NA	22	72600	N	
			8	Th-231	999	E +/- 6 keV	24.04	85.27	789	Actinium	1183	No DCGL	NA	
			8	Pb-210	162	E +/- 6 keV	49.99		128	Uranium	192	No DCGL	NA	
			8	Th-234	812	E +/- 6 keV	90.89	63.29	641	Uranium	962	152	Y	1, 2, & 3
			8	Th-234	812	FWHM	90.89	63.29	641	Uranium	962	152	Y	1, 2, & 3
			8	Co-57	19	FWHM	126.5	136.5	15	NA	22	72600	N	
There is significant potential that this spectrum is representative of background, based on Notes 1, 2, and 3. The maximum number of counts collected at a single energy after background subtraction was 160 (2.1 cpm).														
54a	816-10-c4.usf	wood	36	Pb-210	780	E +/- 6 keV	47.07		616	Uranium	924	No DCGL	NA	1
			36	Pb-210	780	FWHM	47.07		616	Uranium	924	No DCGL	NA	1
			24	Pb-210	580	E +/- 6 keV	46.82		458	Uranium	687	No DCGL	NA	1
			24	Pb-210	580	FWHM	46.82		458	Uranium	687	No DCGL	NA	1
			16	Pb-210	635	E +/- 6 keV	46.76		501	Uranium	752	No DCGL	NA	1
			16	Th-234	666	E +/- 6 keV	91.89	63.29	526	Uranium	789	152	Y	1
			16	Pb-210	635	FWHM	46.76		501	Uranium	752	No DCGL	NA	1
			16	Th-234	666	FWHM	91.89	63.29	526	Uranium	789	152	Y	1
This is the previous spectrum analyzed using a more appropriate background, concrete. It was recognized that there was a significant amount of interference from the concrete walls and ceiling that were behind the wood panel being analyzed. This spectrum is representative of background, based on Note 1. The maximum number of counts collected at a single energy after background subtraction was 120 (1.6 cpm).														
56	816-3-C6.usf	cinder block	36	Co-57	12	FWHM	120.5	136.5	9	NA	14	72600	N	
	60 minute count time		**16**	**Th-234**	**703**	**E +/- 6 keV**	**98.16**	**63.29**	**555**	**Uranium**	**832**	152	**Y**	
			16	U-235	50	E +/- 6 keV	186.2	96.93	39	Actinium	59	145	N	
			16	U-235	50	FWHM	186.2	96.93	39	Actinium	59	145	N	
			8	**Th-234**	**635**	**E +/- 6 keV**	**98.41**	**63.29**	**501**	**Uranium**	**752**	152	**Y**	
			8	U-235	54	E +/- 6 keV	186.2	96.93	43	Actinium	64	145	N	
			8	U-235	54	FWHM	186.2	96.93	43	Actinium	64	145	N	
This may be a potential positive U-238 activity exceedance, although this spectrum could be representative of background as is indicated by the U238 to U-235 activity ratios. The maximum number of counts collected at a single energy after background subtraction was 160 (2.7 cpm).														
59	816-7-C9.usf	cinder block	24	Pu-239	391	E +/- 6 keV	19.31		309	Weapons PU	463	41	Y	3
	60 minute count time		16	Pu-239	266	E +/- 6 keV	19.24		210	Weapons PU	315	41	Y	3
Conclusion is that this spectrum is representative of background, based on note 3. The maximum number of counts collected at a single energy after background subtraction was 75 (1.3 cpm). Further the ID of Pu-239 is based on a 19 keV peak that is only 1 count high after 60 minutes and there would also be Am-241 in the sample if weapons grade Pu was present. Therefore this isotope is either being mis-identified or is part of the natural background for this sample.														

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified	Peak Activity (dpm)	ID Type (Energy or FWHM)	Peak Energy (keV)	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100 cm²)	Decay Series	Upper Bound Peak Activity (dpm/100 cm²) [c]	DCGL$_W$ [d]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [e]
60	816-8-C1.usf	concrete	36	Pb-210	802	E +/- 6 keV	47.61		633	Uranium	950	No DCGL	NA	
	60 minute count time			Pb-210	161	E +/- 6 keV	51.93		127	Uranium	191	No DCGL	NA	
				Pb-210	802	FWHM	47.61		633	Uranium	950	No DCGL	NA	
			24	Pb-210	472	E +/- 6 keV	40.62		373	Uranium	559	No DCGL	NA	
				Pb-210	1130	E +/- 6 keV	47.25		892	Uranium	1338	No DCGL	NA	
				Th-234	643	E +/- 6 keV	94.15	63.29	508	Uranium	761	152	Y	1
				Pb-210	1130	FWHM	47.25		892	Uranium	1338	No DCGL	NA	
				Th-234	643	FWHM	94.15	63.29	508	Uranium	761	152	Y	1
			16	Pb-210	542	E +/- 6 keV	40.74		428	Uranium	642	No DCGL	NA	
				Pb-210	1500	E +/- 6 keV	47.07		1184	Uranium	1776	No DCGL	NA	
				Th-234	620	E +/- 6 keV	94.9	63.29	489	Uranium	734	152	Y	1
				Pb-210	1500	FWHM	47.07		1184	Uranium	1776	No DCGL	NA	
				Th-234	620	FWHM	94.9	63.29	489	Uranium	734	152	Y	1
Conclusion is that this spectrum is representative of background, based on Note 1. The maximum number of counts collected at a single energy after background subtraction was 65 (1.1 cpm).														
65	819-11-c24.usf	cinder block	16	Th-234	495	E +/- 6 keV	98.41	63.29	391	Uranium	586	152	Y	1 & 3
	60 minute count time		16	Bi-211	298	E +/- 6 keV	356.2	74.39	235	Actinium	353	No DCGL	NA	
			16	Pb-214	104	E +/- 6 keV	356.2	78.67	82	Uranium	123	No DCGL	NA	
			16	Co-57	48	FWHM	126.8	136.5	38	NA	57	72600	N	
			8	Pu-239	252	E +/- 6 keV	19.54		199	Weapons PU	298	41	Y	4
			8	Tl-208	508	E +/- 6 keV	75.59	277.4	401	Thorium	602	No DCGL	NA	
			8	Bi-211	339	E +/- 6 keV	355.2	74.39	268	Actinium	401	No DCGL	NA	
			8	Pb-214	118	E +/- 6 keV	355.2	78.67	93	Uranium	140	No DCGL	NA	
			8	Tl-208	508	FWHM	75.59	277.4	401	Thorium	602	No DCGL	NA	
			8	Co-57	67	FWHM	127	136.5	53	NA	79	72600	N	
Conclusion is that this spectrum is representative of background, based on Notes 1, 3, & 4. The maximum number of counts collected at a single energy after background subtraction was 325 (5.4 cpm). Further the Pu-239 identification is incorrect as it is not associated with any Am-241 as is expected with the age of the Pu and it is not identified in the FWHM IDs.														
67	819-12-c28.usf	cinder block	36	Ra-226	4550	FWHM	192.7	351.9	3592	Uranium	5388	1210	Y	
			36	U-235	277	FWHM	192.7	96.93	219	Actinium	328	145	Y	
	60 minute count time		24	Ra-226	850	E +/- 6 keV	191	351.9	671	Uranium	1006	1210	N	
			24	Bi-211	454	E +/- 6 keV	353.7	74.39	358	Actinium	538	No DCGL	NA	
			24	Pb-214	158	E +/- 6 keV	353.7	78.67	125	Uranium	187	No DCGL	NA	
			24	Bi-211	454	FWHM	353.7	74.39	358	Actinium	538	No DCGL	NA	
			24	Pb-214	158	FWHM	353.7	78.67	125	Uranium	187	No DCGL	NA	
			16	Ra-226	754	E +/- 6 keV	190.2	351.9	595	Uranium	893	1210	N	
			16	U-235	46	E +/- 6 keV	190.2	96.93	36	Actinium	54	145	N	
			16	Bi-211	428	E +/- 6 keV	354.2	74.39	338	Actinium	507	No DCGL	NA	
			16	Pb-214	149	E +/- 6 keV	354.2	78.67	118	Uranium	176	No DCGL	NA	
			16	Bi-211	428	FWHM	354.2	74.39	338	Actinium	507	No DCGL	NA	
			16	Pb-214	149	FWHM	354.2	78.67	118	Uranium	176	No DCGL	NA	
Conclusion is that this spectrum is representative of background, except as discussed in the balance of this entry. Also, it would appear that there may be an elevated level of Ra-226 at this location. Based on the results using the various methods and smoothing factors it is highly dobutful that the activity is above the DCGLw. However, at least a significant fraction of the activity would be associated with U-235 since the U-235 progeny are also showing up with variability above the background. This indicates that the variability of the U-235 concnentration may result in it being above background,although it is not above the DCGLw. U-235 produces this peak about 50% of the time and Ra-226 about 4%. The maximum number of counts collected at a single energy after background subtraction was 230 (3.3 cpm).															

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified	Peak Activity (dpm) [a/]	ID Type (Energy or FWHM) [b/]	Peak Energy (keV) [c/]	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100 cm^2) [d/]	Decay Series	Upper Bound Peak Activity (dpm/100 cm^2) [d/]	DCGL$_w$ [e/]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [h/]
69	819-12d-c27.usf	cinder block	36	Co-57	32	FWHM	120.2	136.5	25	NA	38	72600	N	
	60 minute count time		16	Th-228	2750	E +/- 6 keV	80.61		2171	Thorium	3256	No DCGL	NA	
			8	Th-231	460	E +/- 6 keV	21.76	85.27	363	Actinium	545	No DCGL	NA	
			8	Ra-223	90	E +/- 6 keV	80.86	269.5	71	Actinium	107	No DCGL	NA	
			8	Th-228	2950	E +/- 6 keV	80.86		2329	Thorium	3493	No DCGL	NA	
			8	Th-234	1330	E +/- 6 keV	94.15	63.29	1050	Uranium	1575	152	Y	2
			8	Ac-228	846	FWHM	94.15	336	668	Thorium	1002	No DCGL	NA	
			8	Th-234	1330	FWHM	94.15	63.29	1050	Uranium	1575	152	Y	2
Conclusion is that this spectrum is representative of background, based on Note 2. The maximum number of counts collected at a single energy after background subtraction was 300 (5 cpm).														
70	819-1-c1.usf	ceramic block	36	Pb-210	282	E +/- 6 keV	50.84		223	Uranium	334	No DCGL	NA	
	45 minute count time		36	Th-228	1590	E +/- 6 keV	89.13		1255	Thorium	1883	No DCGL	NA	
			24	Pu-239	3070	E +/- 6 keV	19.31		2423	Weapons PU	3635	41	Y	4
			24	Pb-210	403	E +/- 6 keV	51.39		318	Uranium	477	No DCGL	NA	
			24	Am-241	72	E +/- 6 keV	56.38	13.9	57	Weapons PU	85	40	Y	4
			24	Am-241	76	E +/- 6 keV	59.11	13.9	60	Weapons PU	90	40	Y	4
			24	Th-228	1720	E +/- 6 keV	87.63		1358	Thorium	2037	No DCGL	NA	
			24	Th-234	385	E +/- 6 keV	87.63	63.29	304	Uranium	456	152	Y	1
			16	Pu-239	3500	E +/- 6 keV	19.39		2763	Weapons PU	4144	41	Y	4
			16	Pb-210	479	E +/- 6 keV	51.33		378	Uranium	567	No DCGL	NA	
			16	Am-241	73	E +/- 6 keV	56.13	13.9	58	Weapons PU	86	40	Y	4
			16	Am-241	43	E +/- 6 keV	59.05	13.9	34	Weapons PU	51	40	Y	4
			16	Th-228	1840	E +/- 6 keV	88.38		1453	Thorium	2179	No DCGL	NA	
			16	Th-234	411	E +/- 6 keV	88.38	63.29	324	Uranium	487	152	Y	1
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on Notes 1 and 4. Since the Th-234 and Pb-210 activities above background are consistent the circa 50 keV peak is more likely to be related to the Pb-210, than the Am-241. Even if the Am-241 were present a significant portion of the activity in this peak would still be related to the Pb-210 and the Am-241 would probably be well below the DCGLw. A comparison of the Am-241 activity indicates that it is less than the DCGLemc, further the alpha and beta survey results are not indicative of contamination at this location. Also the Pu-239 and Am-241 are misidentified based on the actual peak energies seen for Pu-239 (19.3 instead of 13.9) and the ratio of Pu-239 to Am-241 is incorrect for weapons material of this age. The maximum number of counts collected at a single energy after background subtraction was 62 (1.4 cpm).															
71	819-1-c2.usf	concrete	36	Pb-210	1620	E +/- 6 keV	51.93		1279	Uranium	1918	No DCGL	NA	
	60 minute count time		24	Pb-210	1930	E +/- 6 keV	52		1524	Uranium	2285	No DCGL	NA	
			16	Pb-210	233	E +/- 6 keV	47.92		184	Uranium	276	No DCGL	NA	
			16	Pb-210	1570	E +/- 6 keV	52.3		1239	Uranium	1859	No DCGL	NA	
			16	Am-241	188	E +/- 6 keV	57.11	13.9	148	Weapons PU	223	40	Y	1 & 4
			16	Tl-208	177	E +/- 6 keV	70.83	277.4	140	Thorium	210	No DCGL	NA	
Conclusion is that this spectrum is representative of background with some elevated naturally occurring materials, based on Notes 1 and 4. Since the Th-234 and Pb-210 activities above background are consistent, the circa 50 keV peak is more likely to be related to the Pb-210, than the Am-241. Even if the Am-241 were present a significant portion of the activity in this peak would still be related to the Po-210 and the Am-241 would probably be well below the DCGLw. The maximum number of counts collected at a single energy after background subtraction was 300 (5 cpm).															
78	819-4-c8.usf	cinder block	16	Pb-210	352	E +/- 6 keV	48.28		278	Uranium	417	No DCGL	NA	
	60 minute count time		16	Ac-228	190	FWHM	95.91	336	150	Thorium	225	No DCGL	NA	
			8	Pb-210	435	E +/- 6 keV	48.41		343	Uranium	515	No DCGL	NA	
			8	Th-234	395	E +/- 6 keV	95.91	63.29	312	Uranium	468	152	Y	1
			8	U-235	74	E +/- 6 keV	179.9	96.93	58	Actinium	88	145	N	
Conclusion is that this spectrum is representative of background, based on Note 1. The maximum number of counts collected at a single energy after background subtraction was 260 (4.3 cpm).														

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified	Peak Activity (dpm) [a]	ID Type (Energy or FWHM) [b]	Peak Energy (keV) [c]	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100 cm²) [d]	Decay Series	Upper Bound Peak Activity (dpm/100 cm²) [e]	DCGL$_W$ [f]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [g]
80	819-5-c11.usf	wood panel over cinder block wall	36	U-235	63	FWHM	183.9	96.93	50	Actinium	75	145	N	
	45 minute count time		24	U-235	118	FWHM	181.2	96.93	93	Actinium	140	145	N	
			16	Pb-210	742	E +/- 6 keV	46.15		586	Uranium	879	No DCGL	NA	
			16	Th-228	2320	E +/- 6 keV	79.6		1831	Thorium	2747	No DCGL	NA	
			16	Th-234	1010	E +/- 6 keV	92.14	63.29	797	Uranium	1196	152	Y	1
			16	U-235	79	E +/- 6 keV	182.2	96.93	62	Actinium	94	145	N	
			16	Pb-210	742	FWHM	46.15		586	Uranium	879	No DCGL	NA	
			16	Th-234	1010	FWHM	92.14	63.29	797	Uranium	1196	152	Y	1
Conclusion is that this spectrum is representative of background, based on Note 1. The maximum number of counts collected at a single energy after background subtractionwas 240 (5.3 cpm).														
81	819-5-c12.usf	wood panel over cinder block wall	24	Th-234	691	E +/- 6 keV	98.41	63.29	545	Uranium	818	152	Y	1
	45 minute count time		24	Tl-208	1470	FWHM	72.33	277.4	1160	Thorium	1741	No DCGL	NA	
			24	Ac-228	438	FWHM	98.41	336	346	Thorium	519	No DCGL	NA	
			16	Pb-210	877	E +/- 6 keV	46.95		692	Uranium	1038	No DCGL	NA	
			16	Th-234	882	E +/- 6 keV	97.41	63.29	696	Uranium	1044	152	Y	1
			16	Pb-210	877	FWHM	46.95		692	Uranium	1038	No DCGL	NA	
			16	Tl-208	1760	FWHM	71.58	277.4	1389	Thorium	2084	No DCGL	NA	
			16	Ac-228	560	FWHM	97.41	336	442	Thorium	663	No DCGL	NA	
Conclusion is that this spectrum is representative of background, based on Note 1. The maximum number of counts collected at a single energy after background subtraction was 250 (5.6 cpm).														
82	819-5-c13.usf	wood panel over cinder block wall	24	Co-57	23	FWHM	122.2	136.5	18	NA	27	72600	N	
	45 minute count time		**24**	**Ra-226**	**1580**	**FWHM**	**188.4**	**351.9**	**1247**	**Uranium**	**1871**	1210	Y	5
			24	U-235	96	FWHM	188.4	96.93	76	Actinium	114	145	N	
			16	Co-57	33	FWHM	122.2	136.5	26	NA	39	72600	N	
			16	Ra-226	912	FWHM	187.2	351.9	720	Uranium	1080	1210	N	
			16	U-235	55	FWHM	187.2	96.93	43	Actinium	65	145	N	
Conclusion is that this spectrum is representative of background with the possible exception of Ra-226, based on Note 5. The maximum number of counts collected at a single energy after background subtraction was 270 (6 cpm).														

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified	Peak Activity (dpm) [b]	ID Type (Energy or FWHM) [b]	Peak Energy (keV) [c]	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100 cm^2) [d]	Decay Series	Upper Bound Peak Activity (dpm/100 cm^2) [d]	DCGL$_W$ [g]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [h]
83	819-5-c14.usf	wood panel	36	Pb-210	861	E +/- 6 keV	47.13		680	Uranium	1020	No DCGL	NA	
	45 minute count time	over cinder	36	Pb-210	861	FWHM	47.13		680	Uranium	1020	No DCGL	NA	
		block wall	24	Pb-210	1100	E +/- 6 keV	47.07		868	Uranium	1303	No DCGL	NA	
			24	Pb-210	1100	FWHM	47.07		868	Uranium	1303	No DCGL	NA	
			16	Pu-239	3110	E +/- 6 keV	19.47		2455	Weapons PU	3683	41	Y	4
			16	Pb-210	725	E +/- 6 keV	47.01		572	Uranium	858	No DCGL	NA	
			16	Pb-210	725	FWHM	47.01		572	Uranium	858	No DCGL	NA	
			16	Ra-226	546	FWHM	183.7	351.9	431	Uranium	647	1210	N	
			16	U-235	33	FWHM	183.7	96.93	26	Actinium	39	145	N	
			36	Th-228	146	E +/- 6 keV	84.87		115	Thorium	173	No DCGL	NA	
			36	Ac-228	8	E +/- 6 keV	91.89	336	6	Thorium	9	No DCGL	NA	
			36	Ac-228	31	E +/- 6 keV	96.66	336	24	Thorium	37	No DCGL	NA	
			36	**Ra-226**	**1490**	**E +/- 6 keV**	**182.7**	**351.9**	**1176**	**Uranium**	**1764**	1210	Y	5
			36	U-235	91	E +/- 6 keV	182.7	96.93	72	Actinium	108	145	N	
			36	Bi-211	178	E +/- 6 keV	354	74.39	141	Actinium	211	No DCGL	NA	
			36	Pb-214	62	E +/- 6 keV	354	78.67	49	Uranium	73	No DCGL	NA	
			36	Th-228	146	FWHM	84.87		115	Thorium	173	No DCGL	NA	
			36	Th-234	12	FWHM	91.89	63.29	9	Uranium	14	152	N	
			36	Ac-228	31	FWHM	96.66	336	24	Thorium	37	No DCGL	NA	
			36	**Ra-226**	**1490**	**FWHM**	**182.7**	**351.9**	**1176**	**Uranium**	**1764**	1210	Y	5
			36	U-235	91	FWHM	182.7	96.93	72	Actinium	108	145	N	
			36	Bi-211	178	FWHM	354	74.39	141	Actinium	211	No DCGL	NA	
			36	Pb-214	62	FWHM	354	78.67	49	Uranium	73	No DCGL	NA	
Conclusion is that this spectrum is representative of background, based on Notes 4 & 5, with the possible exception of Ra-226. The maximum number of counts collected at a single energy after background subtraction was 200 (4.4 cpm).														
86	819-7-c17.usf	cinder block	24	Pb-210	1020	E +/- 6 keV	40.56		805	Uranium	1208	No DCGL	NA	
	45 minute count time		24	Th-234	957	E +/- 6 keV	94.15	63.29	755	Uranium	1133	152	Y	1, 2, & 3
			24	Ac-228	607	FWHM	94.15	336	479	Thorium	719	No DCGL	NA	
			24	Th-234	957	FWHM	94.15	63.29	755	Uranium	1133	152	Y	1, 2, & 3
			16	Pb-210	1250	E +/- 6 keV	40.62		987	Uranium	1480	No DCGL	NA	
			16	Th-228	3680	E +/- 6 keV	79.1		2905	Thorium	4358	No DCGL	NA	
			16	Th-234	1270	E +/- 6 keV	94.4	63.29	1003	Uranium	1504	152	Y	1, 2, & 3
			16	Ac-228	803	FWHM	94.4	336	634	Thorium	951	No DCGL	NA	
			16	Th-234	1270	FWHM	94.4	63.29	1003	Uranium	1504	152	Y	1, 2, & 3
Conclusion is that this spectrum is representative of background, based on Notes 1, 2, and 3. The maximum number of counts collected at a single energy after background subtraction was 310 (6.9 cpm).														
88	819-8-c19.usf	cinder block	36	Pb-210	101	E +/- 6 keV	47.49		80	Uranium	120	No DCGL	NA	
	45 minute count time		24	Pb-210	165	E +/- 6 keV	47.68		130	Uranium	195	No DCGL	NA	
			16	Pb-210	221	E +/- 6 keV	47.68		174	Uranium	262	No DCGL	NA	
			16	Th-228	2820	E +/- 6 keV	83.87		2226	Thorium	3339	No DCGL	NA	
			16	Th-234	181	E +/- 6 keV	97.41	63.29	143	Uranium	214	152	Y	2 & 3
			16	Ra-223	86	FWHM	83.87	269.5	68	Actinium	102	No DCGL	NA	
			16	Th-228	2820	FWHM	83.87		2226	Thorium	3339	No DCGL	NA	
			16	Ac-228	115	FWHM	97.41	336	91	Thorium	136	No DCGL	NA	
Conclusion is that this spectrum is representative of background, based on Notes 2 and 3. The maximum number of counts collected at a single energy after background subtraction was 245 (5.4 cpm).														

Table O-3
Summary of Gamma Spectroscopy and Radionuclide Identification Results
SEAD-12 Building Report
Seneca Army Depot Activity

Sample Number	Spectra Filename	Sample Material	Smoothing Factor	Radionuclides Identified	Peak Activity (dpm) [b]	ID Type (Energy or FWHM) [b]	Peak Energy (keV) [c]	Confirmatory Peak Energy (keV)	Peak Activity (dpm/100 cm^2) [d]	Decay Series	Upper Bound Peak Activity (dpm/100 cm^2) [e]	DCGL$_W$ [f]	Upper Bound Exceeds Surficial DCGL?	Analysis Notes [h]
92	823-1-c1.usf	cinder block	8	Pu-239	1630	E +/- 6 keV	19.24		1287	Weapons PU	1930	41	Y	4
	45 minute count time		8	Pb-210	700	E +/- 6 keV	52.12		553	Uranium	829	No DCGL	NA	
Conclusion is that this spectrum is representative of background, based on Note 4. The maximum number of counts collected at a single energy after background subtraction was 220 (4.9 cpm). Further the identification of Pu-239 is deemed incorrect based on the acutal energy of the peak (19.24 keV) and that Am-241 was not specifically identified at this location.														
98	Material Sample 819-	material	36	Pb-210	337	E +/- 6 keV	42.69		266	Uranium	399	No DCGL	NA	
	12D-c25 Alpha high		36	Pb-210	159	E +/- 6 keV	45		126	Uranium	188	No DCGL	NA	
	spot.usf		36	Th-234	508	E +/- 6 keV	93.15	63.29	401	Uranium	602	152	Y	1
	25 minute count time		36	Th-234	508	FWHM	93.15	63.29	401	Uranium	602	152	Y	1
Conclusion is that this spectrum is maybe representative of background, based on Note 1. The maximum number of counts collected at a single energy after background subtraction was 30 (1.2 cpm).														
102	Material Sample	material	36	Pb-210	601	E +/- 6 keV	42.87		474	Uranium	712	No DCGL	NA	
	BKGD-CB1.usf		36	Pb-210	358	E +/- 6 keV	51.2		283	Uranium	424	No DCGL	NA	
	90 minute count time		24	Pb-210	135	E +/- 6 keV	43.23		107	Uranium	160	No DCGL	NA	
			24	Pb-210	602	E +/- 6 keV	50.78		475	Uranium	713	No DCGL	NA	
			24	Am-241	115	E +/- 6 keV	57.84	13.9	91	Weapons PU	136	40	Y	6
			24	Th-234	296	E +/- 6 keV	95.65	63.29	234	Uranium	350	152	Y	1
			16	Pu-239	607	E +/- 6 keV	16.42		479	Weapons PU	719	41	Y	
			16	U-238	304	E +/- 6 keV	16.42		240	Uranium	360	152	Y	1
			16	Pb-210	210	E +/- 6 keV	43.36		166	Uranium	249	No DCGL	NA	
			16	Pb-210	326	E +/- 6 keV	50.6		257	Uranium	386	No DCGL	NA	
			16	Am-241	136	E +/- 6 keV	57.71	13.9	107	Weapons PU	161	40	Y	6
This is a background material sample that was taken for lab analysis to build a correlation dataset between the lab Ge detector and the NaI based FIDLER used with the URSA in-situ. The Pu-239 and Am-241 identification appear to be misidentifications based on Notes 4 and 6. The U-238 identification appears to be part of the ambient background based on Note 1. The maximum number of counts collected at a single energy after background subtraction was 75 (0.8 cpm).														

[a] dpm = disintegrations per minute.

[b] ID Type = Identification type. The energy-based identification compares known and observed gamma energy peaks within a given resolution (in this analysis +/- 6 keV). The full-width half-maximum (FWHM) identification applies the additional criteria that the FWHM must be less than 10% for the primary peak and 20% for the confirmatory peak before the observed peaks are compared to the known peaks.

[c] keV = kiloelectron volts.

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

[e] The upper bound peak activity is a conservative estimate of the surficial activity for the identified radionuclide based on the energy peak activity determined by the analysis software plus 50 percent.

[f] DCGL$_W$ = Derived Concentration Guideline Limit; from Table 4.1 in the text.

[g] NA = not applicable.

[h] Please refer to Section O.7 in the **Appendix O** text for the analysis notes.

APPENDIX P

Building Diagrams for Class I and Class II Survey Units

Building 803
- *Room 1*
- *Room 2*
- *Room 3*
- *Room 4*
- *Room 5*
- *Room 6*
- *Room 7*

Building 804
- *Room 1*
- *Room 2*
- *Room 3*
- *Room 4*
- *Room 5*
- *Room 6*

Building 805
- *Room 1*

Building 806
- *Room 1*

Building 810
- *Room 1*

Building 809
- *Room 1*

Building 812
- *Room 32*

Building 815
- *Room 1*
- *Room 2*
- *Room 3*
- *Room 4*
- *Room 5*
- *Room 6*
- *Room 7*
- *Room 8*
- *Room 9*
- *Room 10*
- *Room 11*
- *Room 12*
- *Room 13*
- *Room 14*
- *Room 15*
- *Room 16*

Building 816
- *Room 2*
- *Room 3*
- *Room 4*
- *Room 5*
- *Room 7*
- *Room 8*
- *Room 9*
- *Room 10*
- *Room 11*
- *Room 12*
- *Room 13*

Building 819
- *Room 1*
- *Room 2*
- *Room 4*
- *Room 5*
- *Room 6 A & B*
- *Room 7*
- *Room 8 A & B*
- *Room 9*
- *Room 10*
- *Room 11*
- *Room12 A, B, C, &D*

NOTE:

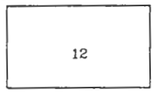
CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

N

TOP COVER OF SHELVES



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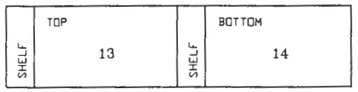

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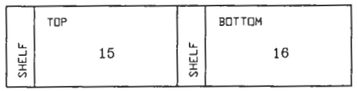

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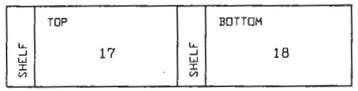

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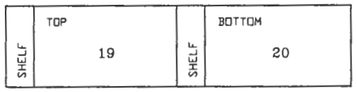
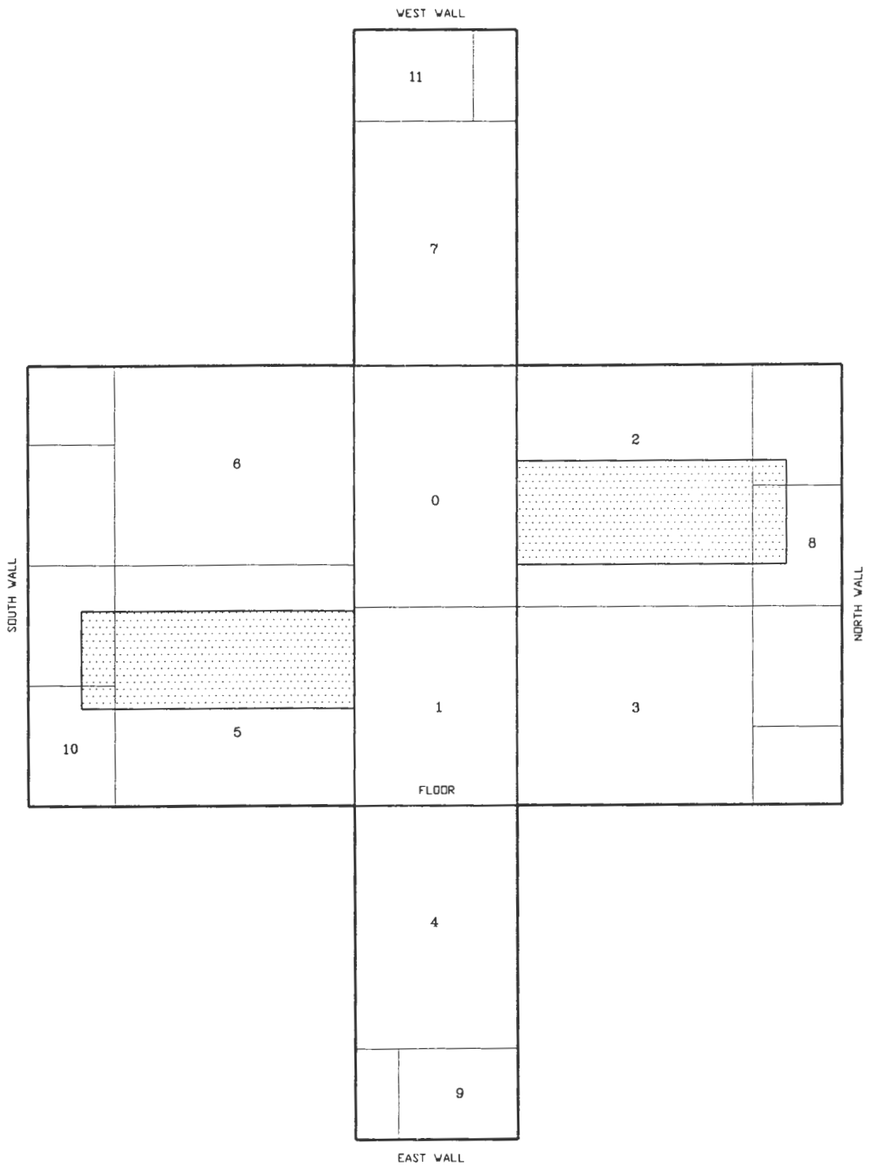
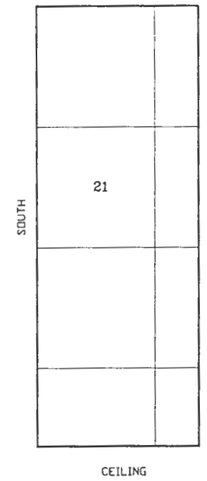




ROOM 803-1



FEET 0 3 6
METERS 0 1 2

0 2' 4' 6'
(APPROX. SCALE FT.)

NOTE(S):
BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-300, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 9/5/58.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING D+O NO. 730047-01001

BUILDING 803
ROOM 803-1

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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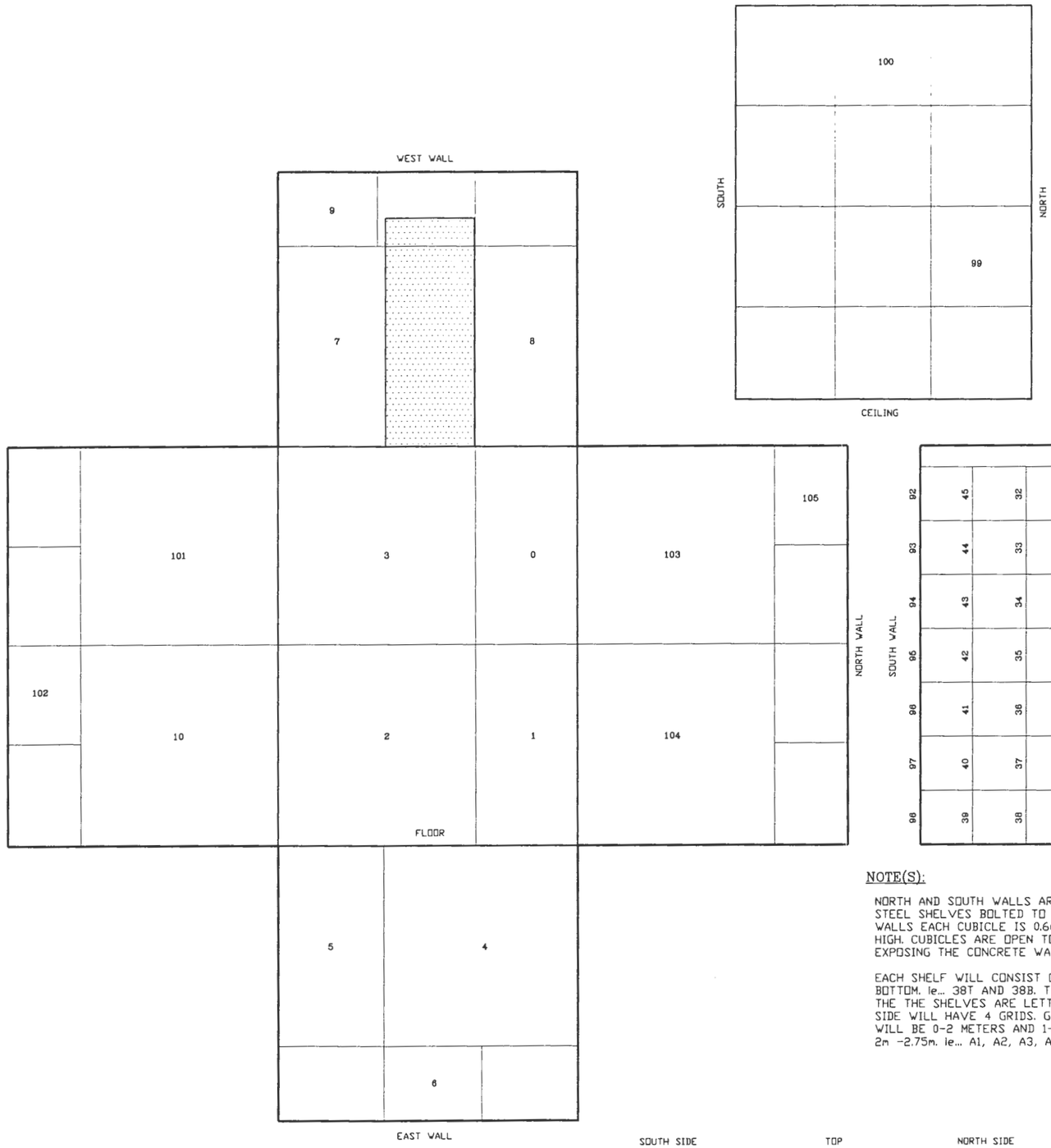

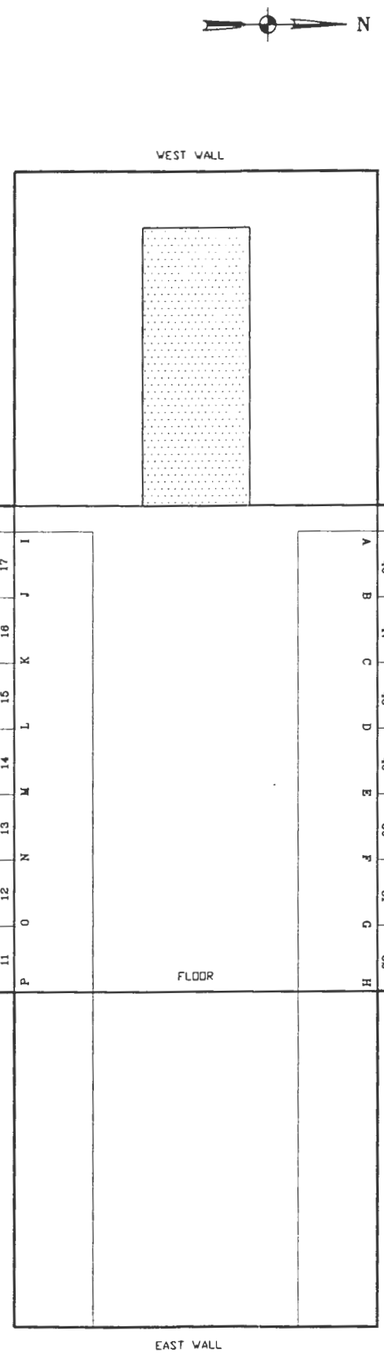

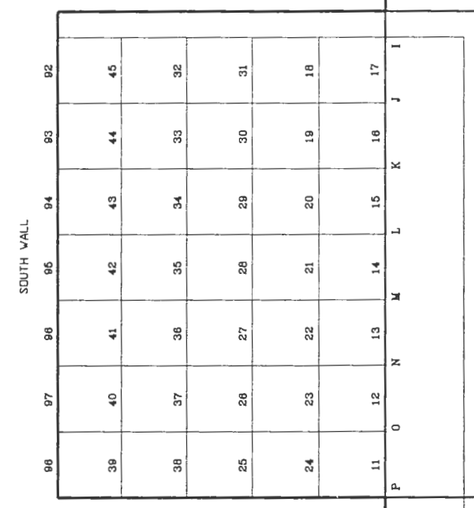

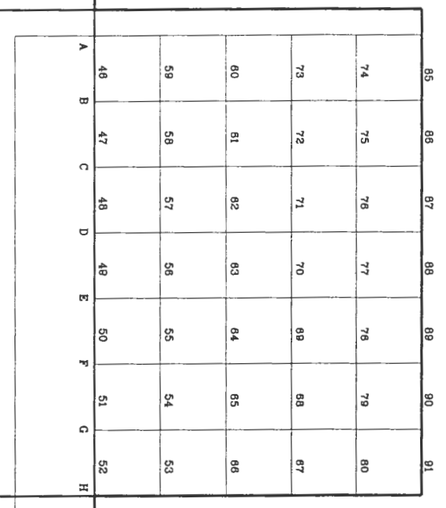

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-300, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 9/5/58.

NOTE(S):

NORTH AND SOUTH WALLS ARE LINED WITH STEEL SHELVES BOLTED TO THE FLOOR AND WALLS EACH CUBICLE IS 0.66m DEEP, 0.53m HIGH. CUBICLES ARE OPEN TO THE BACK, EXPOSING THE CONCRETE WALL BEHIND.

EACH SHELF WILL CONSIST OF A TOP AND BOTTOM. Ie... 38T AND 38B. THE SIDES OF THE THE SHELVES ARE LETTERED EACH SIDE WILL HAVE 4 GRIDS. GRID 0 AND 2 WILL BE 0-2 METERS AND 1-3 WILL BE 2m -2.75m. Ie... A1, A2, A3, A4.

SOUTH SIDE	TOP	NORTH SIDE	BOTTOM
84	83	82	81

ROOM 803-2

FEET 0 3 6
METERS 0 1 2
0 2' 4' 6'
(APPROX. SCALE FT.)

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SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
D+G NO 730047-01001

BUILDING 803
ROOM 803-2

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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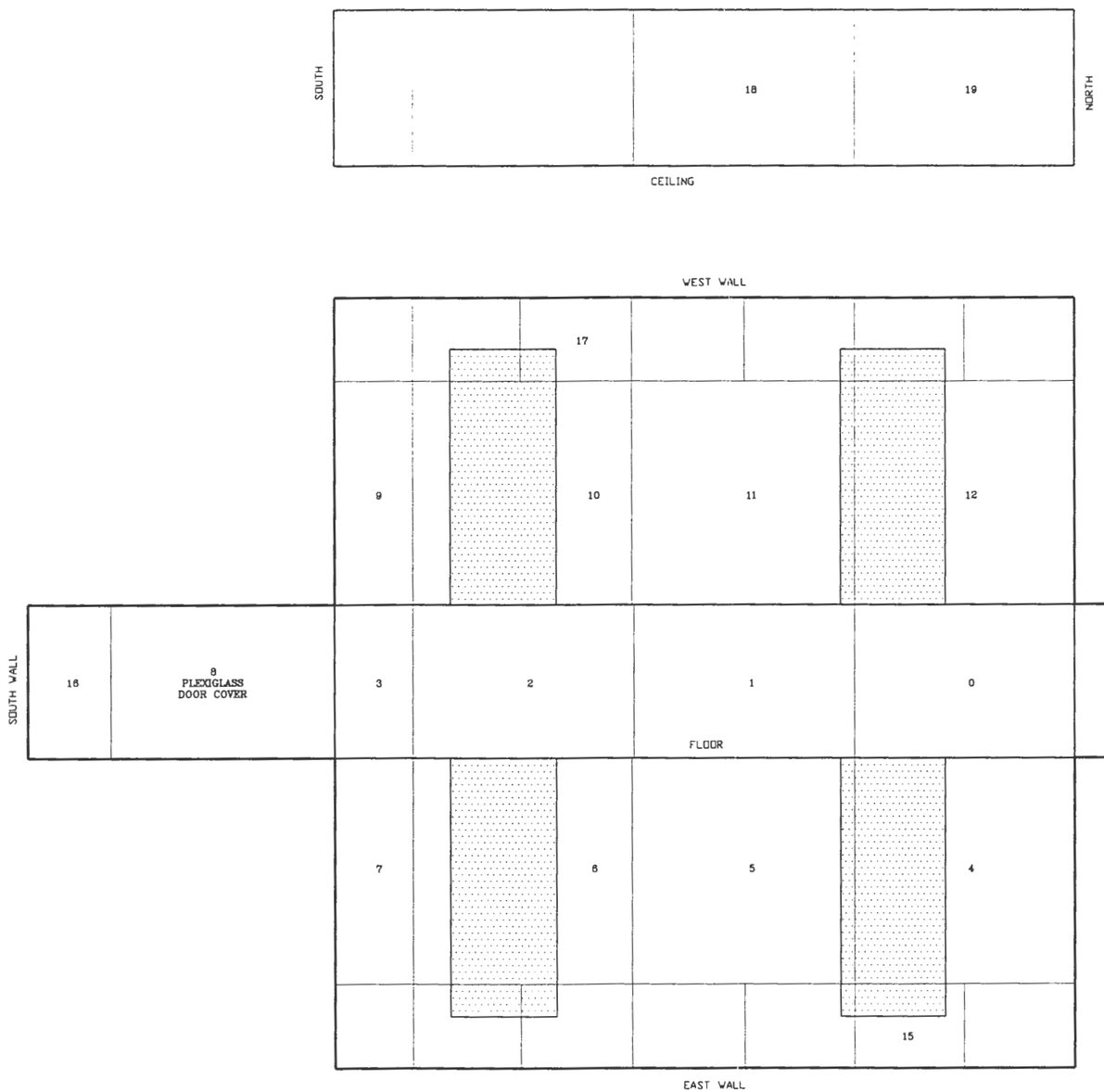

ROOM 803-3

N

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 2' 4' 6'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-300, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 9/5/58.

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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | Dwg No. 730047-01001

BUILDING 803
ROOM 803-3

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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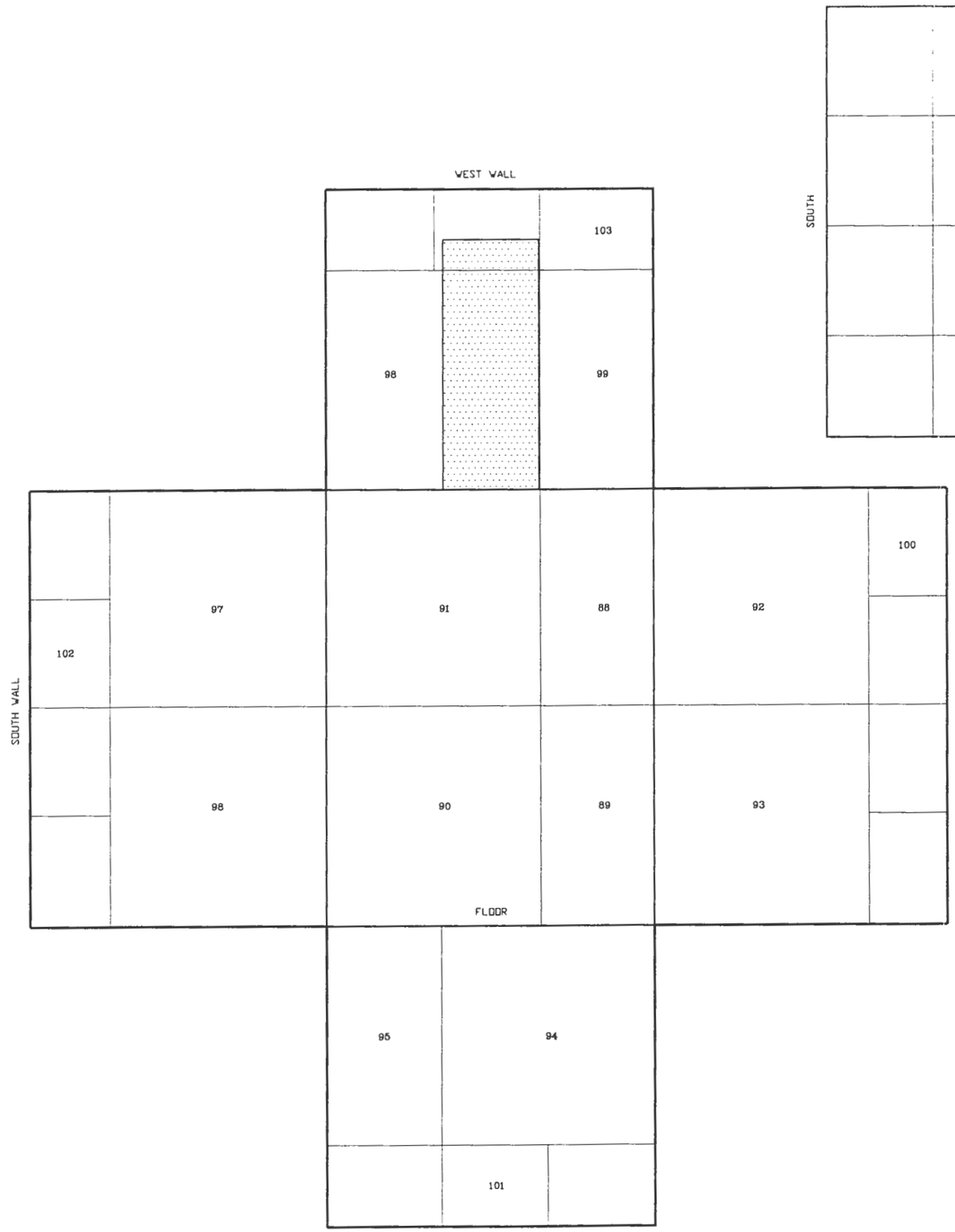
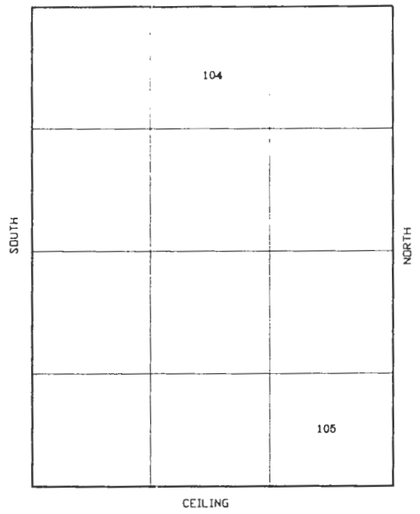
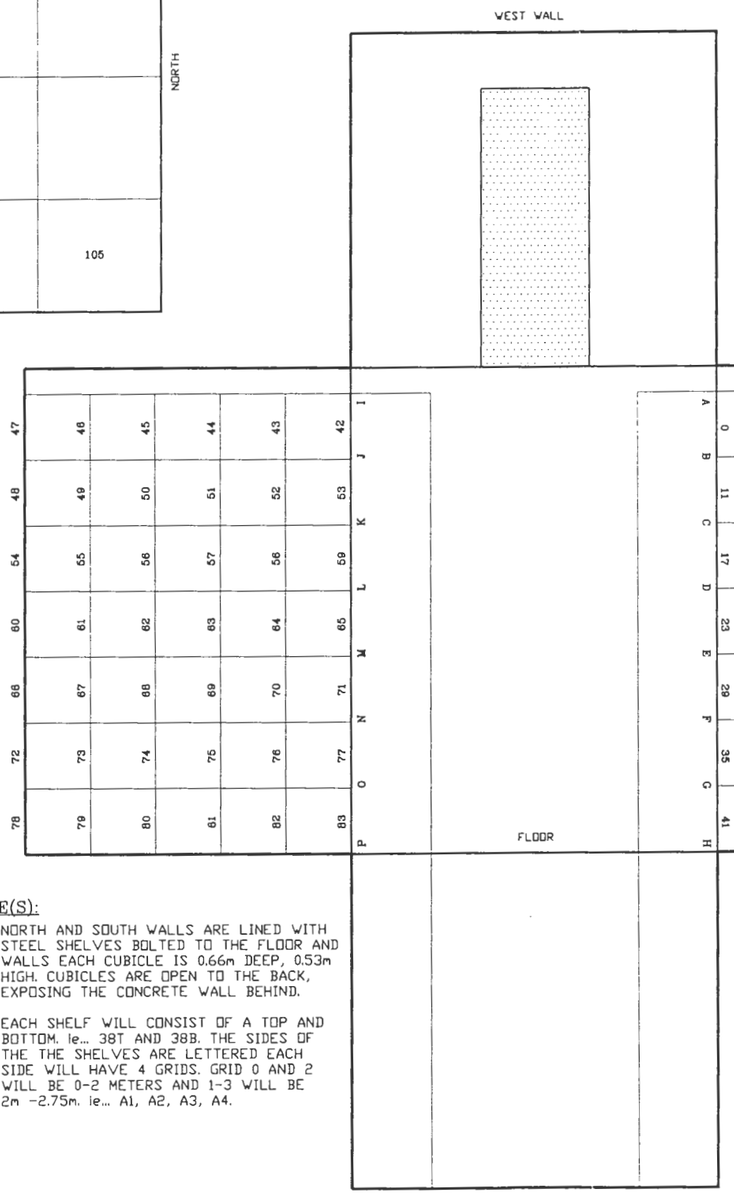
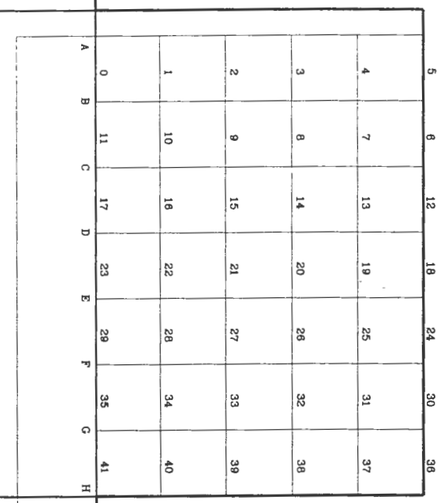


ROOM 803-4







NOTE(S):

NORTH AND SOUTH WALLS ARE LINED WITH STEEL SHELVES BOLTED TO THE FLOOR AND WALLS EACH CUBICLE IS 0.66m DEEP, 0.53m HIGH. CUBICLES ARE OPEN TO THE BACK, EXPOSING THE CONCRETE WALL BEHIND.

EACH SHELF WILL CONSIST OF A TOP AND BOTTOM. ie... 38T AND 38B. THE SIDES OF THE THE SHELVES ARE LETTERED EACH SIDE WILL HAVE 4 GRIDS. GRID 0 AND 2 WILL BE 0-2 METERS AND 1-3 WILL BE 2m -2.75m. ie... A1, A2, A3, A4.

SOUTH SIDE	TOP	NORTH SIDE	BOTTOM
87	88	85	84

N

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-300, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 9/5/58.

FEET 0 3 6
METERS 0 1 2

0 2' 4' 6'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
Dwg No 730047-01001

BUILDING 803
ROOM 803-4

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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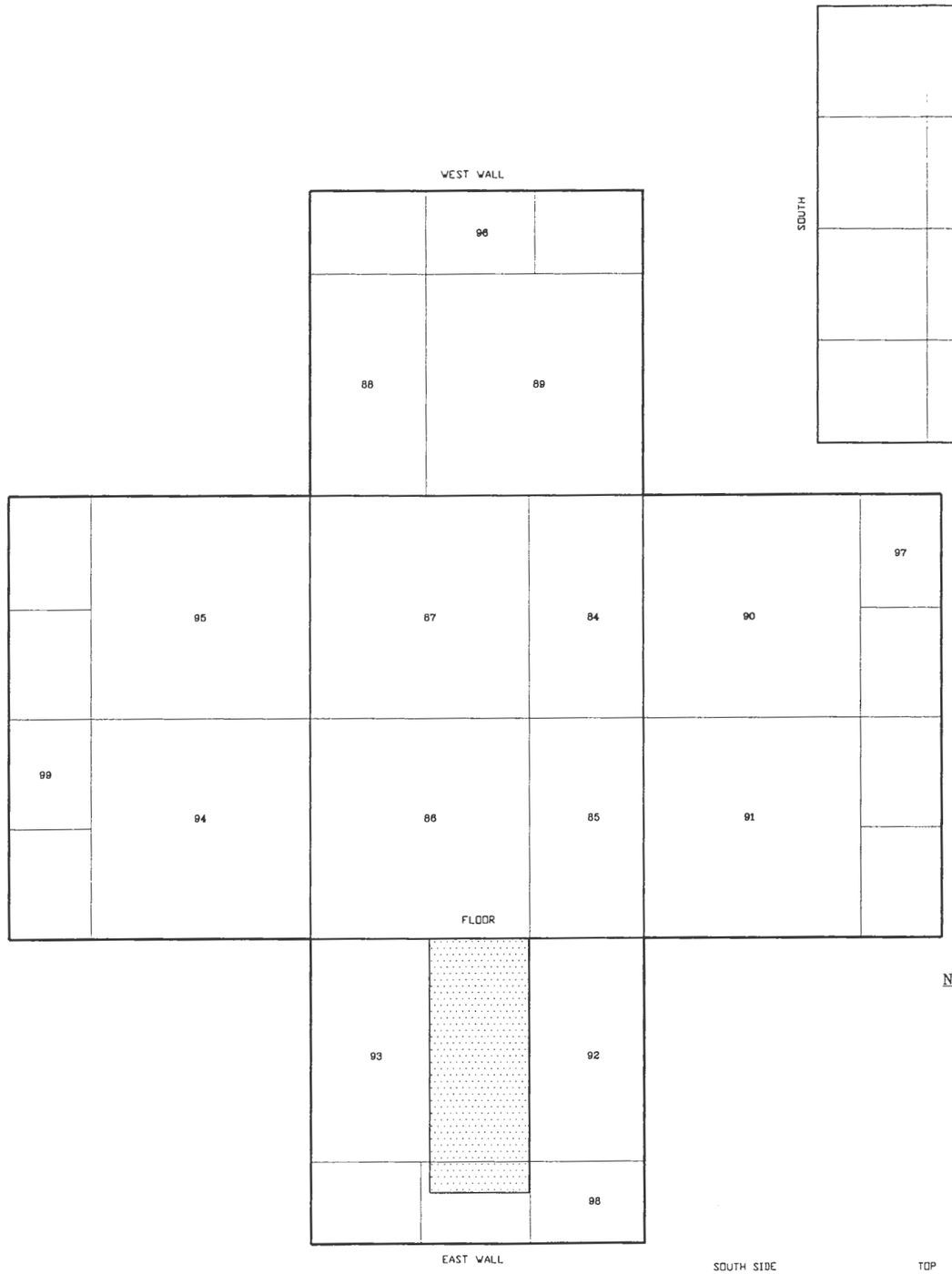
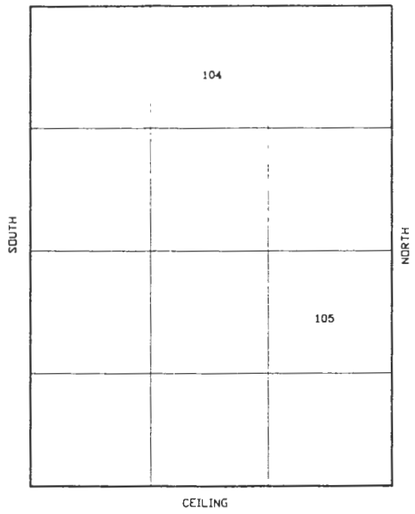
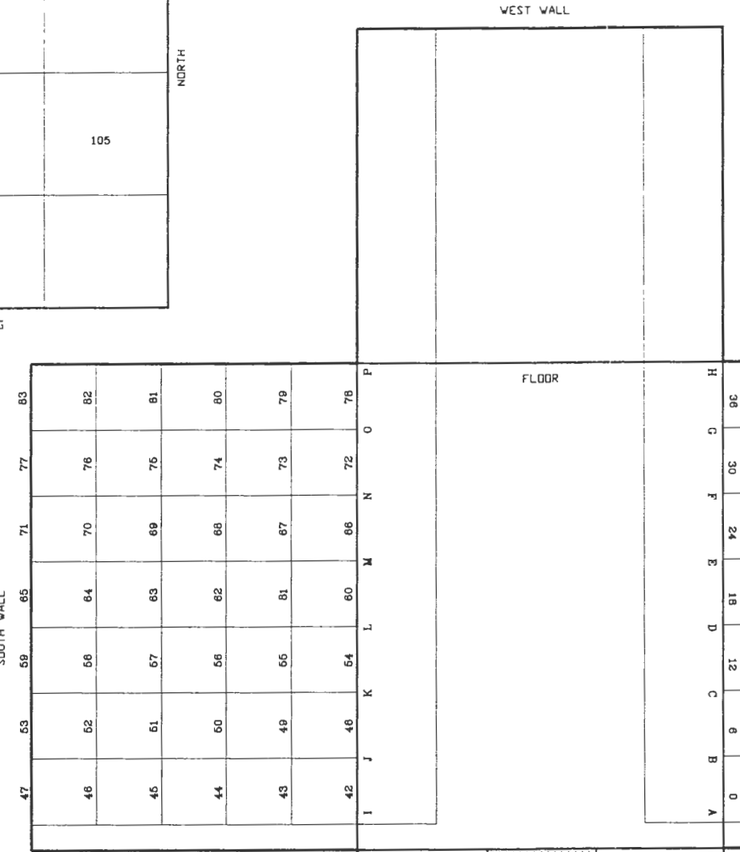


ROOM 803-5





NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-300, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 9/5/58.

NOTE(S):

NORTH AND SOUTH WALLS ARE LINED WITH STEEL SHELVES BOLTED TO THE FLOOR AND WALLS EACH CUBICLE IS 0.66m DEEP, 0.53m HIGH. CUBICLES ARE OPEN TO THE BACK, EXPOSING THE CONCRETE WALL BEHIND.

EACH SHELF WILL CONSIST OF A TOP AND BOTTOM. ie... 38T AND 38B. THE SIDES OF THE THE SHELVES ARE LETTERED EACH SIDE WILL HAVE 4 GRIDS. GRID 0 AND 2 WILL BE 0-2 METERS AND 1-3 WILL BE 2m -2.75m. ie... A1, A2, A3, A4.

SOUTH SIDE	TOP	NORTH SIDE	BOTTOM
100	101	102	103

FEET 0 3 6
METERS 0 1 2
0 2' 4' 6'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
D+Q NO 730047-01001

BUILDING 803
ROOM 803-5

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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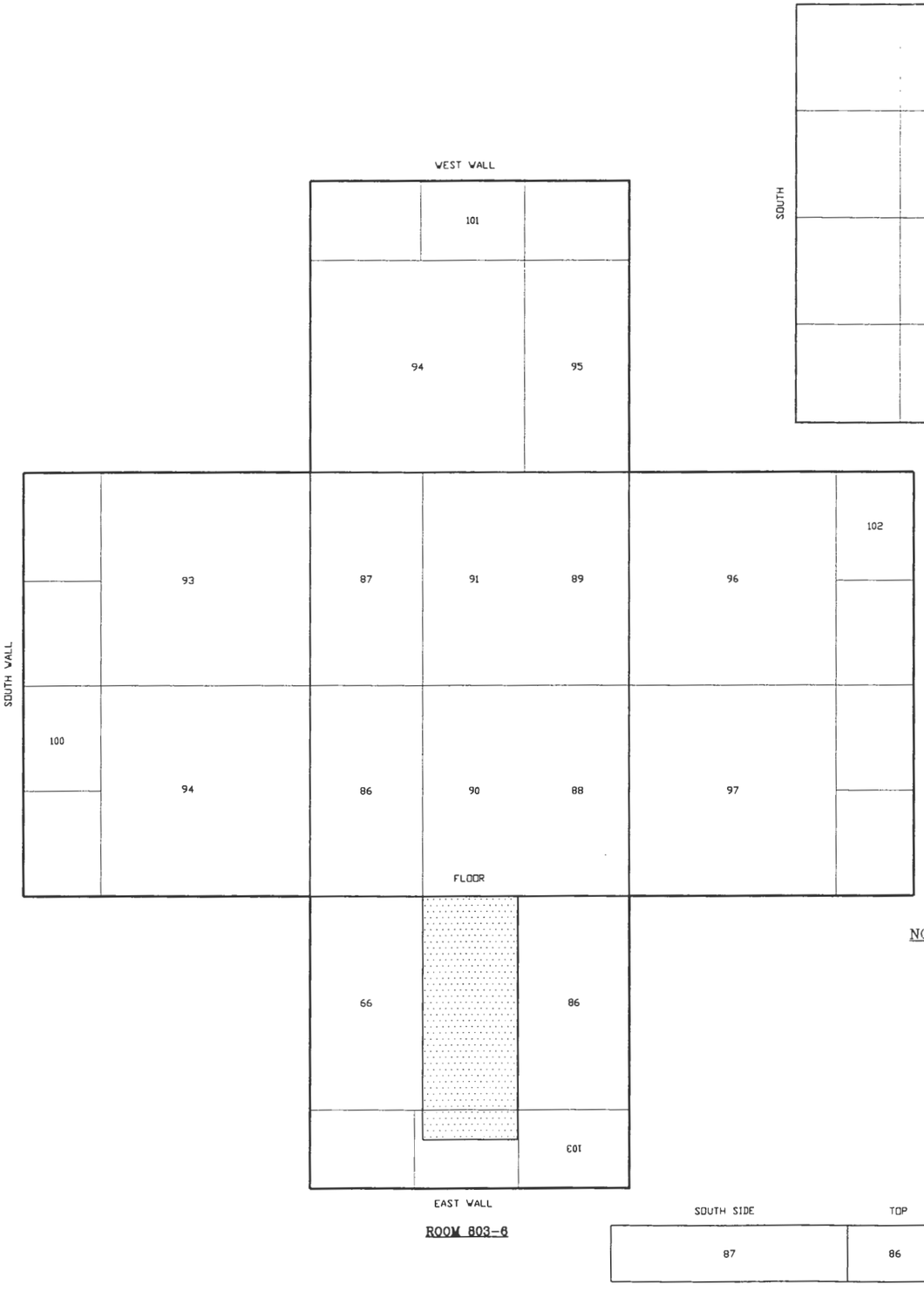
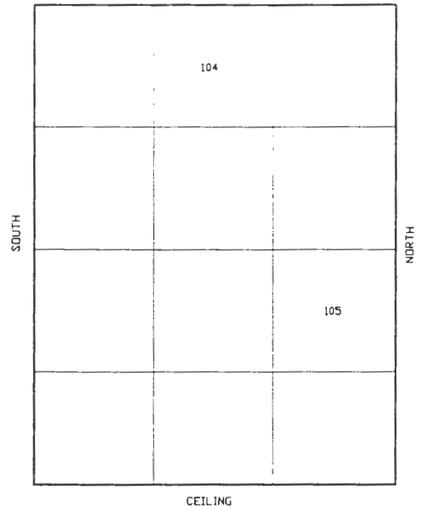
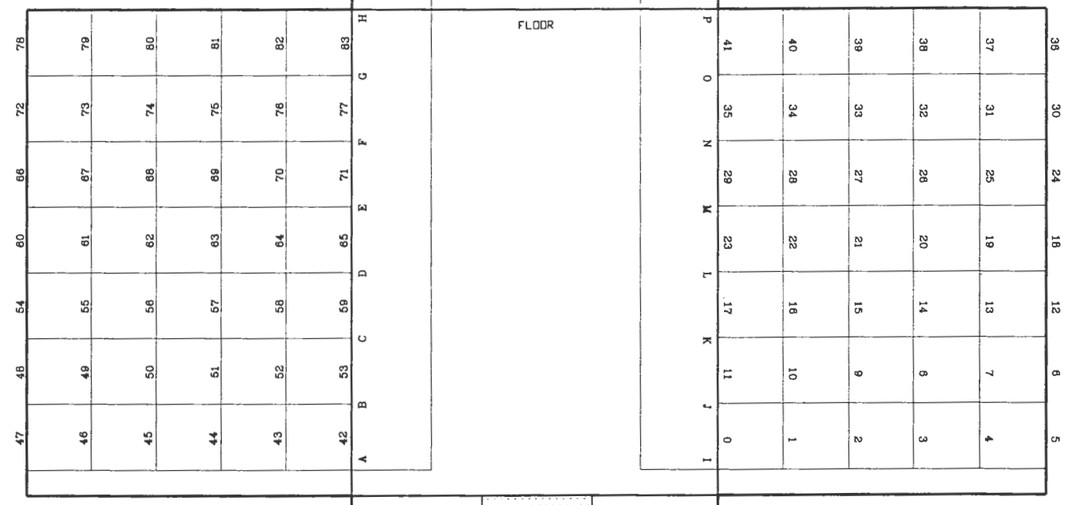
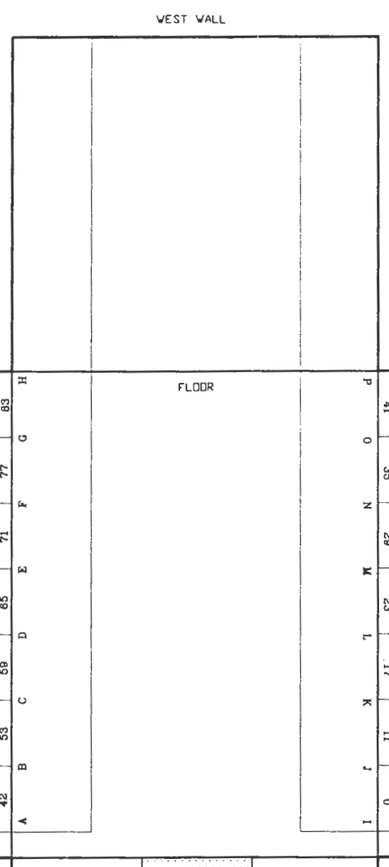








NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-300, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 9/5/58.

NOTE(S):

NORTH AND SOUTH WALLS ARE LINED WITH STEEL SHELVES BOLTED TO THE FLOOR AND WALLS EACH CUBICLE IS 0.66m DEEP, 0.53m HIGH. CUBICLES ARE OPEN TO THE BACK, EXPOSING THE CONCRETE WALL BEHIND.

EACH SHELF WILL CONSIST OF A TOP AND BOTTOM. Ie... 38T AND 38B. THE SIDES OF THE THE SHELVES ARE LETTERED EACH SIDE WILL HAVE 4 GRIDS. GRID 1 AND 2 WILL BE 0-2 METERS AND 3-4 WILL BE 2m -2.75m. Ie... A1, A2, A3, A4.

ROOM 803-6

SOUTH SIDE	TOP	NORTH SIDE	BOTTOM
87	86	85	94

FEET 0 3 6
METERS 0 1 2
0 2' 4' 6'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

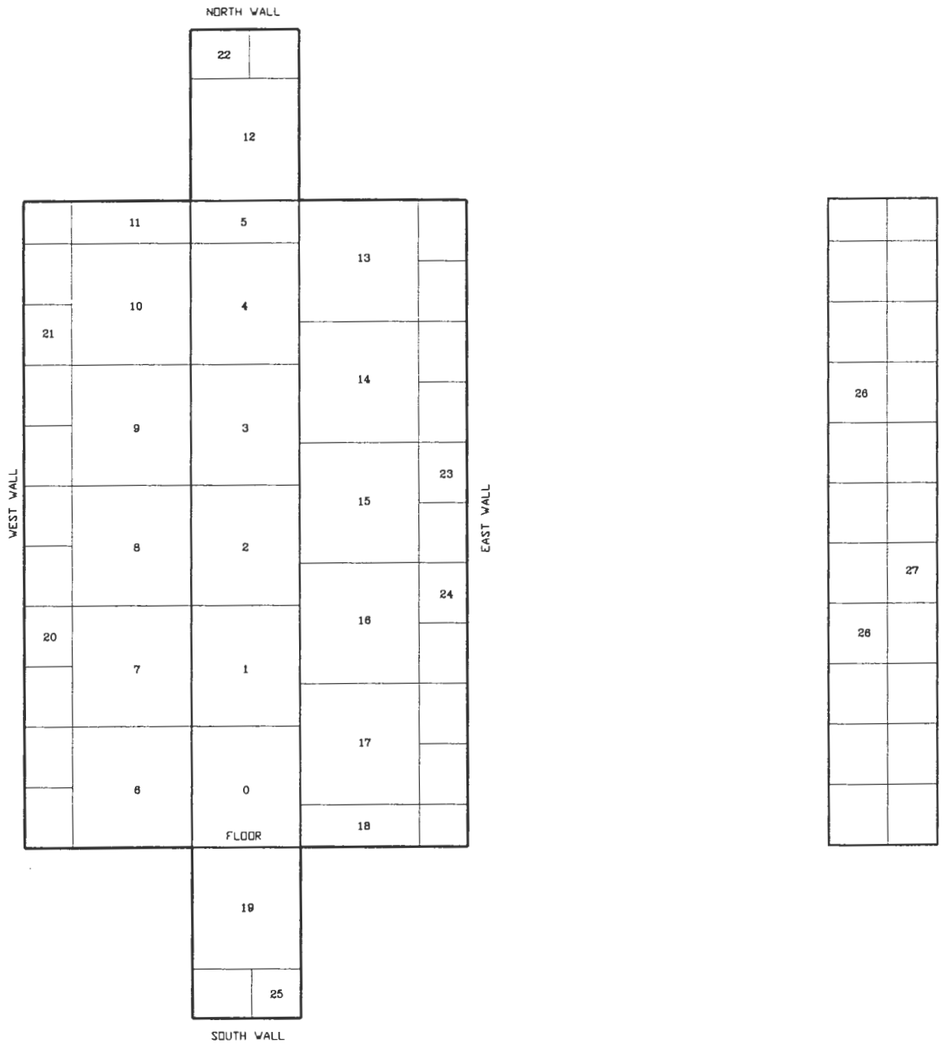
CLIENT/PROJECT TITLE
SENECA army DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
Dwg No 730047-01001

BUILDING 803
ROOM 803-6

SCALE AS NOTED
DATE FEBRUARY 2000
REV A

R:\SENECA\RFS\SD12\803-6.DWG



ROOM 803-7

N

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSIENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-300, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 9/5/58.

FEET 0 3 6
METERS 0 1 2

0 2' 4' 6'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING Dwg No. 730047-01001

BUILDING 803
ROOM 803-7

SCALE AS NOTED | DATE FEBRUARY 2000 | REV A

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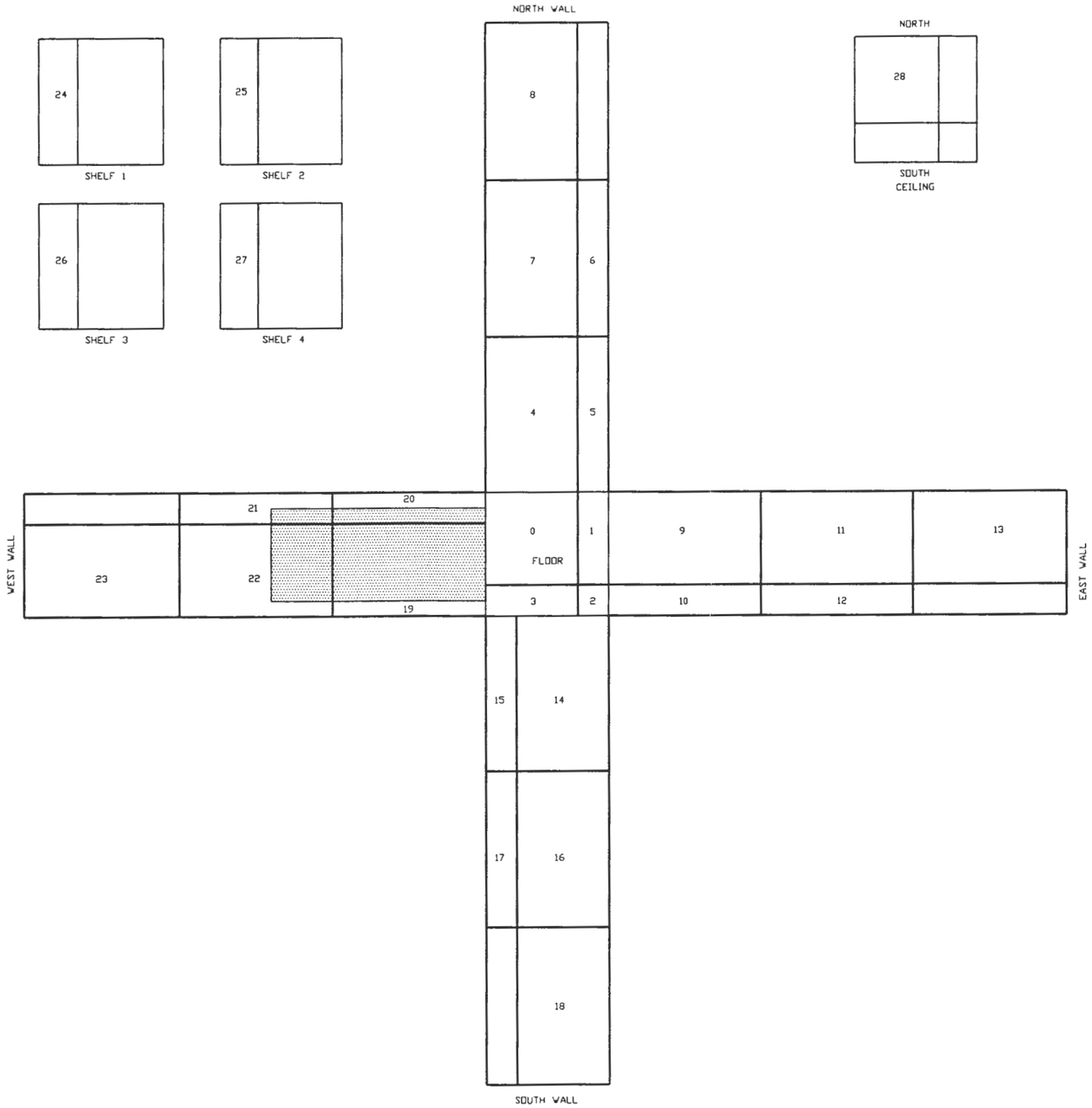

ROOM 804-1

N

NOTE:

CLASS ONE ROOM
1m x 1m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

— — — SUSPENDED CEILING

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-855, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. CAMPBELL DESIGN ARCH./ENG. PLANNERS FLOOR PLANS, DETAIL & SCHEDULES DRAWING NO. 10-87, SHEET M-1, PR. NO. 52-85, DATE: FEB. 18, 87.

FEET 0 3 6
METERS 0 1 2
0 2' 4' 6'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING Dwg. No. 7300047-01001

BUILDING 804
ROOM 804-1

SCALE AS NOTED | DATE OCTOBER 1990 | REV A

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NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

N

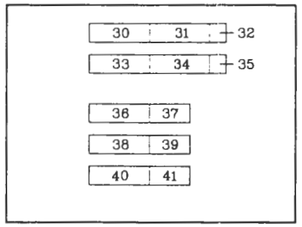
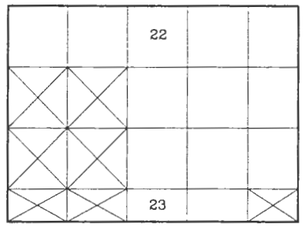
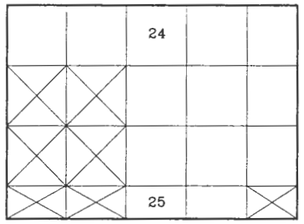


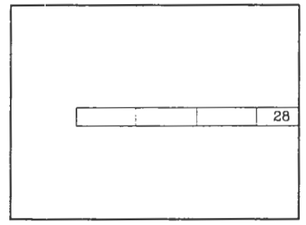
TABLE TOP SURFACES



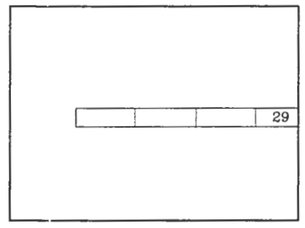
SUSPENDED CEILING - BOTTOM



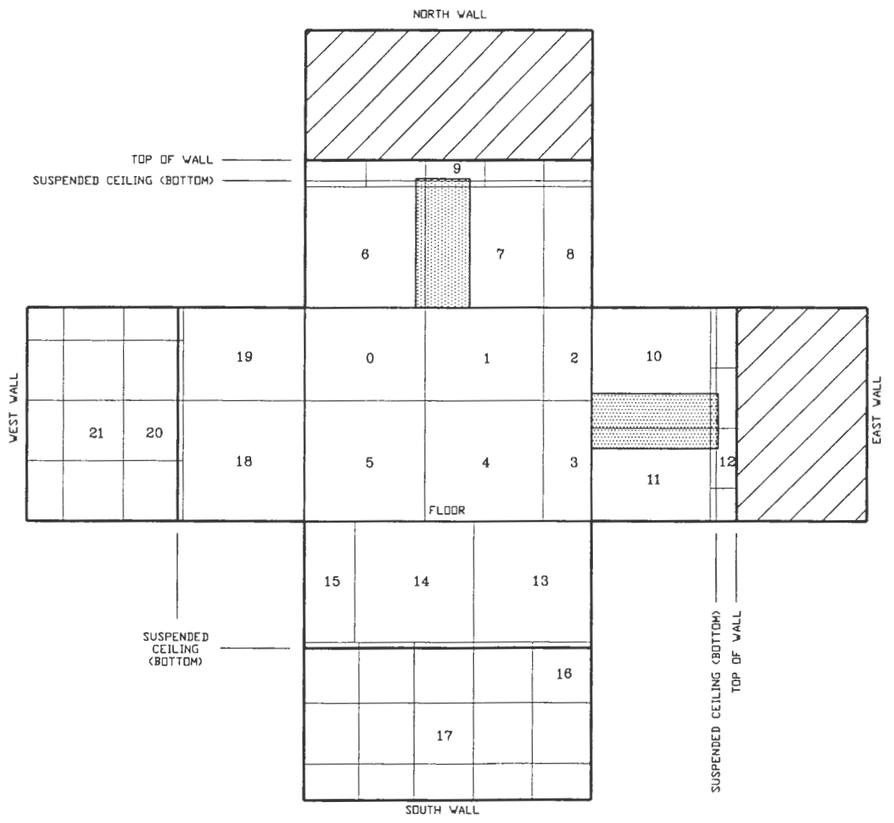
SUSPENDED CEILING - TOP

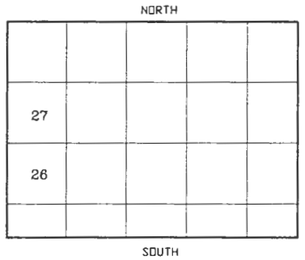


DUCTWORK - BOTTOM



DUCTWORK - TOP





METAL CEILING

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-855, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. CAMPBELL DESIGN ARCH./ENG. PLANNERS FLOOR PLANS, DETAIL & SCHEDULES DRAWING NO. 10-87, SHEET M-1, PR. NO. 52-85, DATE: FEB. 18, 87.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING D+O NO 730047-01001

BUILDING 804
ROOM 804-2

SCALE AS NOTED | DATE FEBRUARY 2000 | REV A

ROOM 804-2

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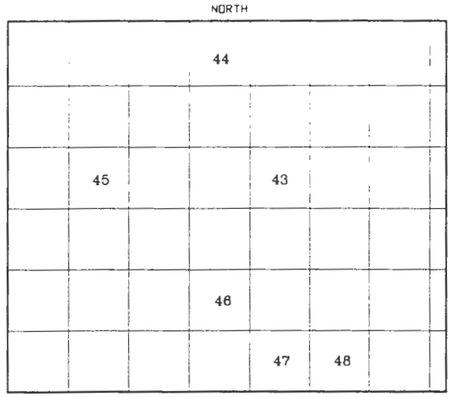
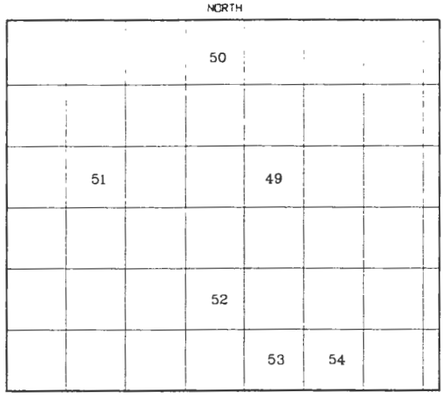
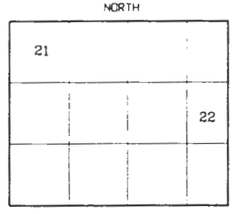
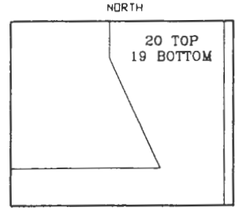
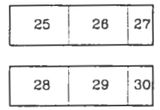
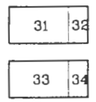












NOTE:

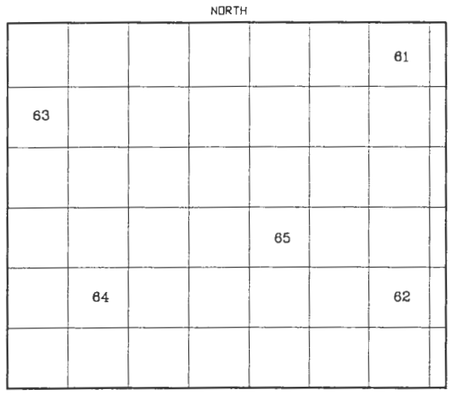
CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

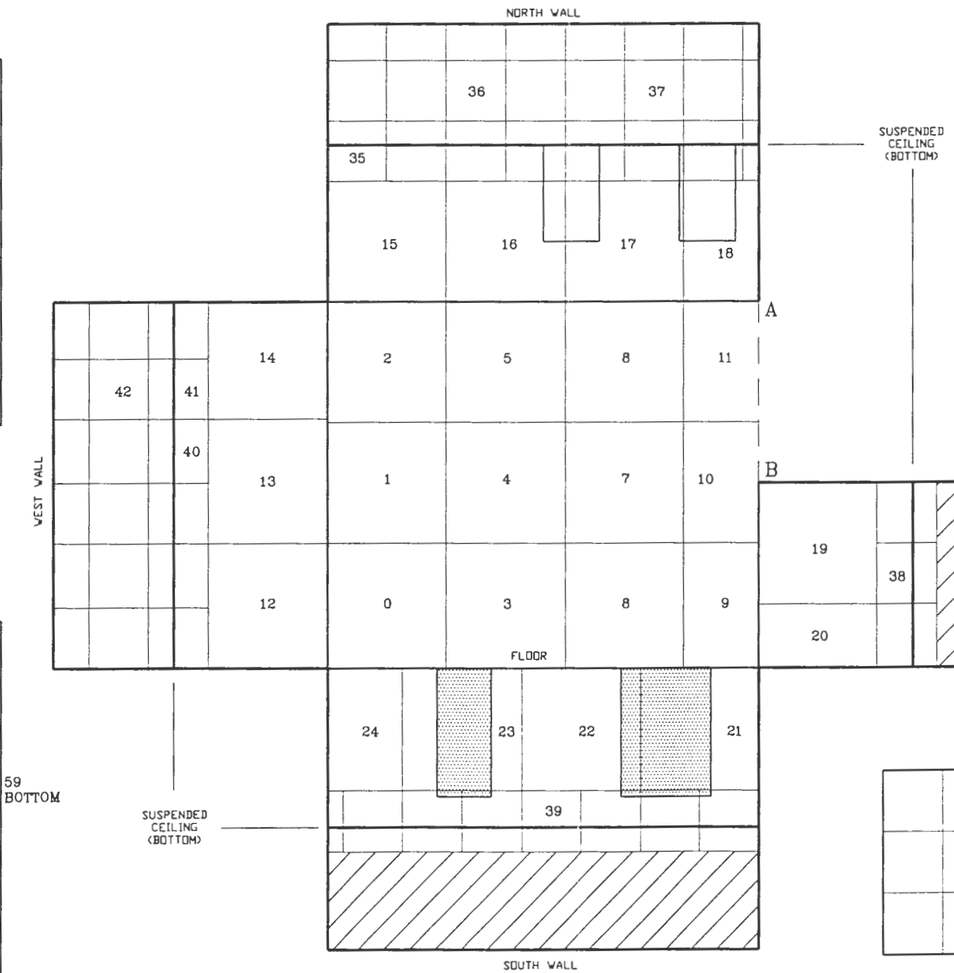
1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

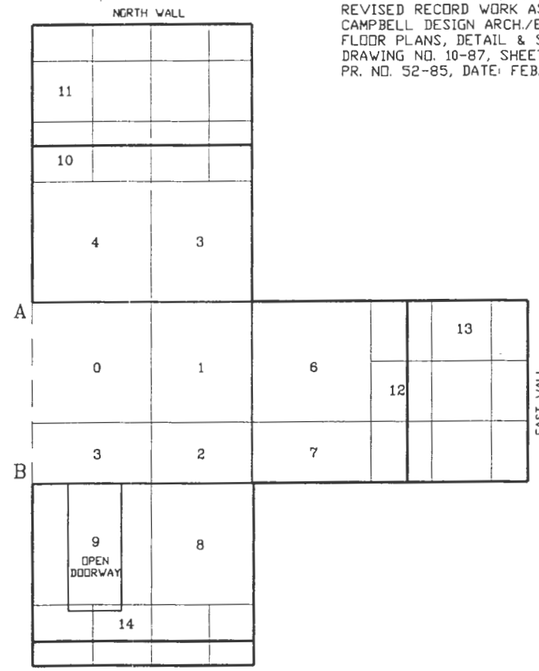
NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-855, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. CAMPBELL DESIGN ARCH./ENG. PLANNERS FLOOR PLANS, DETAIL & SCHEDULES DRAWING NO. 10-87, SHEET M-1, PR. NO. 52-85, DATE: FEB. 18, 87.

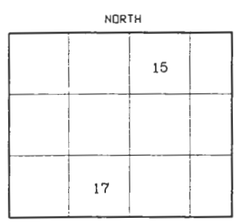


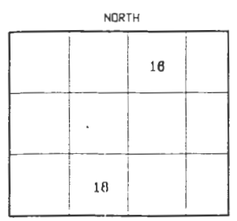


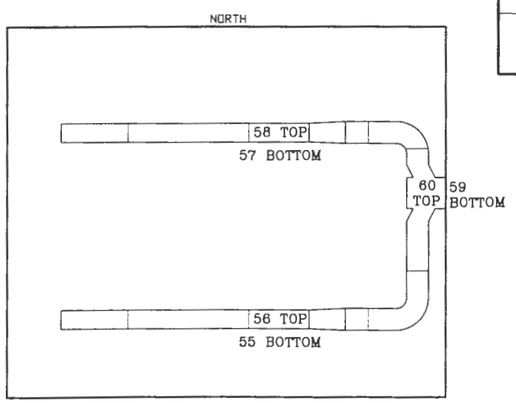
ROOM 804-3A



ROOM 804-3B







FEET 0 3 6
METERS 0 1 2
0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING D+Q NO 750047-01001

BUILDING 804
ROOM 804-3 A AND B

SCALE AS NOTED | DATE FEBRUARY 2000 | REV A

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NOTE:

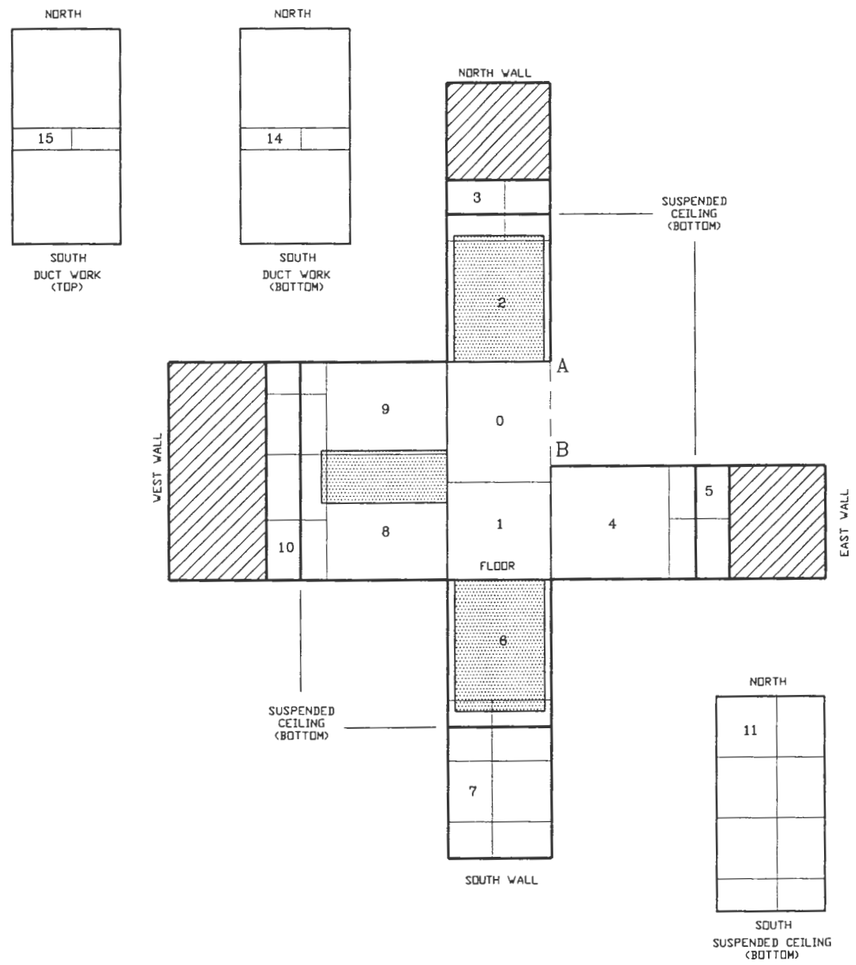
CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

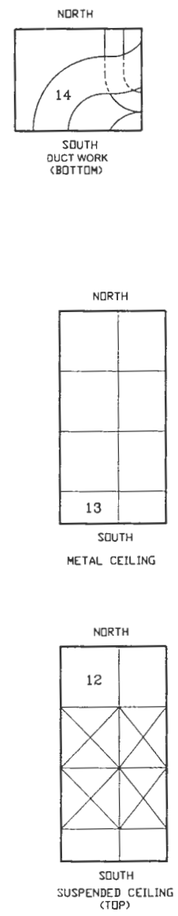
DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

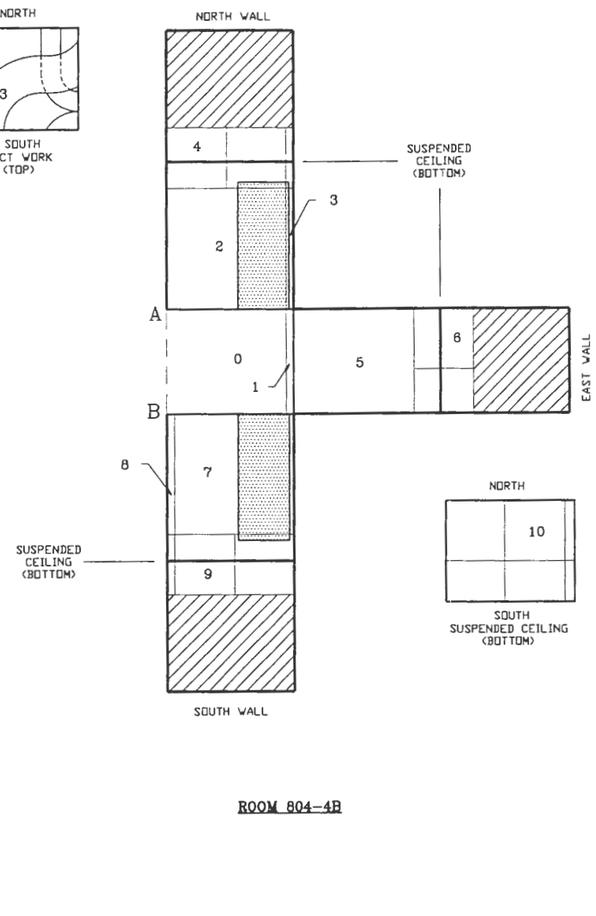
SUSPENDED CEILING

N

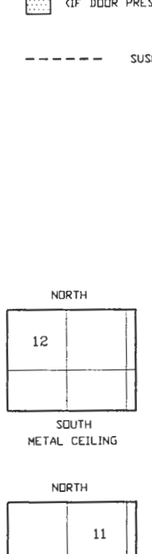


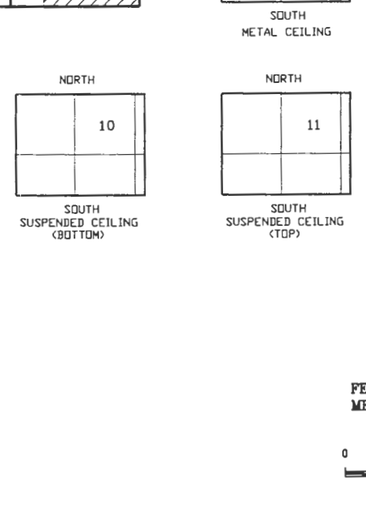
ROOM 804-4A





ROOM 804-4B





FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-855, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. CAMPBELL DESIGN ARCH./ENG. PLANNERS FLOOR PLANS, DETAIL & SCHEDULES DRAWING NO. 10-87, SHEET M-1, PR. NO. 52-85, DATE: FEB. 18, 87.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | D&D NO. 730047-01001

BUILDING 804
ROOM 804-4 A AND B

SCALE AS NOTED | DATE FEBRUARY 2000 | REV A

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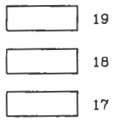
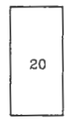
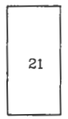
SHELVING ON WEST WALL





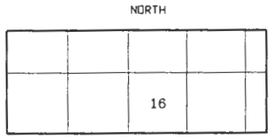
BATHROOM STALL DOOR (FRONT)

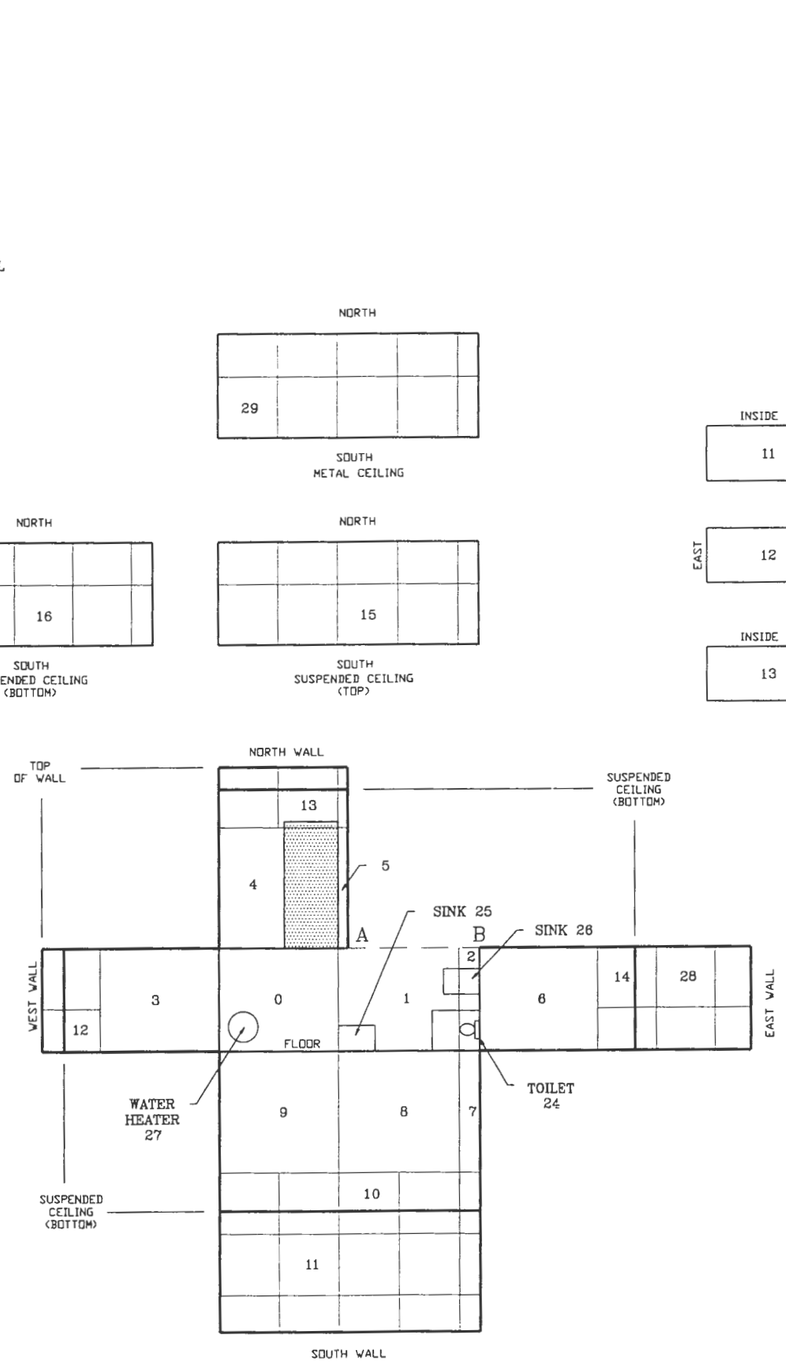


BATHROOM STALL DOOR (BACK)

SIDE OF BATHROOM STALL (FRONT)

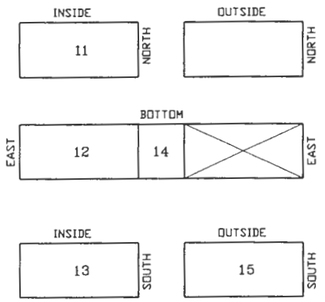
SIDE OF BATHROOM STALL (BACK)

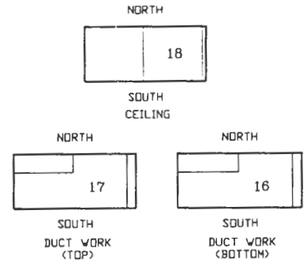


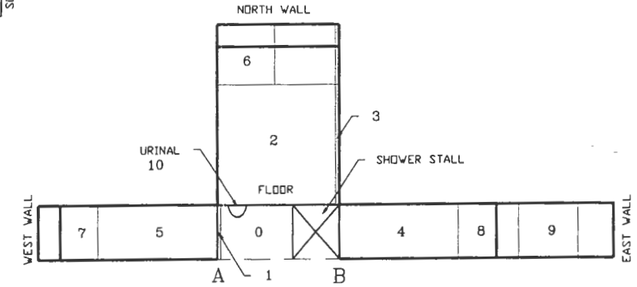


ROOM 804-5A

SHOWER STALL







ROOM 804-5B

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

N

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-855, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. CAMPBELL DESIGN ARCH./ENG. PLANNERS FLOOR PLANS, DETAIL & SCHEDULES DRAWING NO. 10-87, SHEET M-1, PR. NO. 52-85, DATE: FEB. 18, 87.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | D+Q NO 730047-01001

BUILDING 804
ROOM 804-5 A AND B

SCALE AS NOTED | DATE OCTOBER 1990 | REV A

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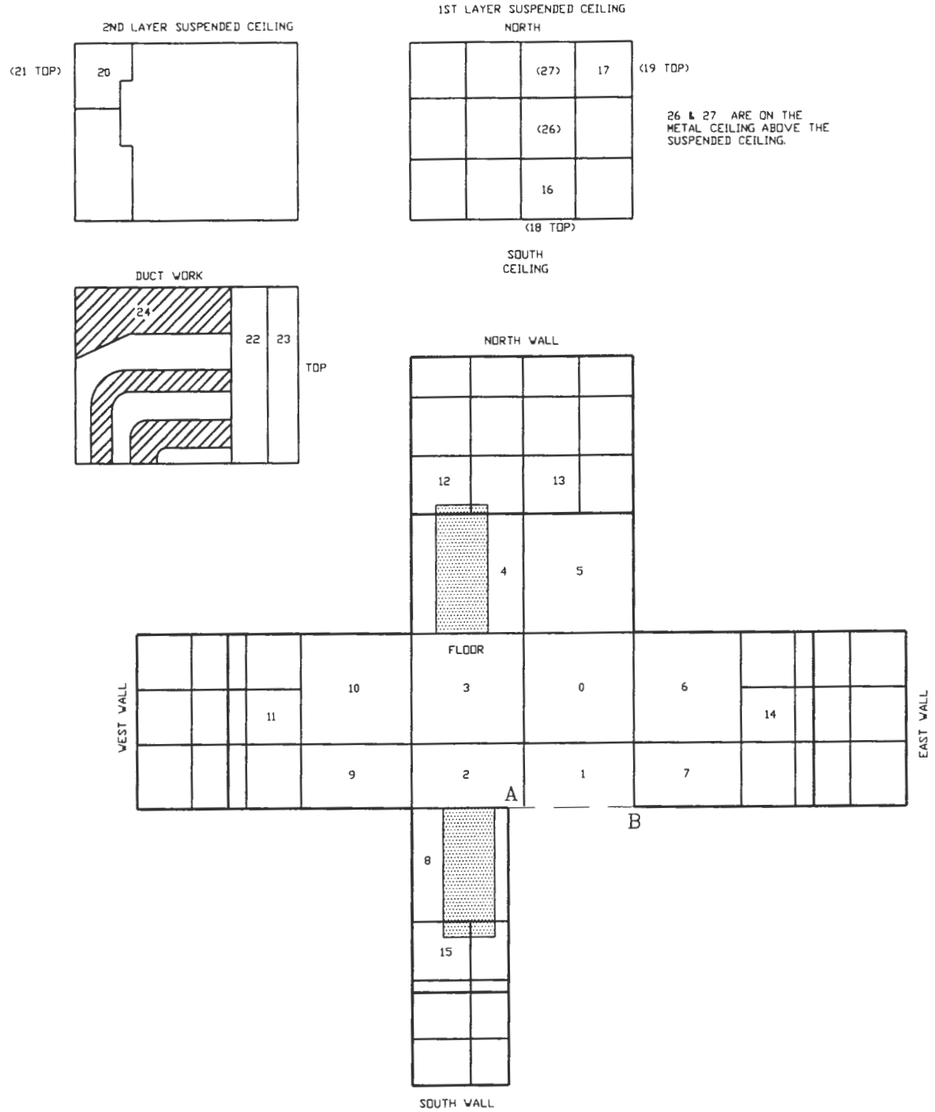
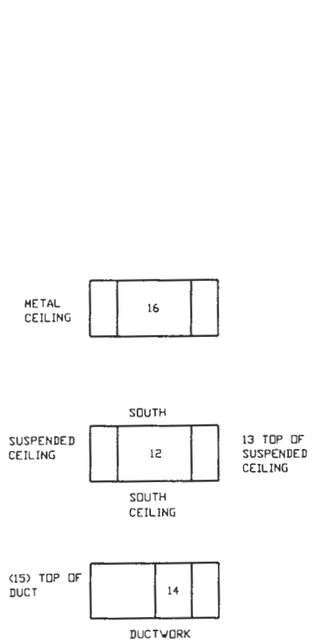
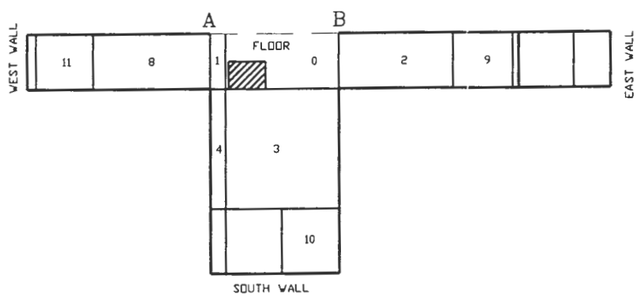


ROOM 804-6A





ROOM 804-6B

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSIENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

— — — SUSPENDED CEILING

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-855, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. CAMPBELL DESIGN ARCH./ENG. PLANNERS FLOOR PLANS, DETAIL & SCHEDULES DRAWING NO. 10-87, SHEET M-1, PR. NO. 52-85, DATE: FEB. 18, 87.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING
D+O NO: 730047-01001

BUILDING 804
ROOM 804-6 A AND B

SCALE: AS NOTED
DATE: OCTOBER 1990
REV: A

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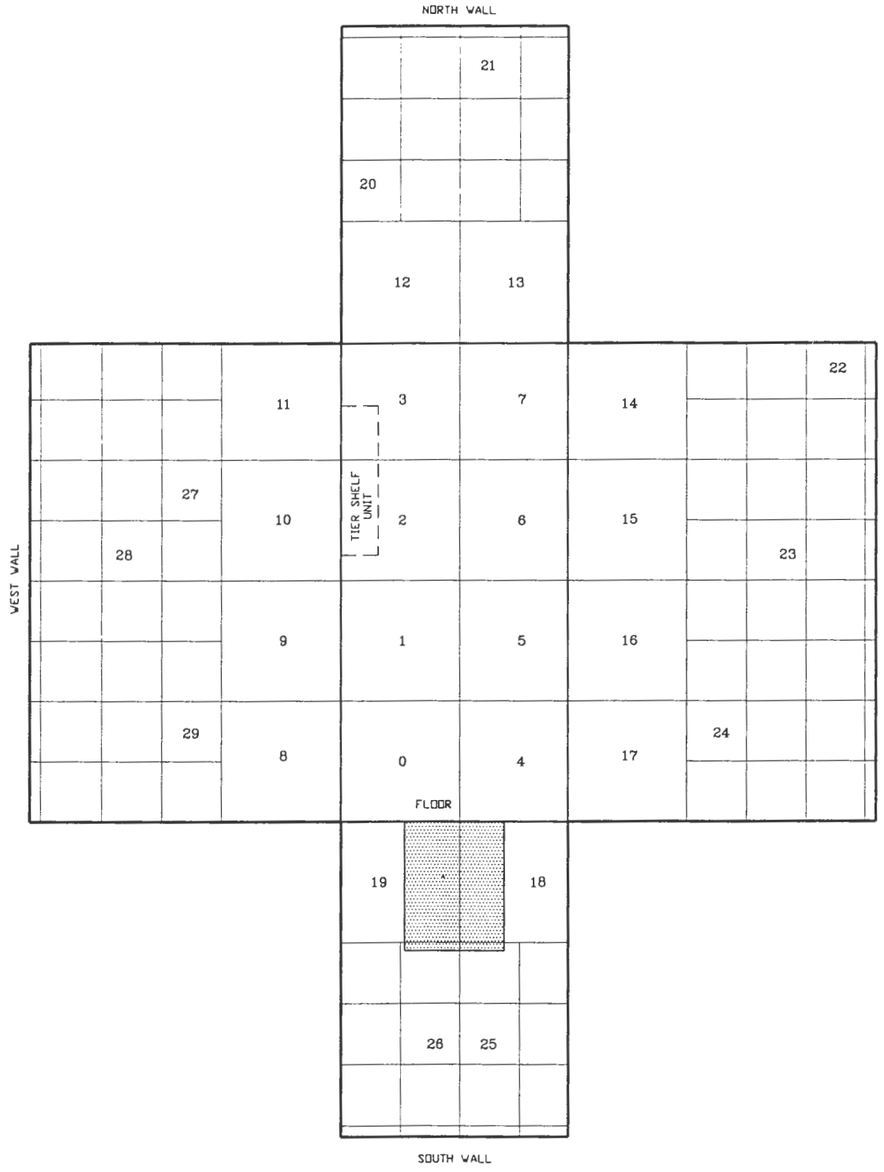
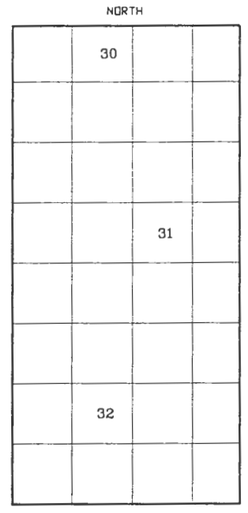


ROOM 805-1



NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-855, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. CAMPBELL DESIGN ARCH./ENG. PLANNERS FLOOR PLANS, DETAIL & SCHEDULES DRAWING NO. 10-87, SHEET M-1, PR. NO. 52-85, DATE: FEB. 18, 87.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | D+D NO. 750047-01001

BUILDING 805
ROOM 805-1

SCALE AS NOTED | DATE DECEMBER 1990 | REV A

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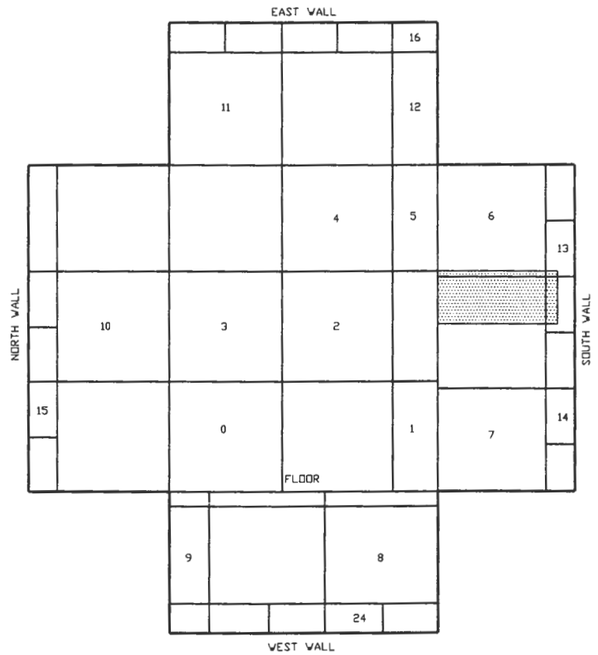
Note:

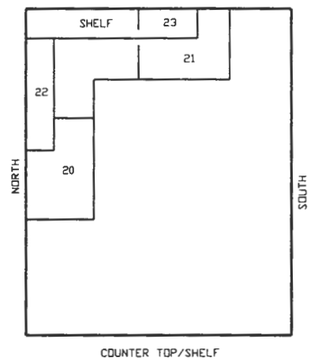
CLASS II ROOM
2m X 2m GRIDS, 50% COVERAGE

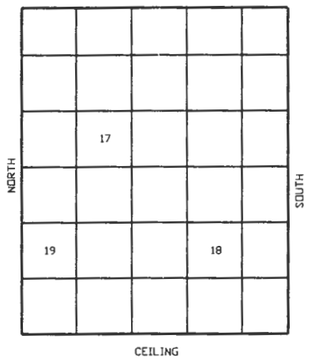
FLOOR
WALL SURFACES BELOW 2m.
ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS II SURVEY UNIT.
INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m X 1m GRIDS, 10% COVERAGE

CEILING (SUSPENDED AND NONSUSPENDED).
UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE).
ROOFS







NOTE:
COUNTER TOP IS 0.90m ABOVE FLOOR.
SHELF IS 1.52m ABOVE FLOOR.

BLDG. 806-1

NOTE(S):
BUILDING INFORMATION REFERENCED FROM MAJOR CORP. OF ENG. DRAWING NO. MISC. 275. RECORD DRAWING AS-BUILT YEAR 1959.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
Dwg No 750047-01001

BUILDING 806
ROOM 806-1

SCALE AS NOTED | DATE OCTOBER 1999 | REV A

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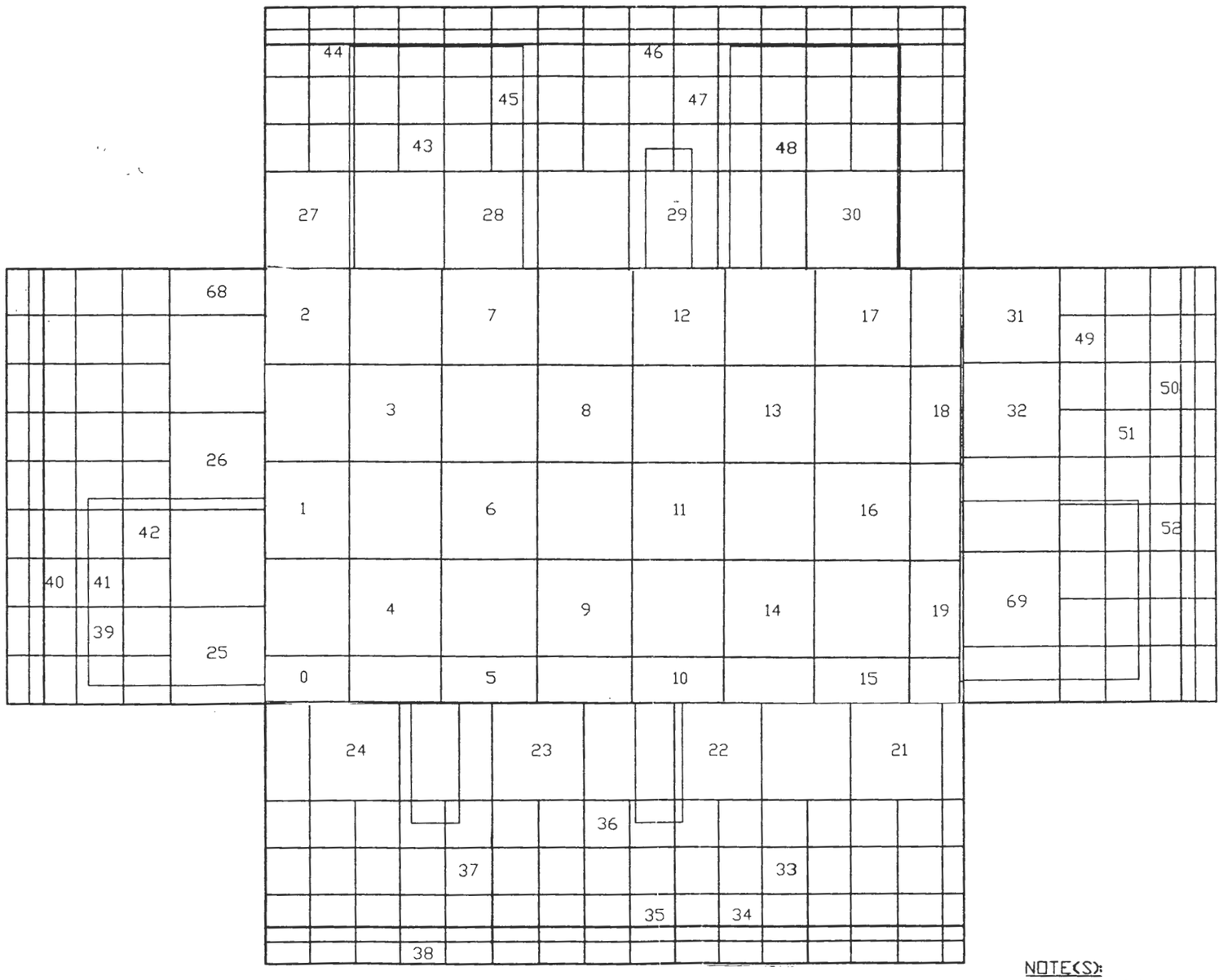
Note:

CLASS TWO ROOM 2m X 2m GRIDS, 50% COVERAGE

FLOOR
WALL SURFACES BELOW 2m
ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m X 1m GRIDS, 10% COVERAGE

CEILING (SUSPENDED AND NONSUSPEENDED)
UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
ROOFS



BLDG. 810-1
FLOOR

FEET 0 3 6
METERS 0 1 2
0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BLACK & VEACH CONSULTING ENGINEERS
PLAN & ELEVATIONS DRAWING NO. Y2-359,
DATE: MAY 2, 1955.
VENTILATION & AIR CONDITIONING SYSTEM
DRAWING NO. 24-71, PR4-71, DATE: OCT. 21, 1971.
BLACK & VEACH CONSULTING ENGINEERS
REVISION RECORD WORK AS-BUILT JUNE 2, 1958.
DRAWING NO. Y2-625.
GALSON & GALSON CONSULTING ENGINEERS,
FLOOR PLAN MECHANICAL, DRAWING NO. 26-88,
SHEET NO. 5 OF 6, PR. NO. 35-86,
DATE: MAY 12, 1988.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA army DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING | Proj. No. 750047-01001

BUILDING 810
ROOM 810-1
FLOOR

SCALE: AS NOTED | DATE: OCTOBER 1990 | REV: A

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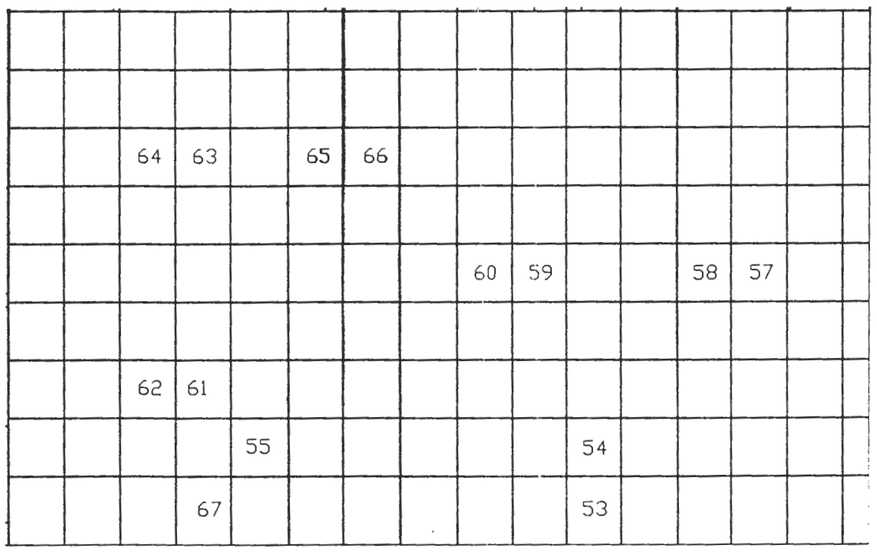
Note:

CLASS II ROOM
2m X 2m GRIDS, 100% COVERAGE

FLOOR
WALL SURFACES BELOW 0m
ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS THIS SURVEY UNIT.
SATISFACTORY HORIZONTAL SURFACES ABOVE 0m.

1m X 1m GRIDS, 10% COVERAGE

CEILING (SUSPENDED AND NONSUSPENDED)
UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
ROOFS



BLDG. 810-1
CEILING

NOTE(S):

BLACK & VEACH CONSULTING ENGINEERS
PLAN & ELEVATIONS DRAWING NO. Y2-359,
DATE: MAY 2, 1955.
VENTILATION & AIR CONDITIONING SYSTEM
DRAWING NO. 24-71, PR4-71, DATE: OCT. 21, 1971.
BLACK & VEACH CONSULTING ENGINEERS
REVISION RECORD WORK AS-BUILT JUNE 2, 1958.
DRAWING NO. Y2-625.
GALSON & GALSON CONSULTING ENGINEERS,
FLOOR PLAN MECHANICAL, DRAWING NO. 26-88,
SHEET NO. 5 OF 6, PR. NO. 35-86,
DATE: MAY 12, 1988.

FEET 0 3 6
METERS 0 1 2
0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING | Dwg. No. 730047-01001

BUILDING 810
ROOM 810-1
CEILING

SCALE: AS NOTED | DATE: MARCH 2000 | REV: A

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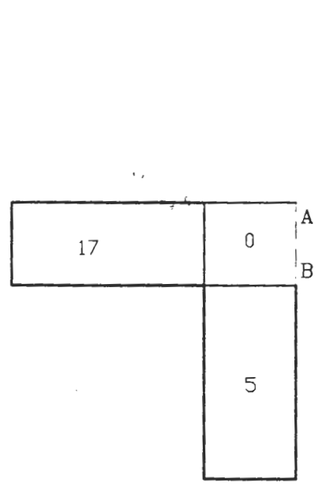
Note

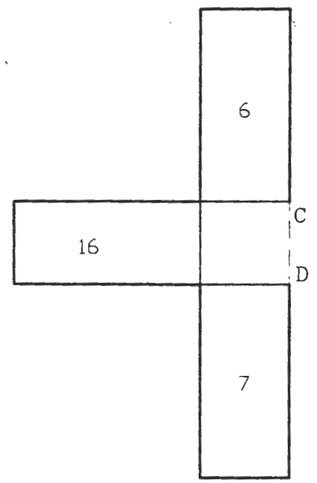
CLASS TWO ROOM
2m X 2m GRIDS, 50% COVERAGE

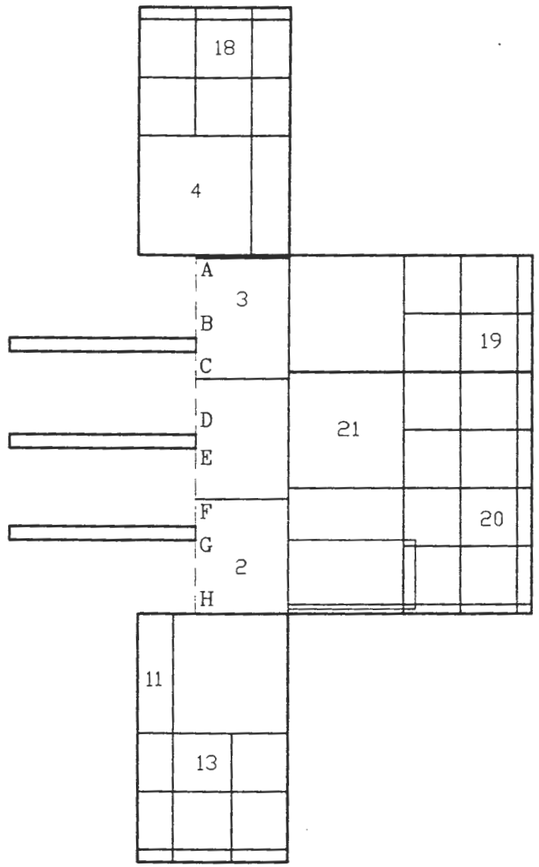
FLOOR
WALL SURFACES BELOW 2m
ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
INTERIOR HORIZONTAL SURFACES ABOVE 2m.

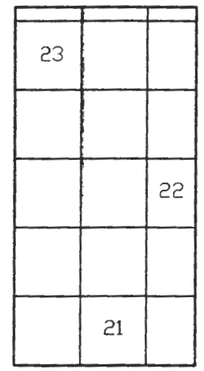
1m X 1m GRIDS, 10% COVERAGE

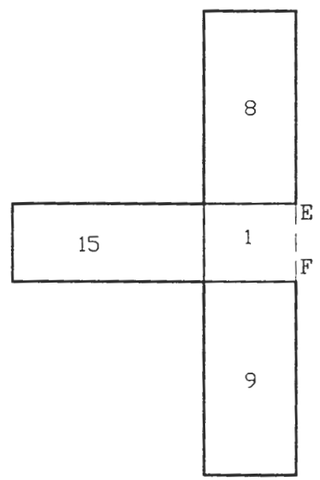
CEILING (SUSPENDED AND NONSUSPENDED)
UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
ROOFS

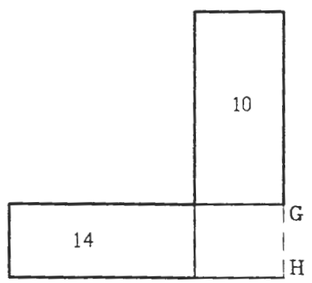












BLDG. 812-32

NOTE(S):

BUILDING INFORMATION REFERENCED FROM RECORD DRAWING OF WORK-AS-BUILT SEP. 5, 1958, DRAIWNG NO. Y2-632.2, AND DRAWING FROM MACKNIGHT-FULIGNI-FRANGOLA ARCHITECTS ROBINSON & WOESE INC. CONSULTING ENGINEERS. SHEET NO. P1 (4 OF 7), DRAWING NO. 15-82, FEB. 12, 1982.
OFFICE OF FACILITES ENGINEER
AIR CONDITIONING & DETAILS DRAWING NO. 15.82 SHEET NO. HVAC-2 (7 OF 7), PR NO. 50-21, DATE FEB. 12, 1982.
OFFICE OF FACILITES ENGINEER
SHEET TITLE CHANGE ORDER #3, PR. NO. 50-81 DRAWING NO. 15-82, DATE FEB. 17, 1983.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | Dwg. No. 790047-01808

BUILDING 812
ROOM 812-32

SCALE AS NOTED | DATE OCTOBER 1990 | REV A

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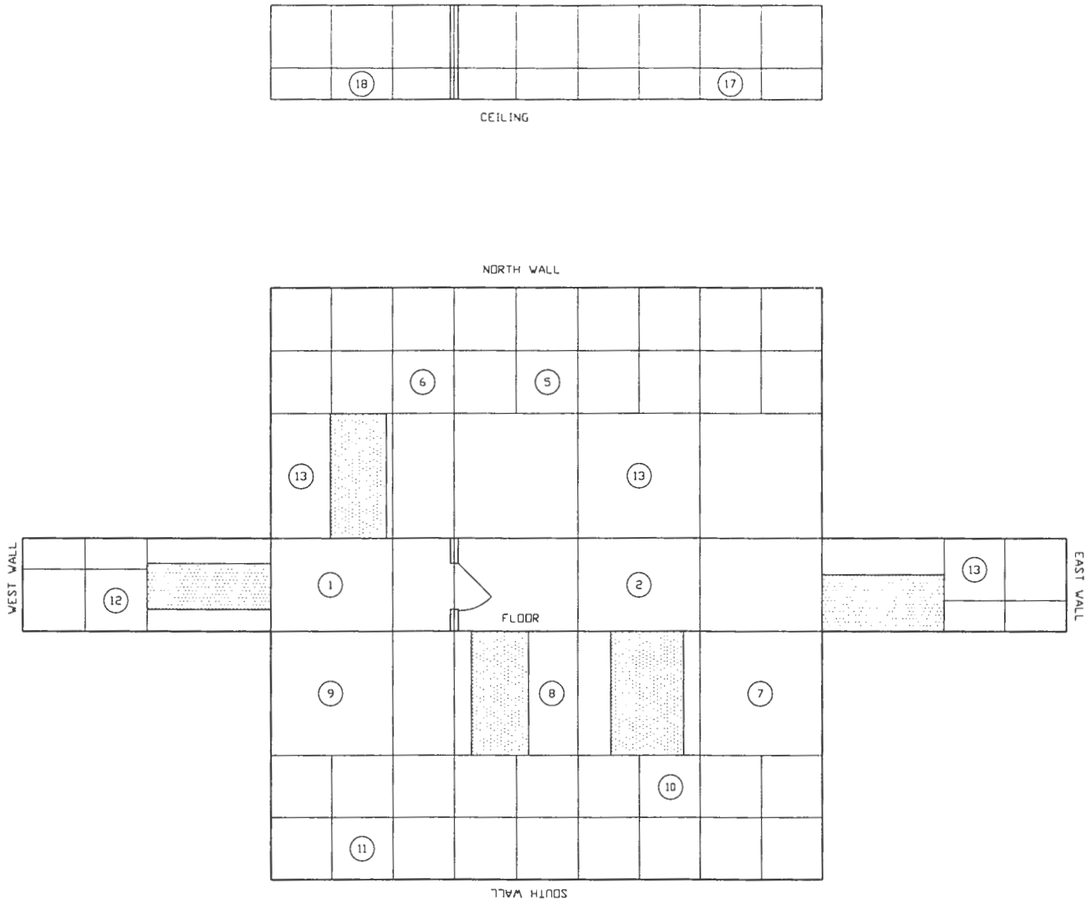


N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

ALL DOORS ARE 2M HIGH

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

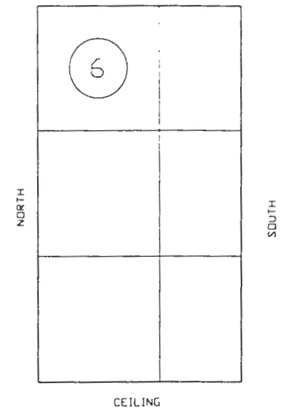
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

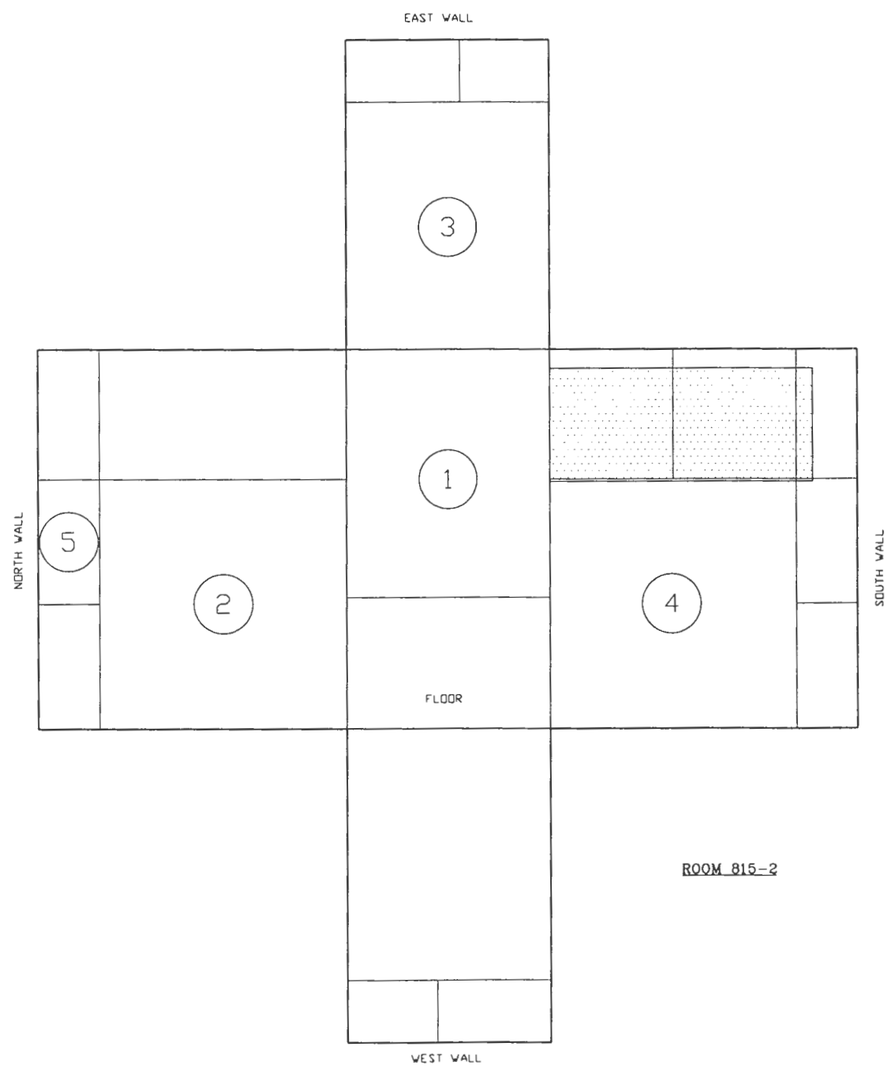
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT. ENVIRONMENTAL ENGINEERING
DRAWING NO. 730047-01001

BUILDING 815
ROOM 815-1

SCALE AS NOTED
DATE AUGUST 2001
REV. B





ROOM 815-2

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 2' 4' 6'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

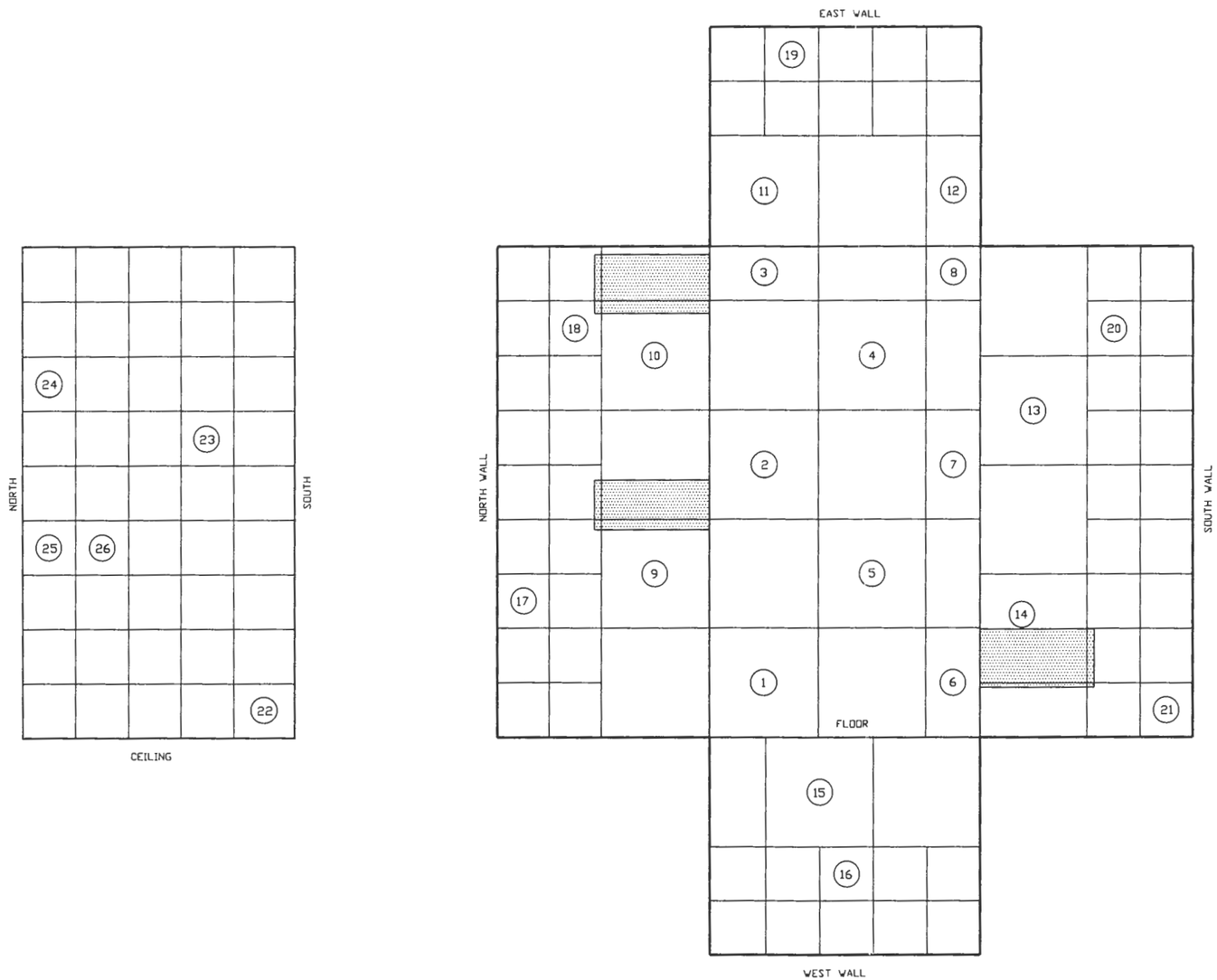
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT. ENVIRONMENTAL ENGINEERING | PROJ. NO. 730047-01001

BUILDING 815
ROOM 815-2

SCALE AS NOTED | DATE AUGUST 2001 | REV. B



ROOM 815-3

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

(27)IS THE COUNTERTOP FOR THE COUNTER GRID(1)

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | DWG NO 730047-01001

BUILDING 815
ROOM 815-3

SCALE AS NOTED | DATE AUGUST 2001 | REV B

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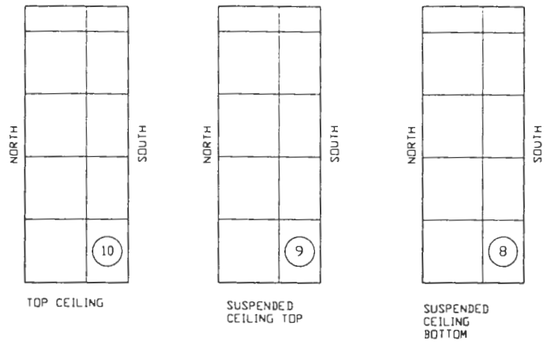
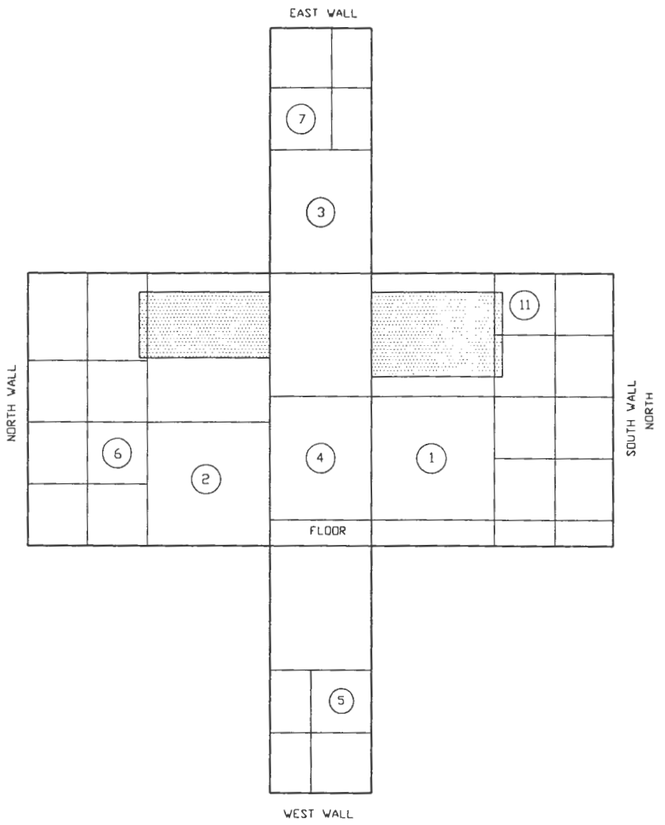




ROOM 815-4

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

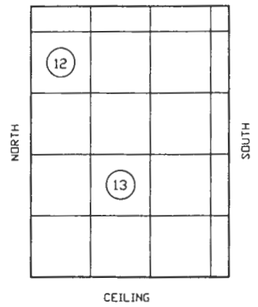
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

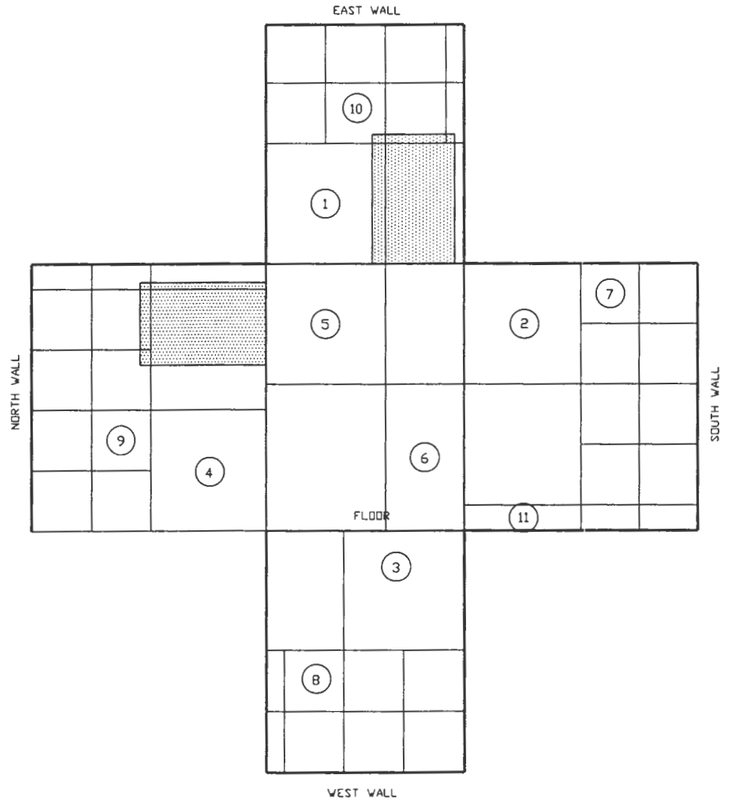
CLIENT PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING DWG NO: 730047-01001

BUILDING 815
ROOM 815-4

SCALE: AS NOTED DATE: AUGUST 2001 REV: B





ROOM 815-5

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WCESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
Dwg No 730047-01001

BUILDING 815
ROOM 815-5

SCALE AS NOTED
DATE AUGUST 2001
REV B

R:\SENECA\RIFS\SD12\815-5.DWG

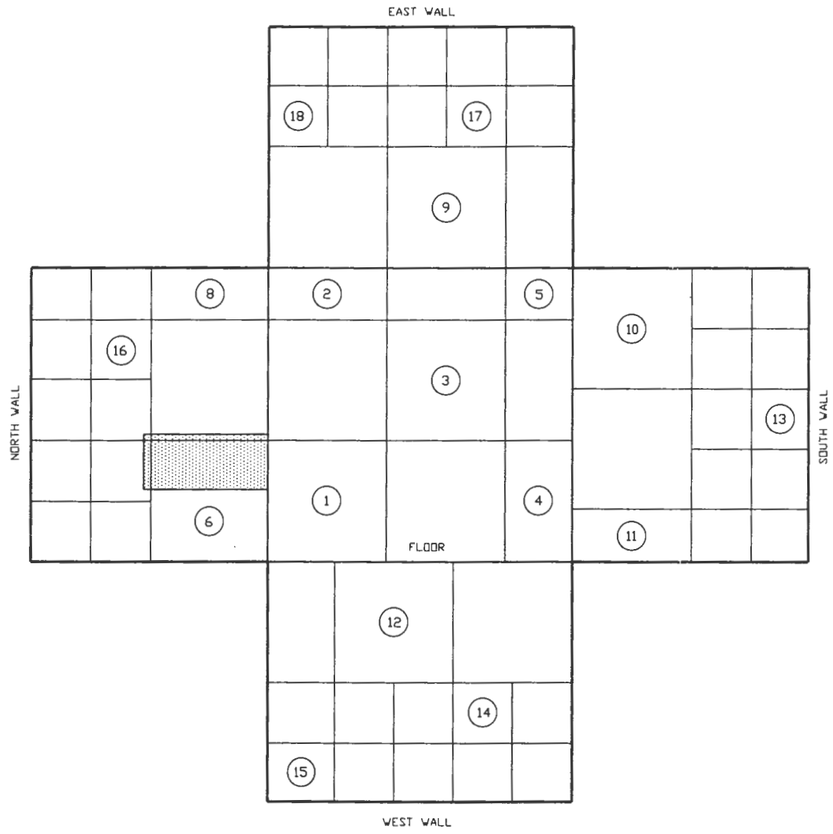
N

NOTE:

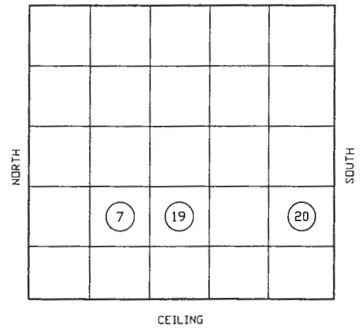
CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)



ROOM 815-6



NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING Dwg No 730047-01001

BUILDING 815
ROOM 815-6

SCALE AS NOTED DATE NOVEMBER 1990 REV A

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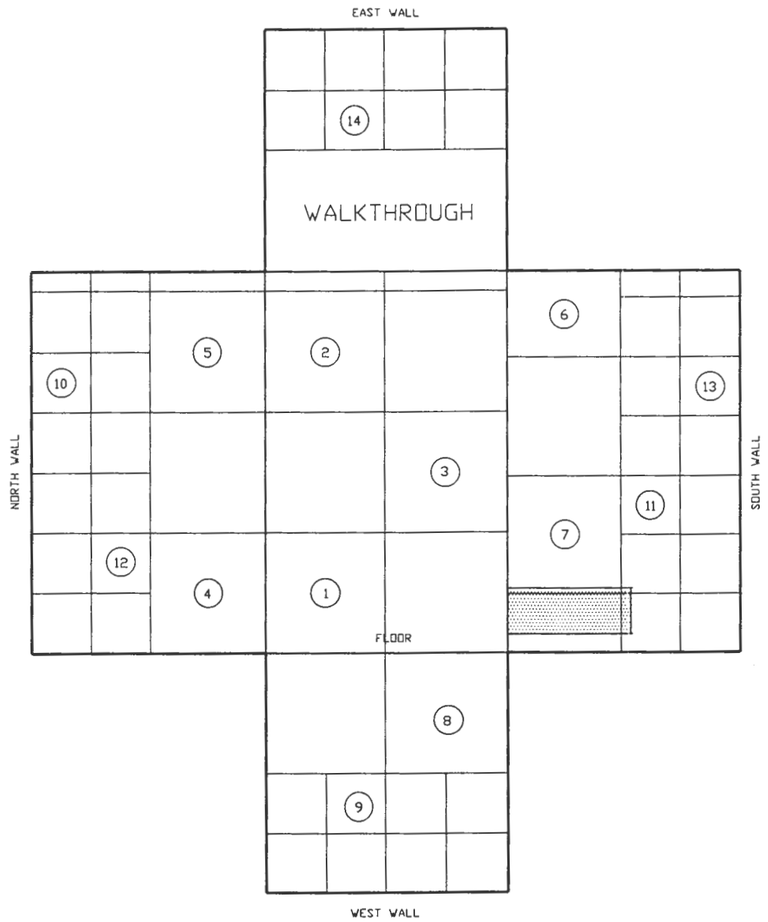
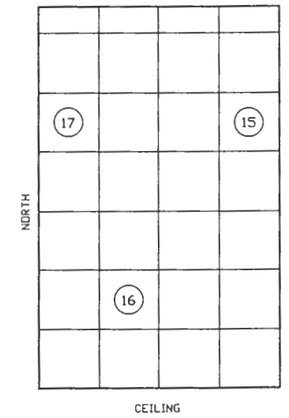


ROOM 815-7



N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER DRAWING NO. 14-76, JULY 19, 1976. HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80. ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO. M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
DWG NO 730047-01001

BUILDING 815
ROOM 815-7

SCALE AS NOTED
DATE NOVEMBER 1989
REV A

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NOTE:

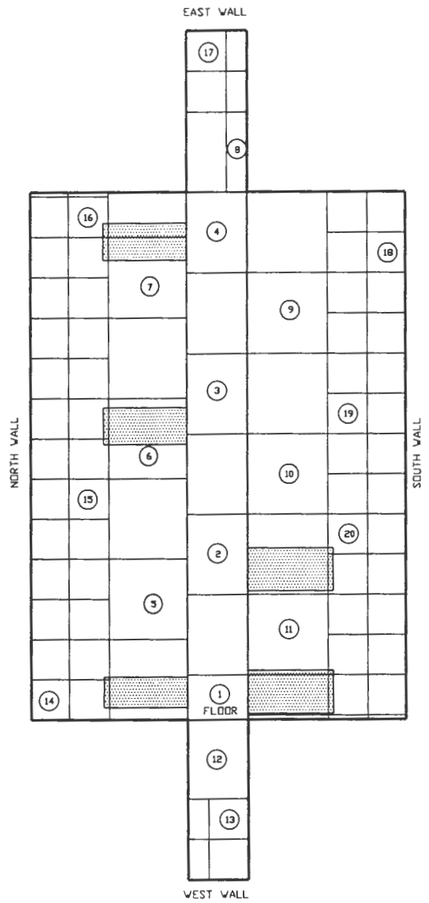
CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

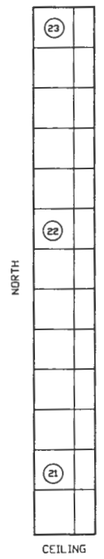
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)





ROOM 815-8

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER DRAWING NO. 14-76, JULY 19, 1976. HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80. ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO. M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | DWG NO 730047-01001

BUILDING 815
ROOM 815-8

SCALE AS NOTED | DATE NOVEMBER 1988 | REV A

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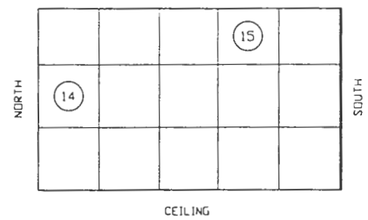
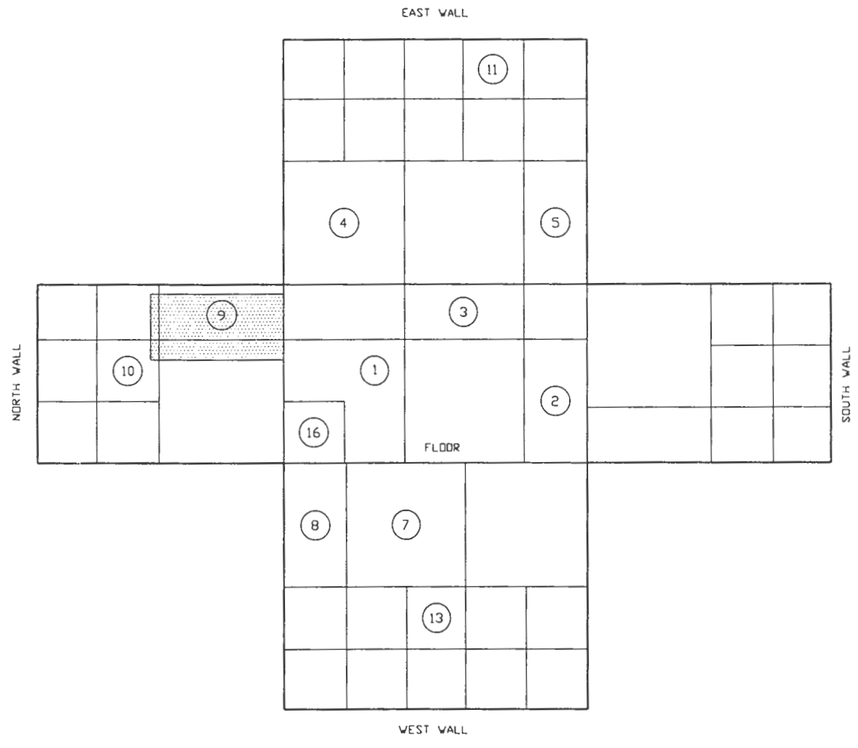




ROOM 815-9

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

(16) IS A SHOWER STALL THAT IS 1X1X2 METERS.

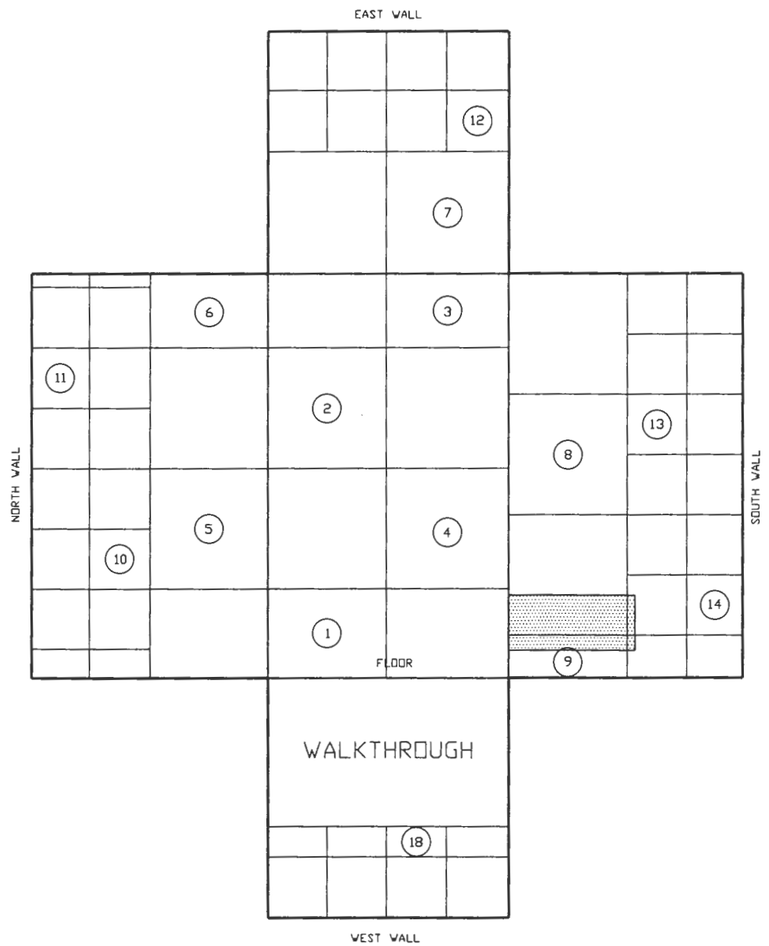
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

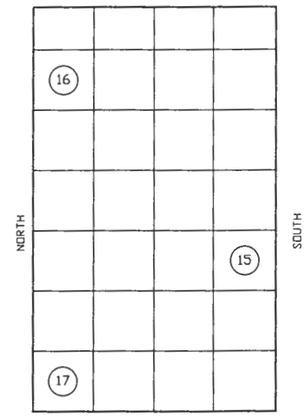
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT. ENVIRONMENTAL ENGINEERING DWG NO. 730047-01001

BUILDING 815
ROOM 815-9

SCALE AS NOTED DATE AUGUST 2001 REV. B





N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

ROOM 815-10

NOTE(S):

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FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | D+B No 730047-01001

BUILDING 815
ROOM 815-10

SCALE AS NOTED | DATE NOVEMBER 1990 | REV A

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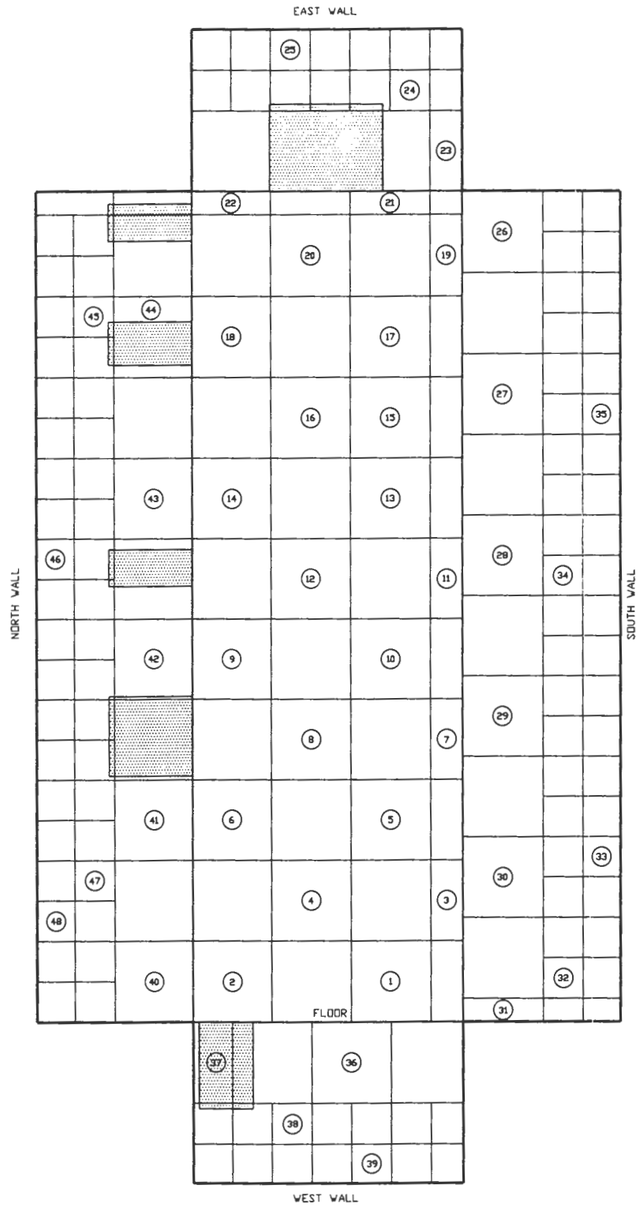
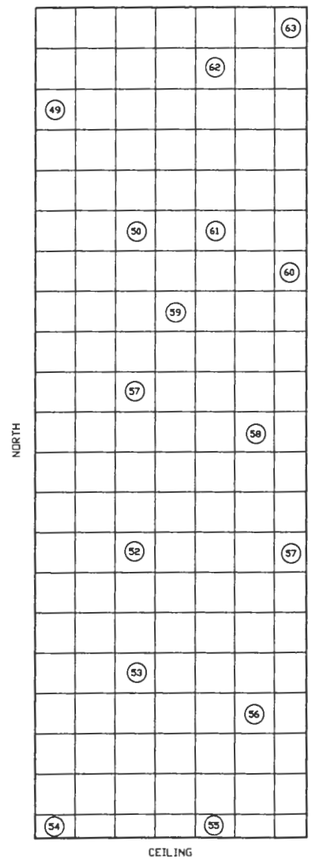


ROOM 815-11



N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER DRAWING NO. 14-76, JULY 19, 1976. HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80. ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO. M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | Dwg No 730047-01001

BUILDING 815
ROOM 815-11

SCALE AS NOTED | DATE NOVEMBER 1988 | REV A

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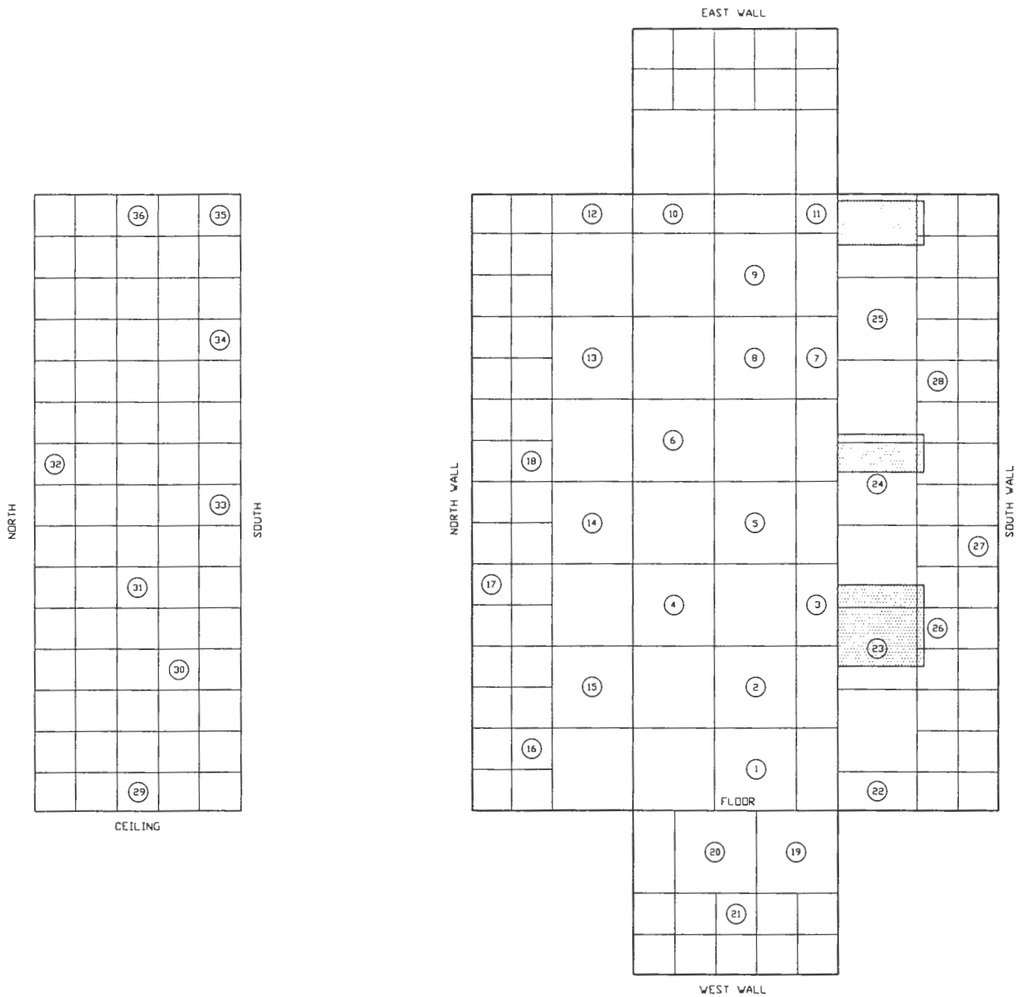


ROOM 815-12

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

EAST WALL, WHICH CONNECTS TO HOTROOM,
WAS SURVEYED DURING PHASE I.

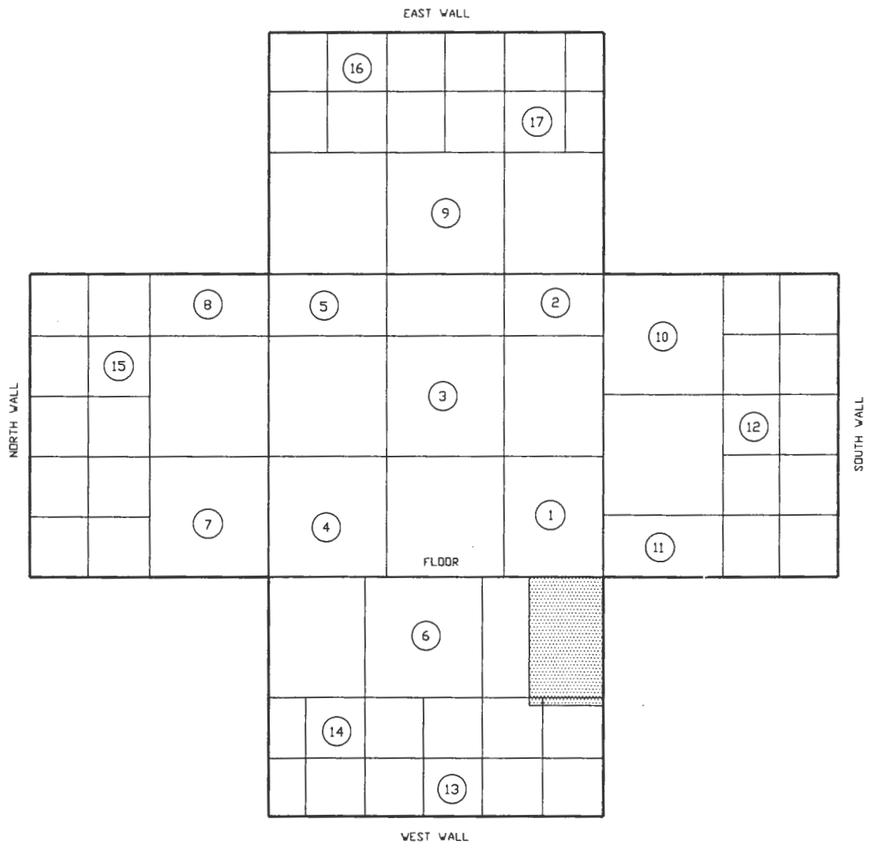
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

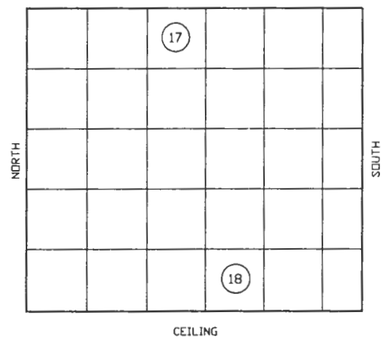
DEPT ENVIRONMENTAL ENGINEERING | DWG NO 730047-01001

BUILDING 815
ROOM 815-12

SCALE AS NOTED | DATE AUGUST 2001 | REV B



ROOM 815-13



N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING DWG NO 730047-01001

BUILDING 815
ROOM 815-13

SCALE AS NOTED | DATE NOVEMBER 1990 | REV A

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N

NOTE:

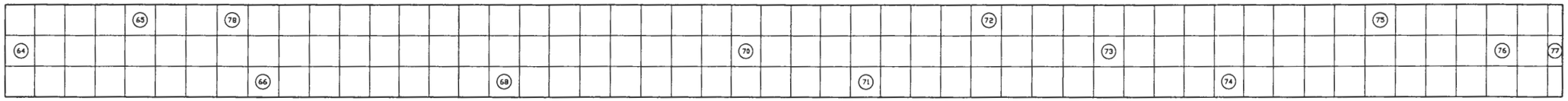
CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

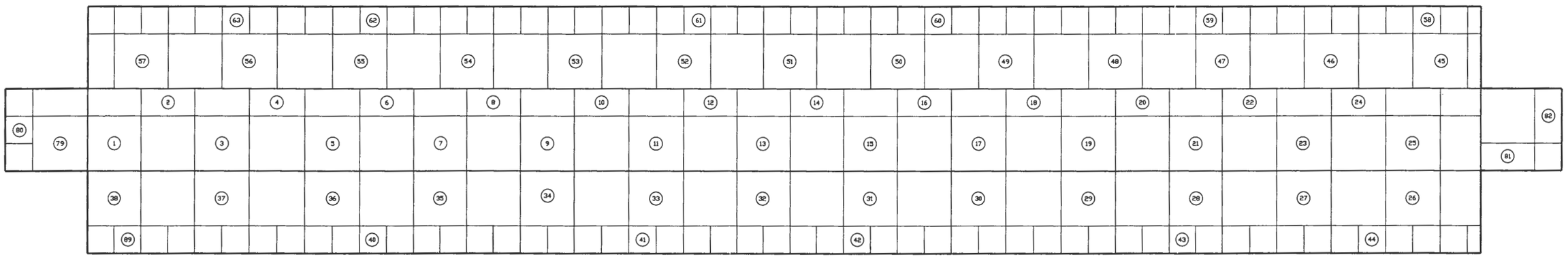
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)





FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | DRG NO 730047-01001

BUILDING 815
ROOM 815-14

SCALE AS NOTED | DATE NOVEMBER 1990 | REV A

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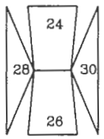
NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

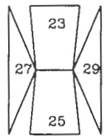
1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

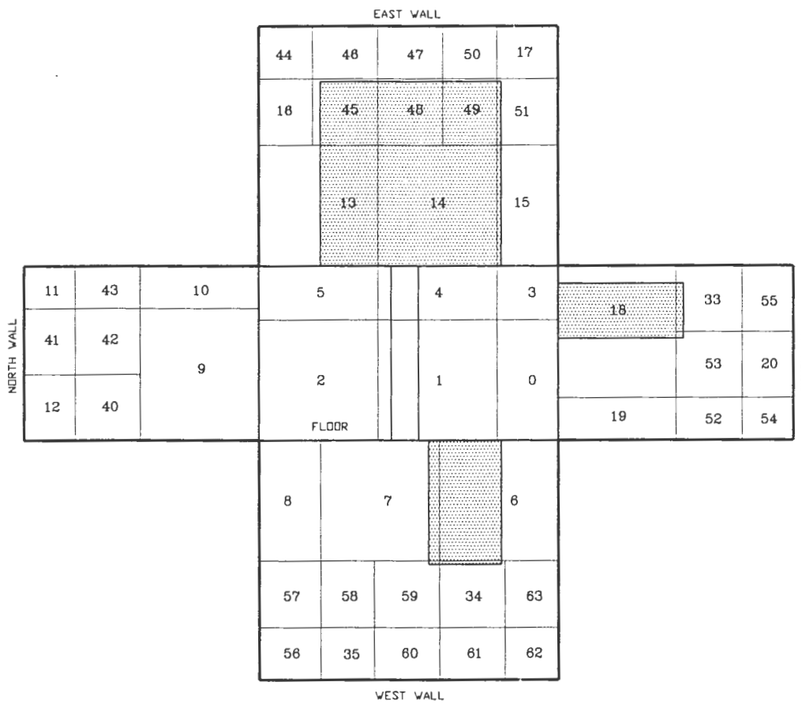
N



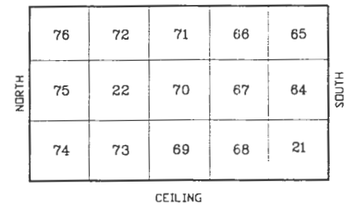
INSIDE HOOD



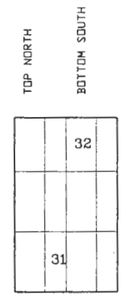
OUTSIDE HOOD



ROOM 815-15



CEILING



DUCT

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER DRAWING NO. 14-76, JULY 19, 1976. HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80. ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO. M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING
DWG NO: 730047-01001

BUILDING 815
ROOM 815-15

SCALE: AS NOTED
DATE: NOVEMBER 1990
REV: A

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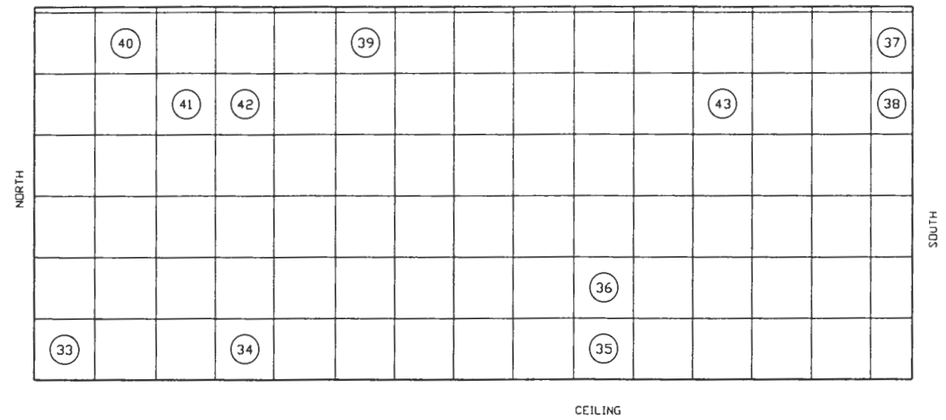
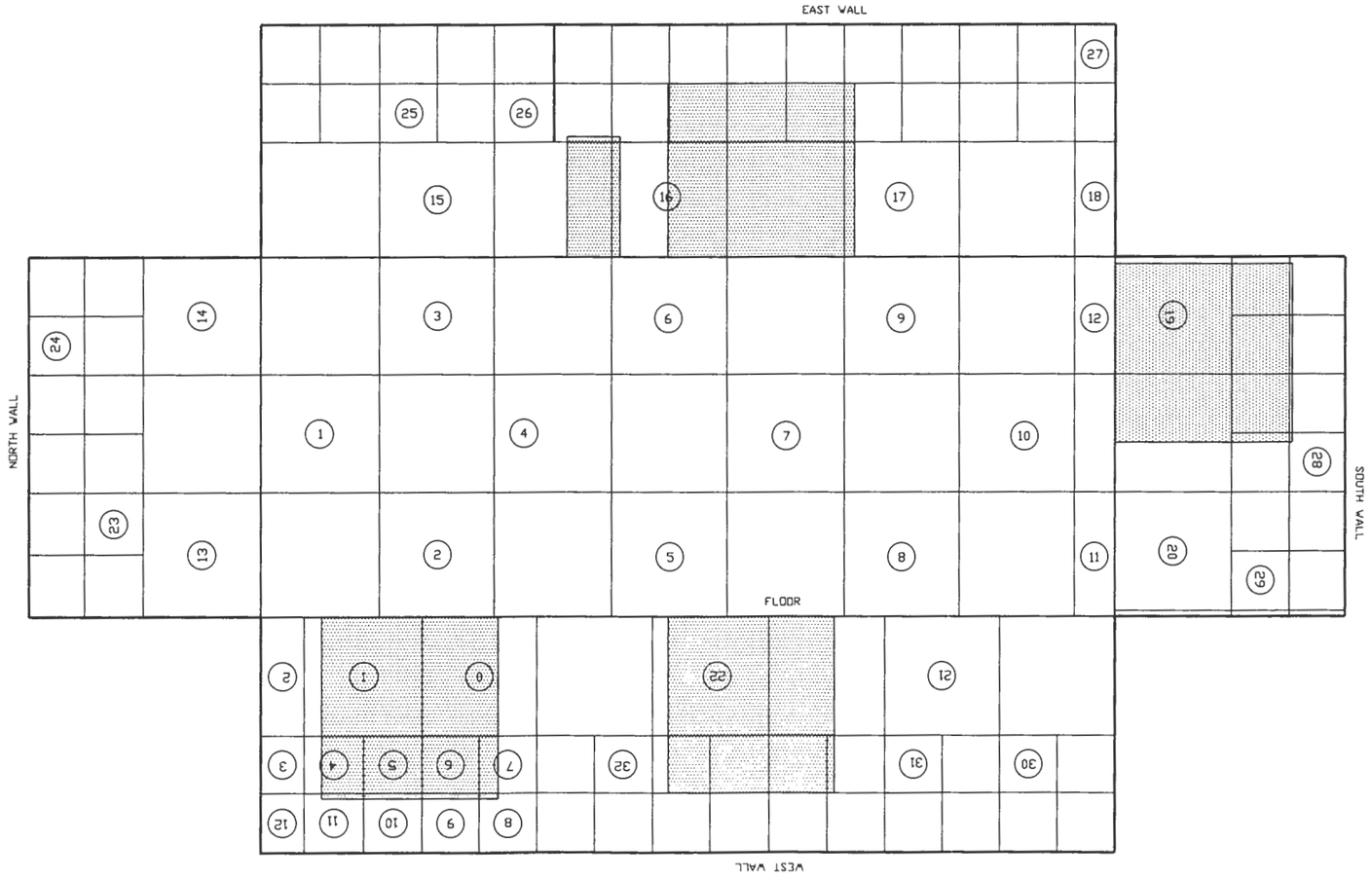




ROOM 815-16B

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

N

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER DRAWING NO. 14-76, JULY 19, 1976. HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80. ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO. M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

WEST WALL SURVEYED DURING PHASE I (GRID #'S ARE FROM PHASE I)

16A & 16B TREATED AS ONE ROOM, 16.

ALL DOORS ARE 3 M HIGH.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | Dwg No 730047-01001

BUILDING 815
ROOM 815-16

SCALE AS NOTED | DATE AUGUST 2001 | REV B

R:\SENECA\HFS\SD12\815-16.DWG

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

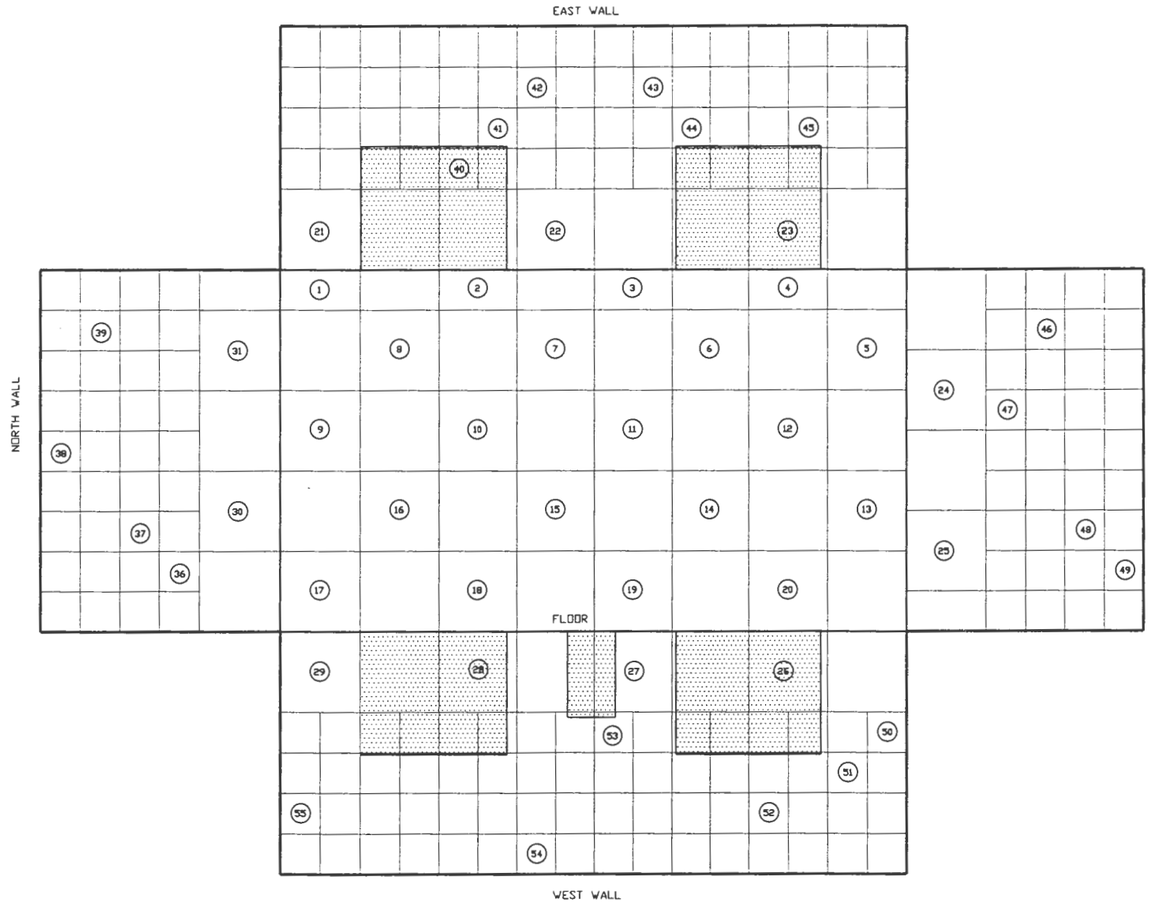
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

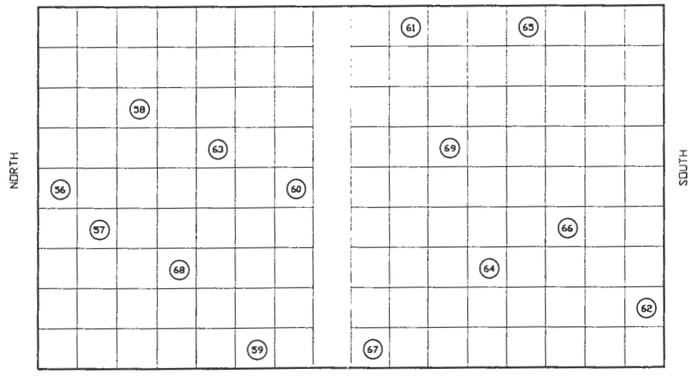
1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

32 = COLUMN IN CENTER OF ROOM
33 = TOP SHELF OF DEST
34 = MAIN DESK TOP
35 = BOTTEM SHELF OF DESK





ROOM 816-1

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER DRAWING NO. 14-76, JULY 19, 1976. HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80. ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO. M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
D+O No 730047-01001

BUILDING 816
ROOM 816-2

SCALE AS NOTED | DATE OCTOBER 1990 | REV A

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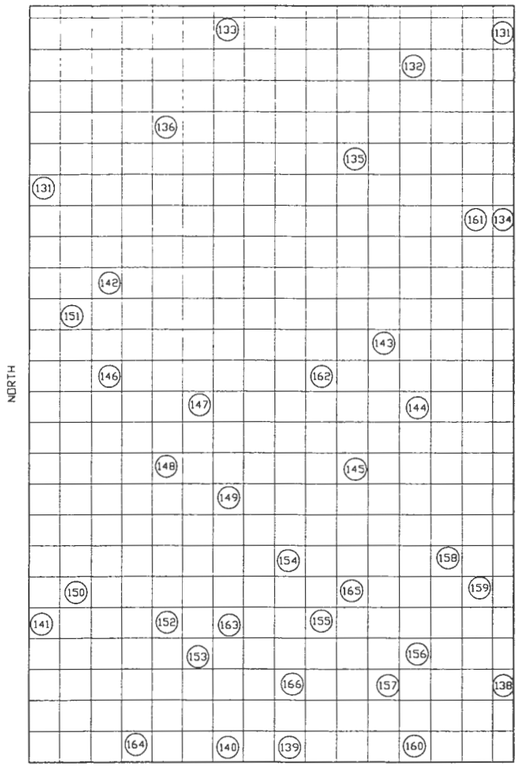

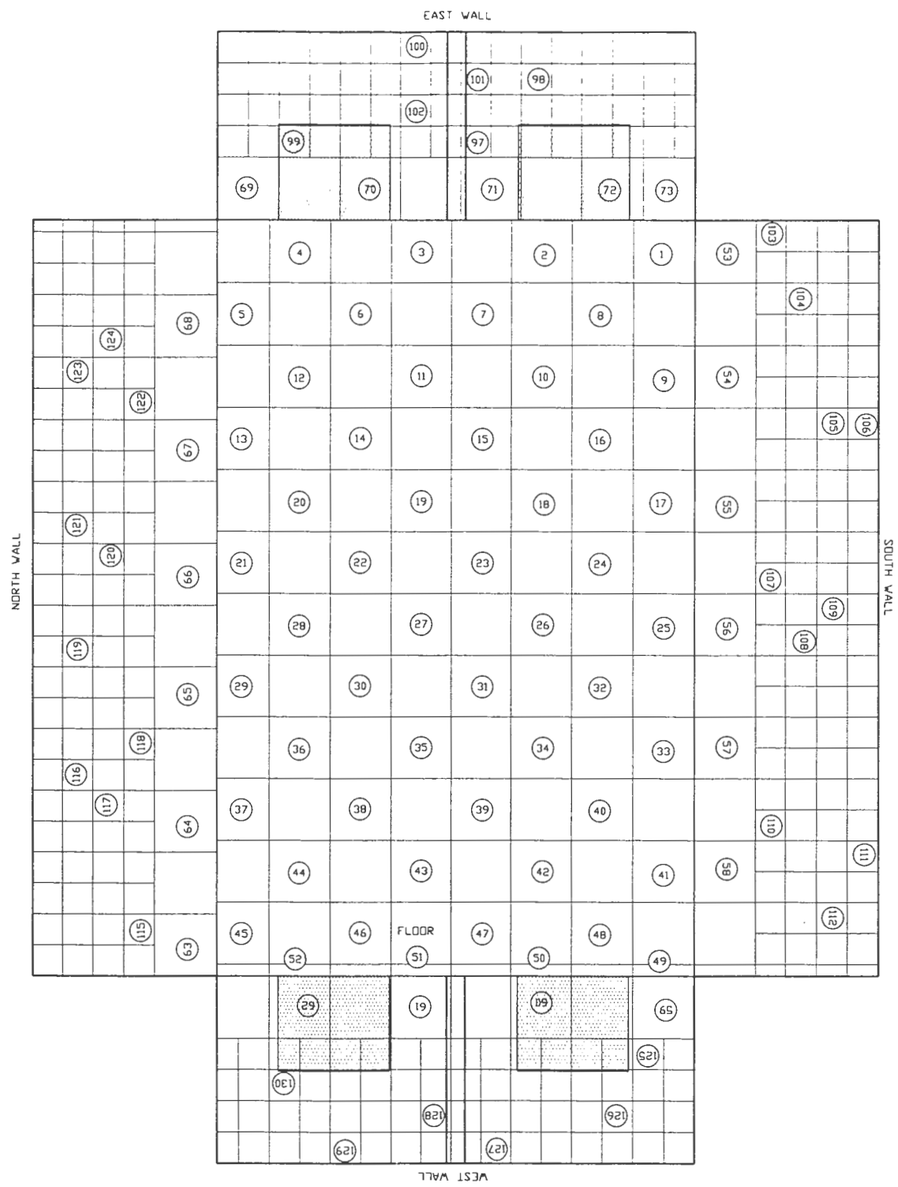

ROOM 816-3

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

- #S 74-96 ARE ON TALBES AND CABINETS
- #113 IS ON CENTER SUPPORT COLUMN 2'X2m WIDE (4 SIDES)
- #114 IS ON WEST SUPPORT COLUMN 2'x2m WIDE (4 SIDES)
- #S 167 & 168 ARE ON UPPER SUPPORT COLUMN
- #S 173-175 ARE 2'x1m
- #S 169-172 ARE ON CRANE RAILS 1'x1m (4 SIDES)

NOTE(S):

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FEET 0 3 6
METERS 0 1 2
0 8' 16' 24'
(APPROX. SCALE FT.)

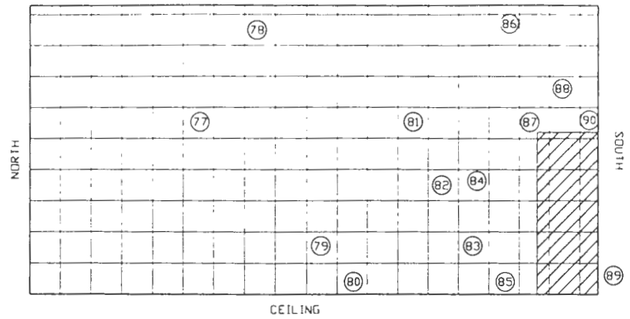
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

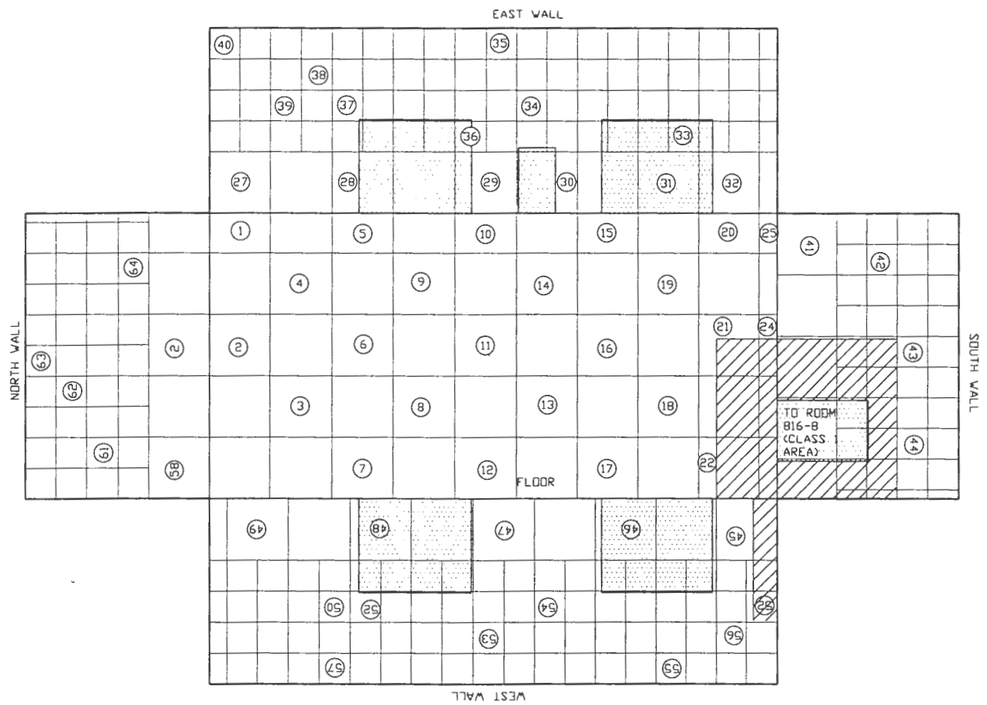
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT. ENVIRONMENTAL ENGINEERING | DRG. NO. 730047-01001

BUILDING 816
ROOM 816-3

SCALE AS NOTED | DATE AUGUST 2001 | REV. B





ROOM 816-4

FEET 0 3 6
METERS 0 1 2

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

CLASS ONE ROOM - SPECIAL
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES (UPPER AND LOWER)
- UNEARTHEN ROOFS WITH DUCTS
- EXTENSION BUILDING SURFACES 2m FROM ACCESS
- HORRIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES COULD DEPOSIT.
- CEILING (SUSPENDED AND NONSUSPENDED)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER DRAWING NO. 14-76, JULY 19, 1976. HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80. ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

0 8' 16' 24'
(APPROX. SCALE FT.)

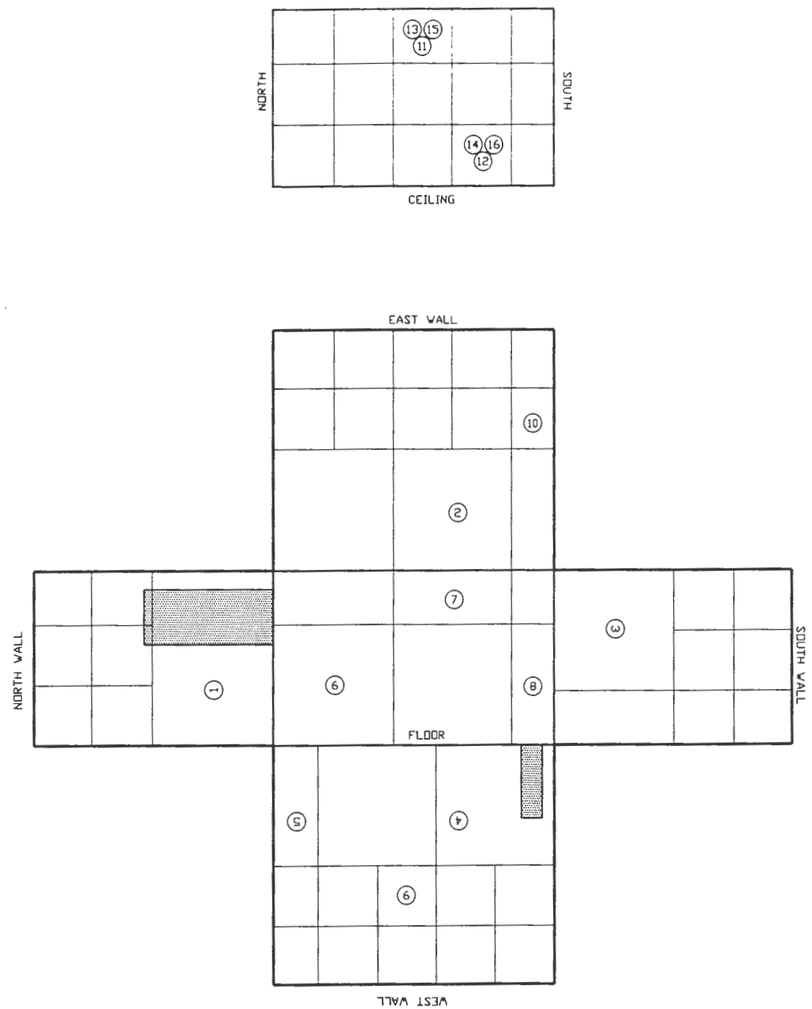
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING DRG No: 730047-01001

BUILDING 816
ROOM 816-4

SCALE: AS NOTED DATE: AUGUST 2001 REV: 8



ROOM 816-5

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

* #11 & #12 ARE ON UNDERSIDE OF SUSPENDED CEILING
* #13 & #14 ARE ON TOP OF SUSPENDED CEILING
* #15 IS ABOVE #13, AND #16 IS ABOVE #14 IN CEILING CAVITY
* #17 & #19 ARE ON BATHROOM STALL WALL NORTH
* #18 IS ON BATHROOM STALL WALL SOUTH
* #20 & #22 ARE ON BATHROOM DOOR EAST SIDE
* #21 IS ON BATHROOM DOOR WEST SIDE
* #23 & 24 ARE AT SINKS
* #25 IS ON SHOWER WALL
* #26 IS ON CABINET AND SHOWER WALL

FEET 0 2 4
METERS 0 1 2

0 4' 8' 12'

(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
Dwg No 730047-01001

BUILDING 816
ROOM 816-5

SCALE AS NOTED | DATE AUGUST 2001 | REV B

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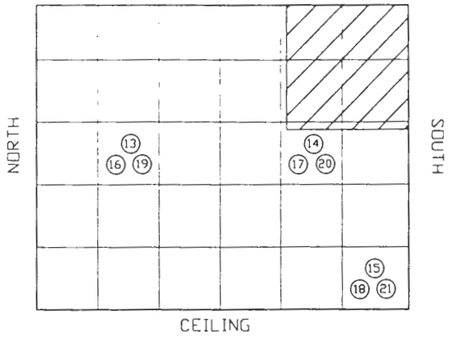
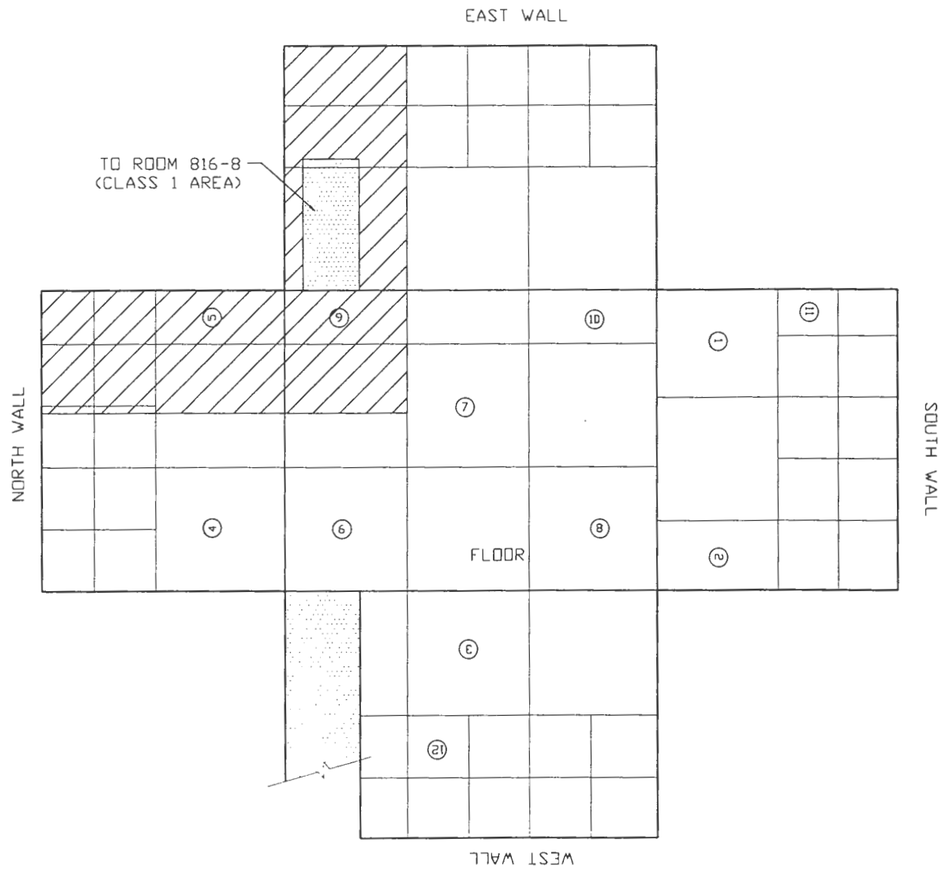




ROOM 816-7

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

CLASS ONE ROOM - SPECIAL
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES (UPPER AND LOWER)
- UNEARTHEN ROOFS WITH DUCTS
- EXTENSION BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES COULD DEPOSIT.
- CEILING (SUSPENDED AND NONSUSPENDED)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

* #S 13, 14 & 15 ARE ON UNDERSIDE OF SUSPENDED CEILING

* #16, 17 & 18 ARE ARE ON TOP SIDE OF SUSPENDED CEILING ABOVE 13, 14 & 15 RESPECTIVELY

* #S 19, 20 & 21 ARE AT TOP OF CEILING CAVITY ABOVE 13, 14 & 15 RESPECTIVELY

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

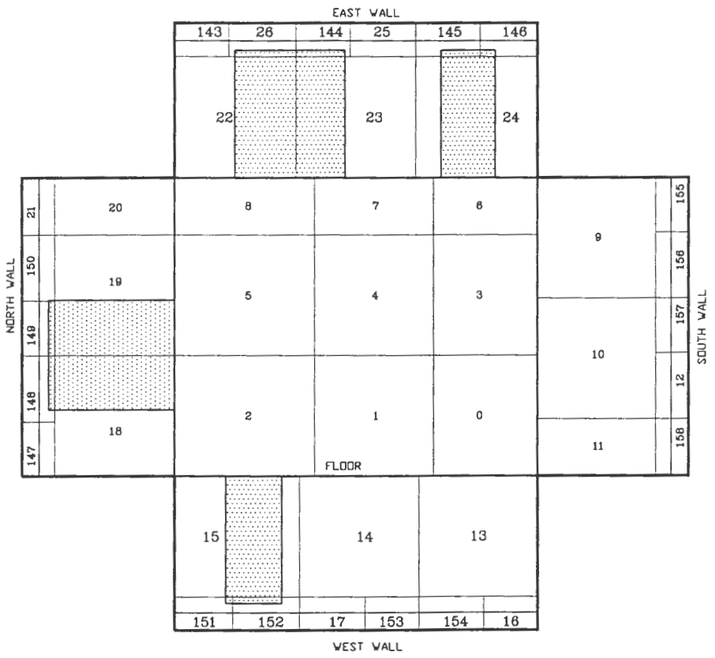
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

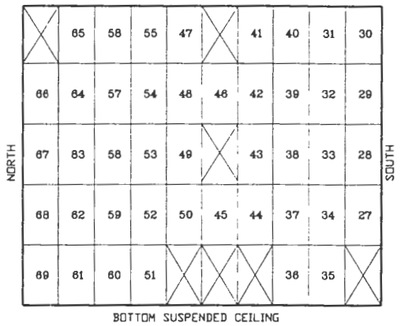
DEPT ENVIRONMENTAL ENGINEERING | DWG NO 730047-01001

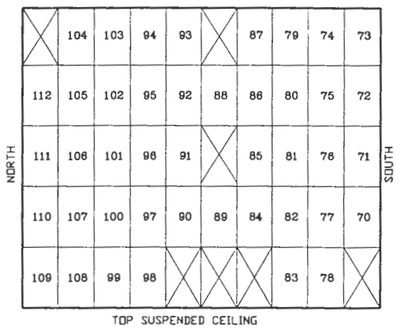
BUILDING 816
ROOM 816-7

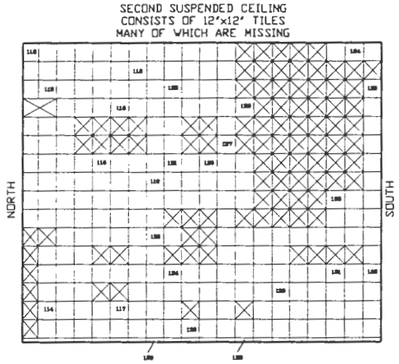
SCALE AS NOTED | DATE AUGUST 2001 | REV. B

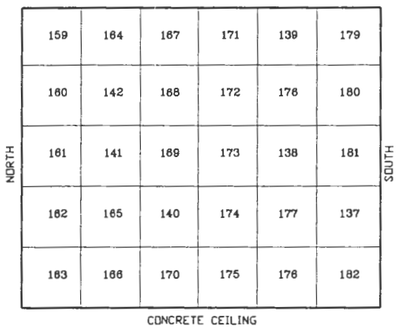


ROOM 816-8









NOTE:

CLASS ONE ROOM - SPECIAL
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES (UPPER AND LOWER)
- UNEARTHEN ROOFS WITH DUCTS
- EXTENSION BUILDING SURFACES 2m FROM ACCESS
- HORRIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES COULD DEPOSIT.
- CEILING (SUSPENDED AND NONSUSPENDED)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

MISSING CEILING TILE

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
Dwg. No. 730047-01001

BUILDING 816
ROOM 816-8

SCALE AS NOTED
DATE JANUARY 2000
REV. 0

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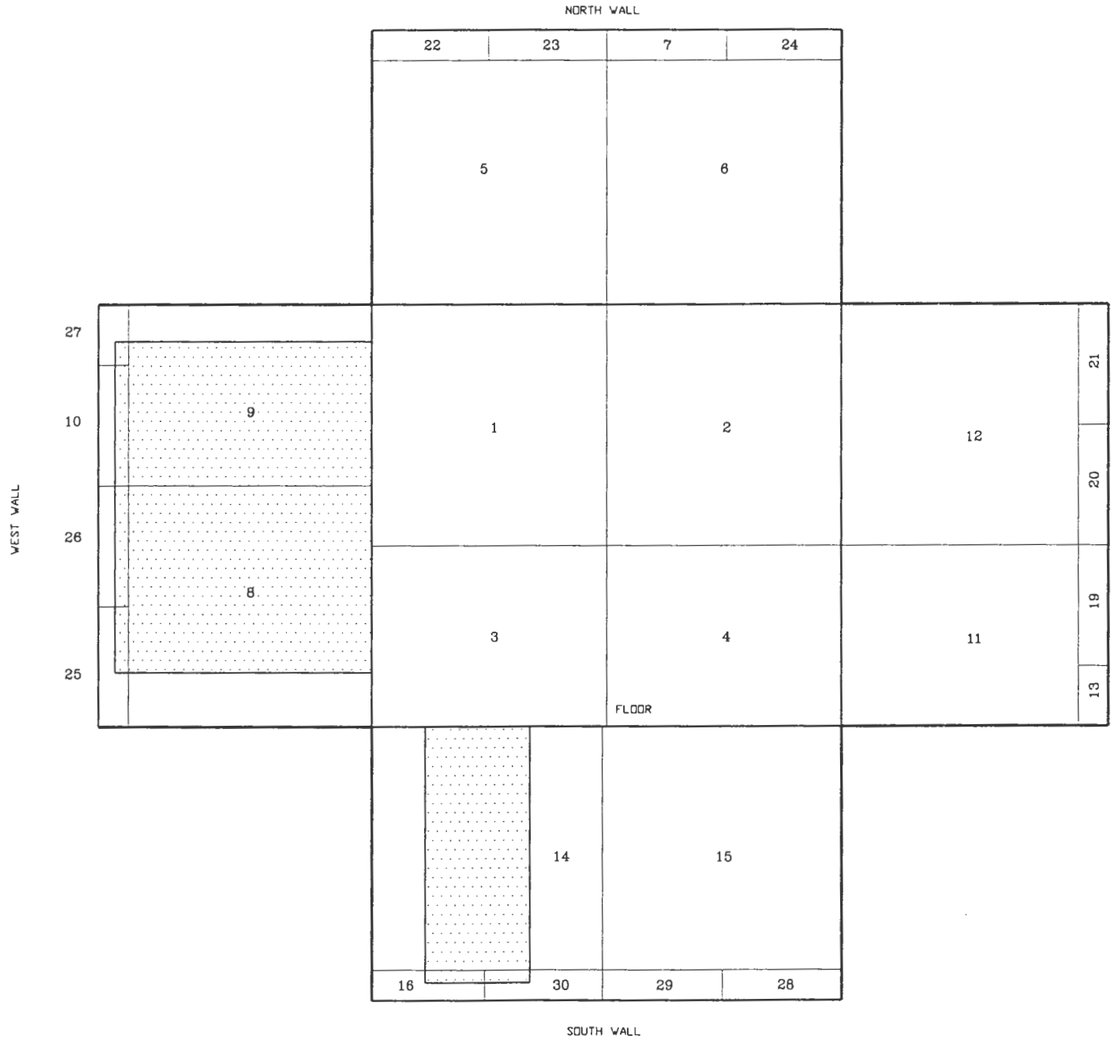
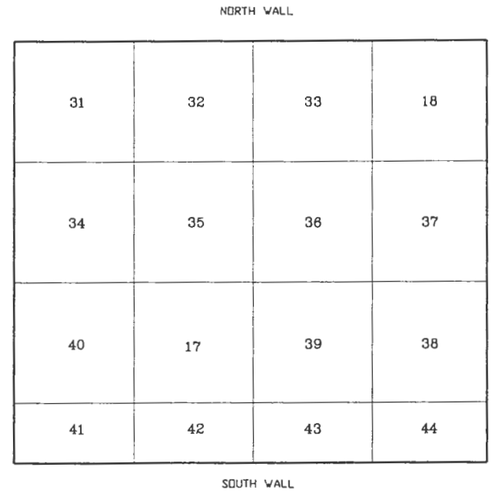


ROOM 816-9



N

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 50% COVERAGE
- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2
0 2' 4' 6'
(APPROX. SCALE FT.)

NOTE(S):

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PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING Dwg No 730047-01001

BUILDING 816
ROOM 816-9

SCALE AS NOTED DATE JANUARY 2000 REV A

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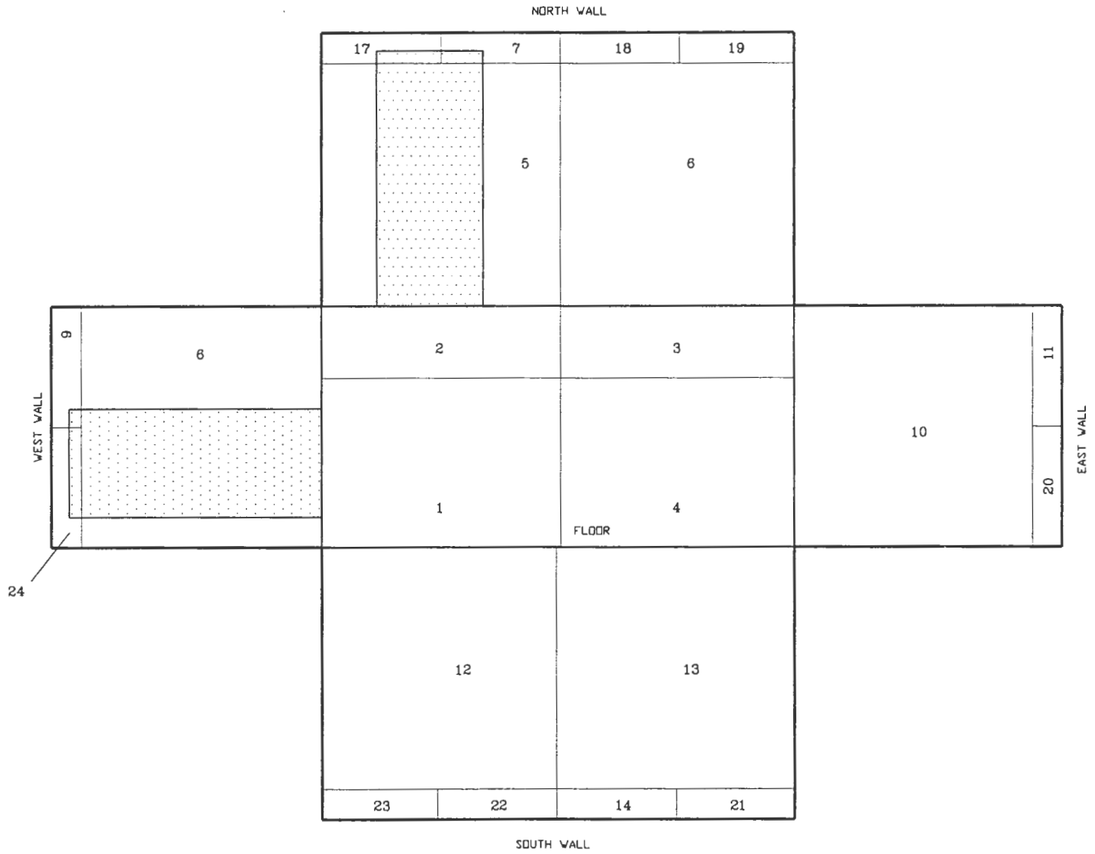
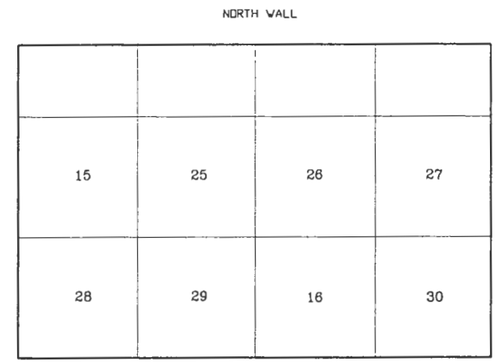


ROOM 816-10



N

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2
0 2' 4' 6'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING D+O No. 730047-01001

BUILDING 816
ROOM 816-10

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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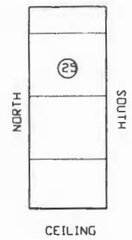
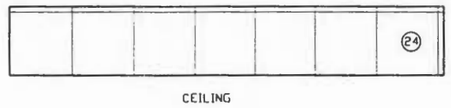
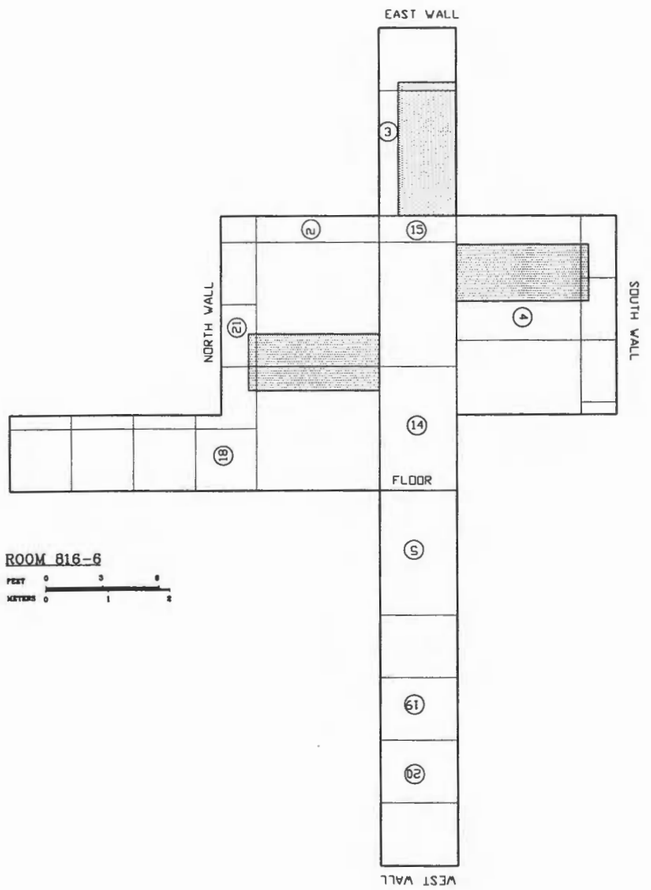
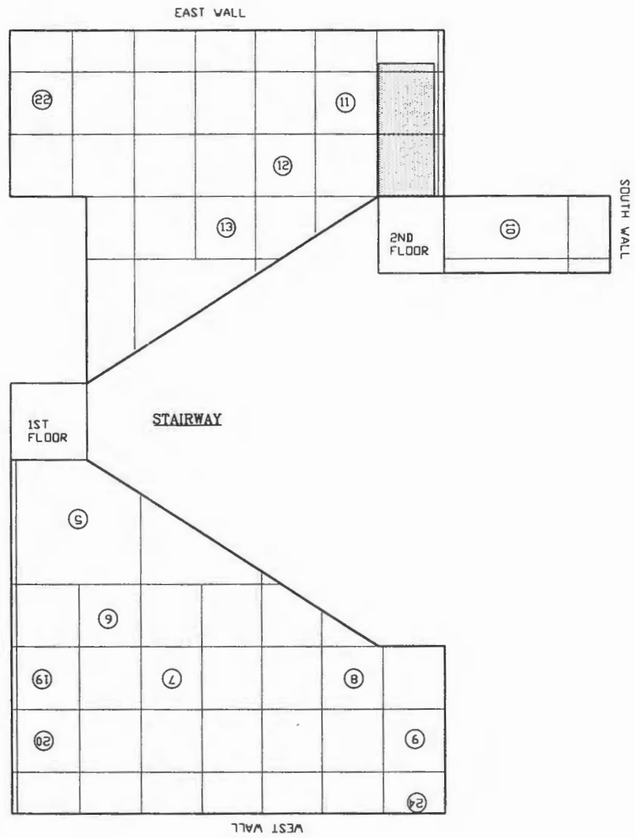






ROOM 816-6

FEET 0 3 6
METERS 0 1 2



NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

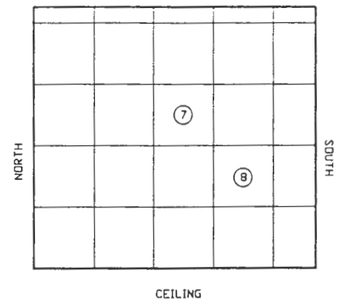
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

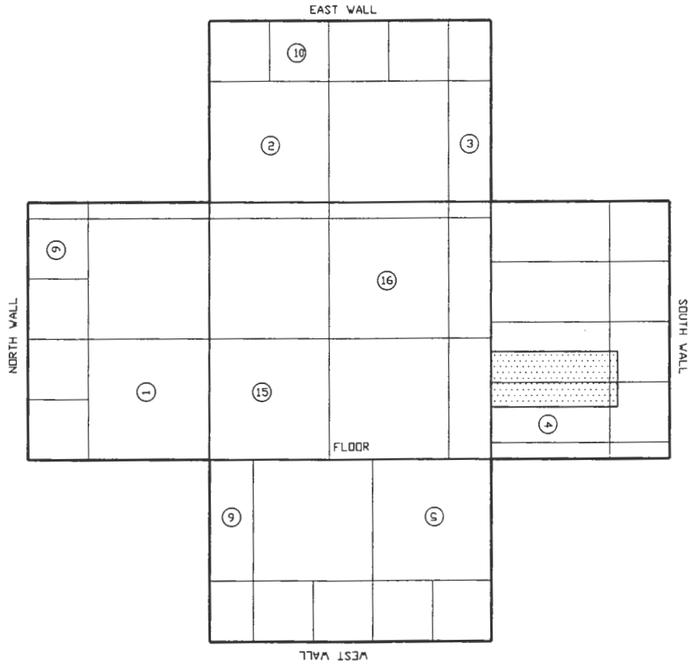
DEPT ENVIRONMENTAL ENGINEERING | DWG NO 730047-01001

BUILDING 816
ROOM 816-11
FIRST FLOOR & STAIRWAY

SCALE AS NOTED | DATE AUGUST 2001 | REV B

816-11X.DWG





ROOM 816-11

N

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80,
SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS
DRAWING NO. M/E-1, SHEET NO. 1 OF 4,
DATE AUG. 6, 1986.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING Dwg No 730047-01001

BUILDING 816
ROOM 816-12

SCALE AS NOTED DATE AUGUST 2001 REV B

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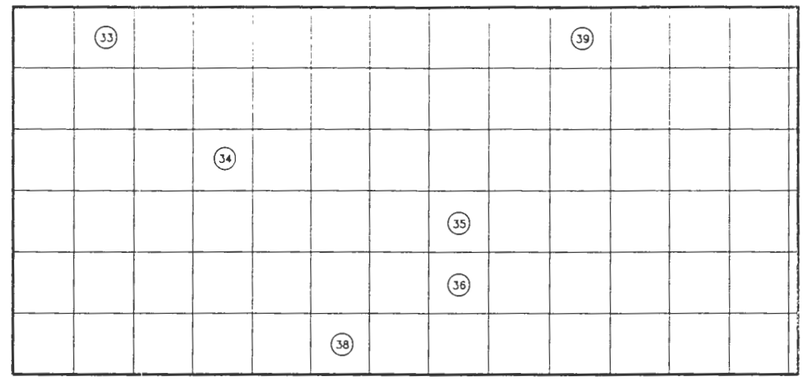
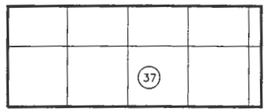
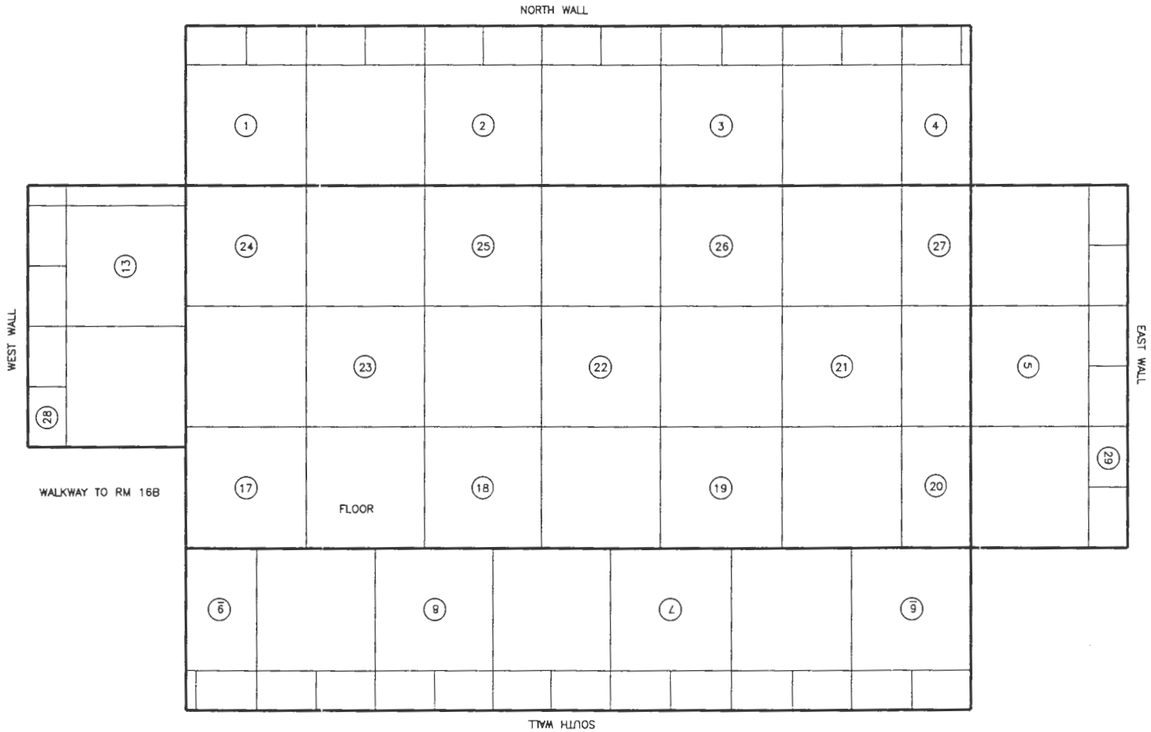


CEILING



CEILING

ROOM 816-13B



ROOM 816-13

NOTE:

CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- ACCESS POINTS TO A DISTANCE OF 2m BEYOND CLASS TWO SURVEY UNIT.
- INTERIOR HORIZONTAL SURFACES ABOVE 2m.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m ABOVE FLOOR SURFACE)
- ROOFS

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM OFFICE OF POST THE ENGINEER
DRAWING NO. 14-76, JULY 19, 1976.
HIBBARD-ENGINEERS DRAWING NO. 20-80, SHEET NO. 1-10, DATE 5/16/80.
ROBSON & WOESE INC. CONSULTING ENGINEERS DRAWING NO. M/E-1, SHEET NO. 1 OF 4, DATE AUG. 6, 1986.

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | Dwg No 730047-01001

BUILDING 816
ROOM 816-13
& 816-13B

SCALE AS NOTED | DATE AUGUST 2001 | REV B

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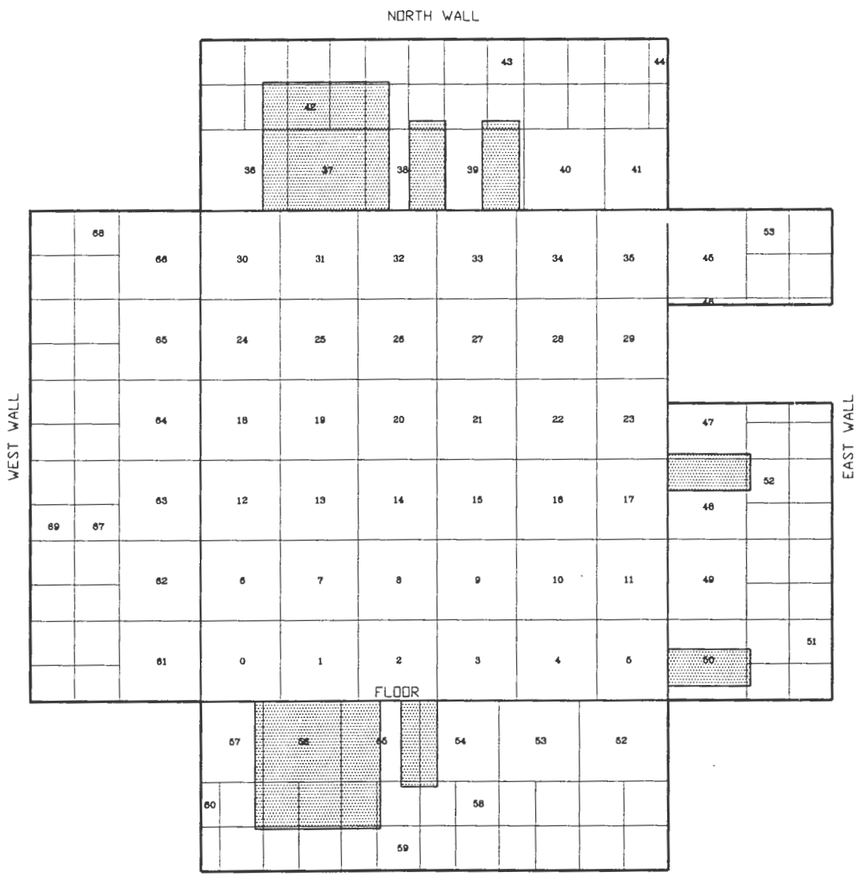
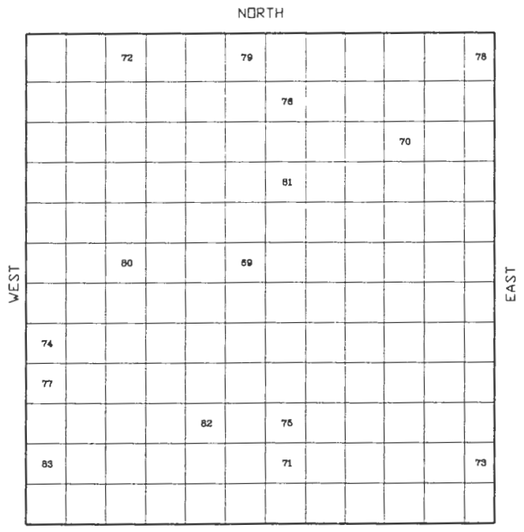
NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)





BLDG. 819 ROOM 819-1
APPROX. SCALE: 1" = 6'-0"

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | D+B No. 730047-01001

BUILDING 819
ROOM 819-1

SCALE AS NOTED | DATE DECEMBER 1999 | REV A

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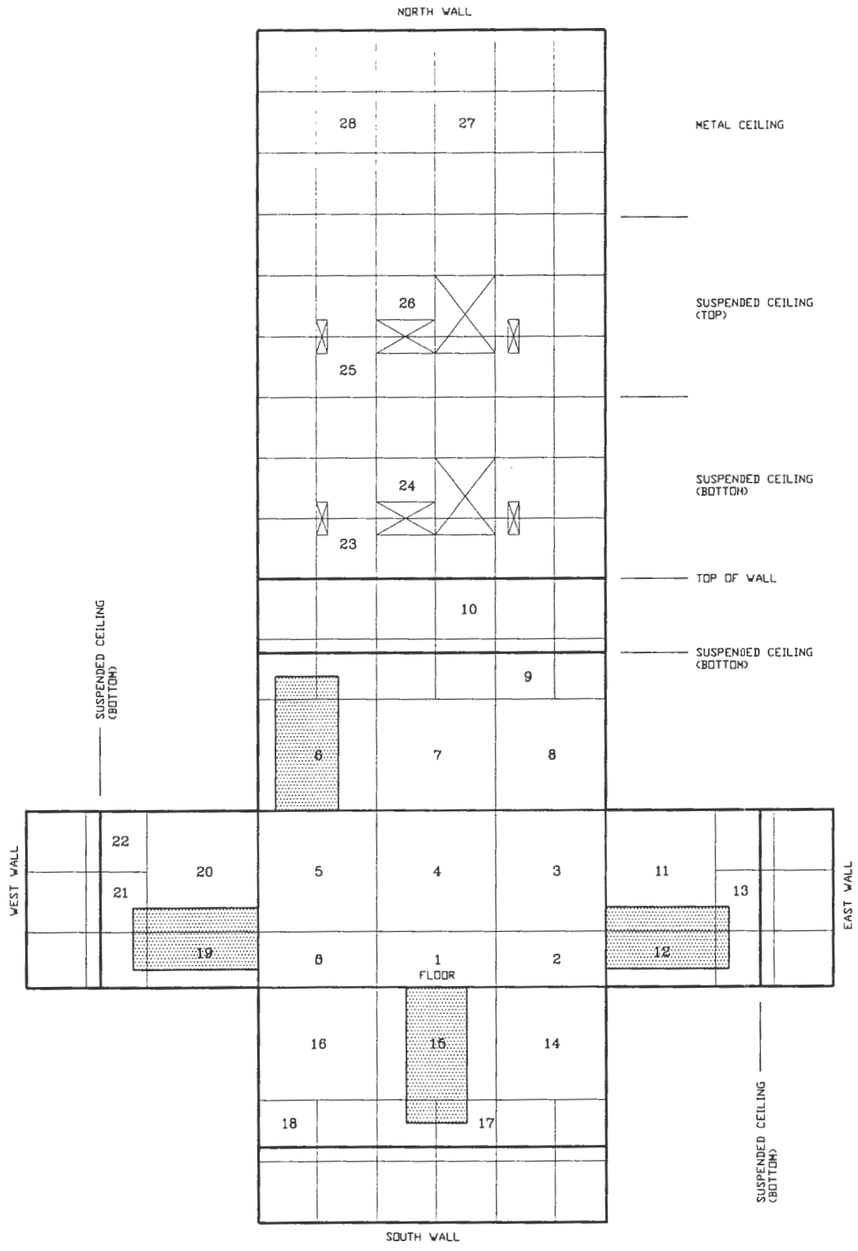


BLDG. 819-2

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

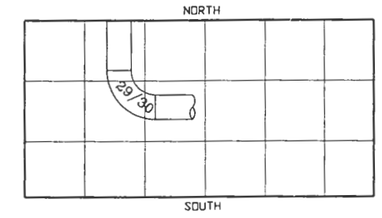
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

MISSING CEILING TILE



29 - BOTTOM OF DUCT
30 - TOP OF DUCT

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'

(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
D+O NO. 730047-01001

BUILDING 819
ROOM 819-2

SCALE AS NOTED
DATE JANUARY 2000
REV A

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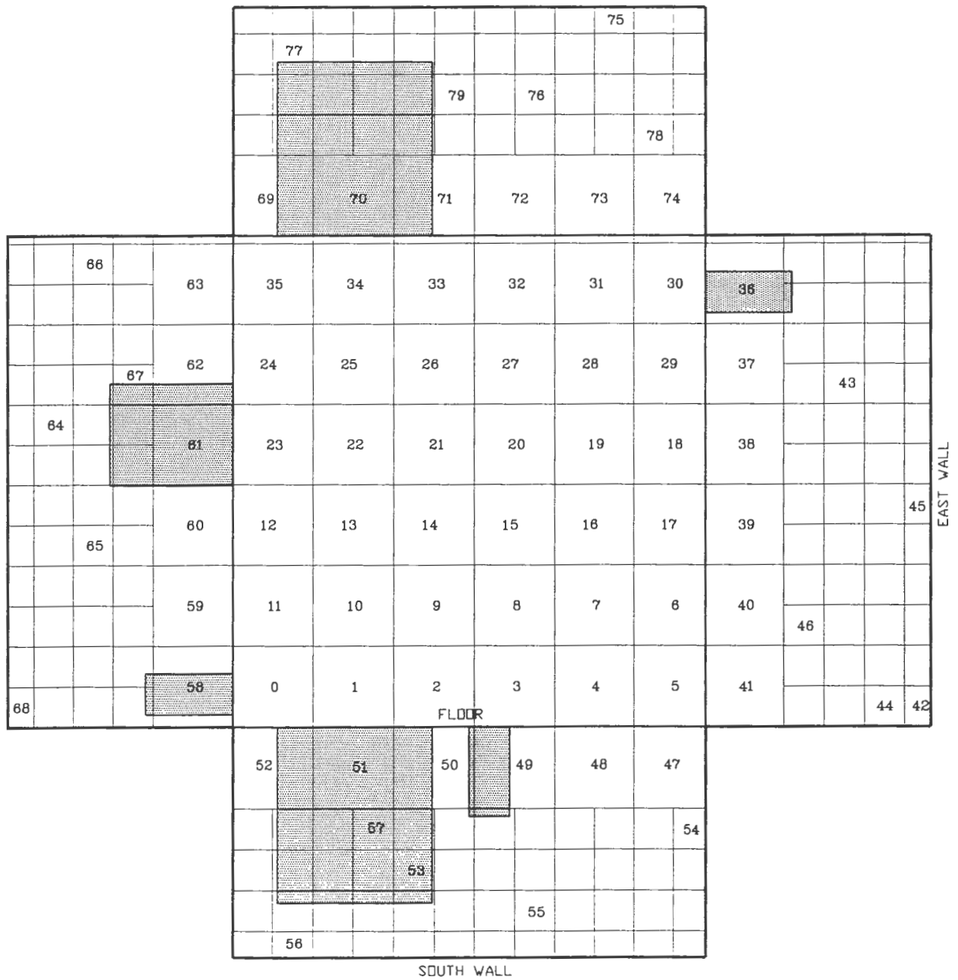
NORTH WALL



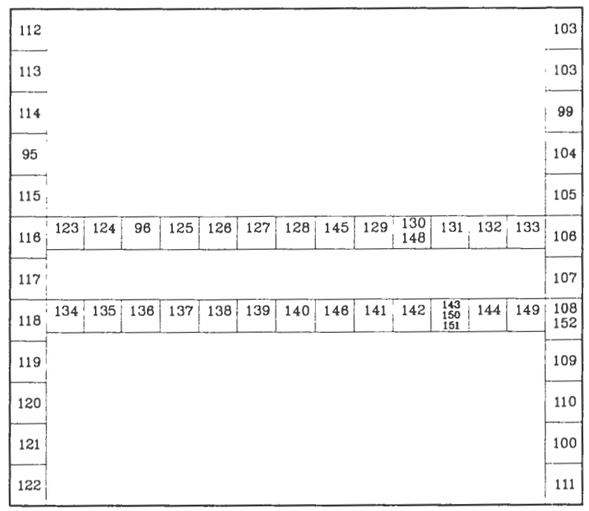
WEST WALL

EAST WALL

SOUTH WALL

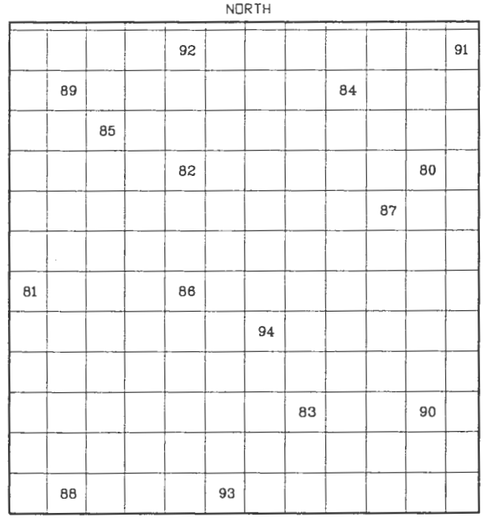
BLDG. 819-3

CRANE



N

NORTH



SOUTH

CEILING

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

DIMENSIONS OF THE CRANE ARE APPROXIMATE

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING Dwg No 7S0047-01001

BUILDING 819
ROOM 819-3

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

MISSING CEILING TILE

N

NORTH
25
SOUTH
DUCT TOP

NORTH
21
20
SOUTH
SUSPENDED CEILING TOP

NORTH WALL
BOTTOM OF SUSPENDED CEILING
12
4
5
17
11
0
2
6
13
WEST WALL
EAST WALL
10
1
3
7
16
14
FLOOR
9
8
15
BOTTOM OF SUSPENDED CEILING
SOUTH WALL

BLDG. 819-4

NORTH
19
18
SOUTH
SUSPENDED CEILING BOTTOM

NORTH
24
SOUTH
DUCT BOTTOM

NORTH
22
23
SOUTH
METAL CEILING

FEET 0 3 6
METERS 0 1 2
0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):
1. BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
D+P No. 730047-01001

BUILDING 819
ROOM 819-4

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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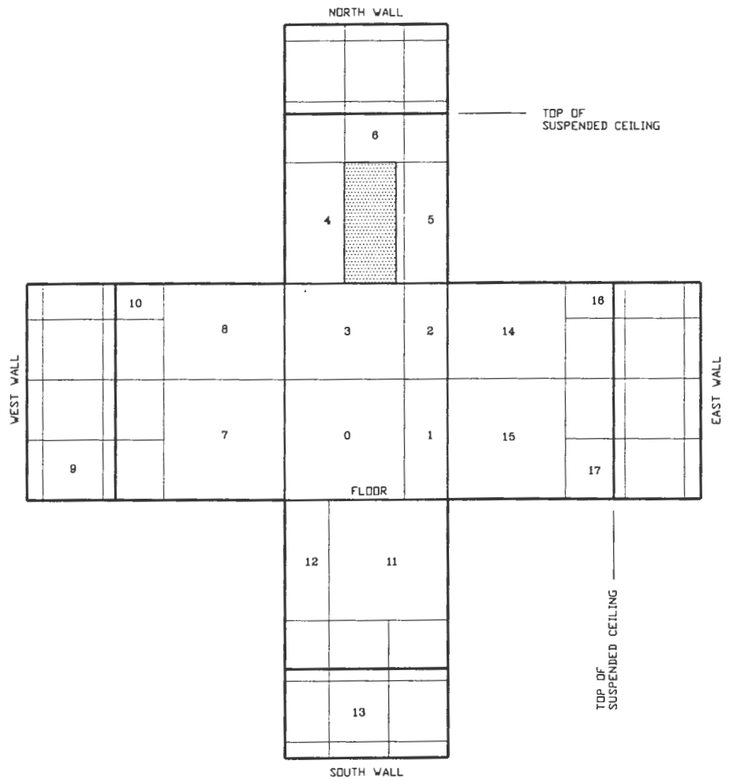
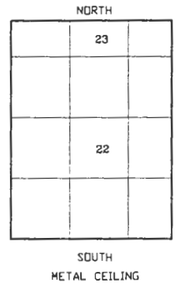
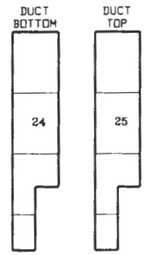
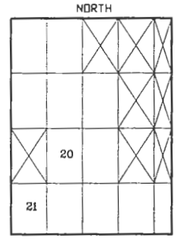
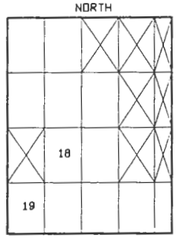


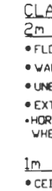
BLDG. 819-5











NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

MISSING CEILING TILE

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM
BLACK & VEATCH CONSULTING ENGINEERS.
DRAWING NO. Y2-621, MAY 2, 1955.
REVISED RECORD WORK AS-BUILT 6/2/58.
BLACK & VEATCH CONSULTING ENGINEERS.
DRAWING NO. Y2-845, MAY 2, 1955.
REVISED RECORD WORK AS-BUILT 6/2/58.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
D+G No. 730047-01001

BUILDING 819
ROOM 819-5

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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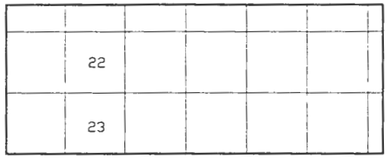
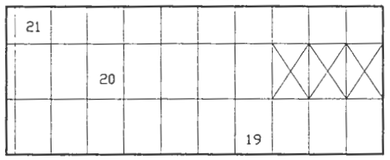
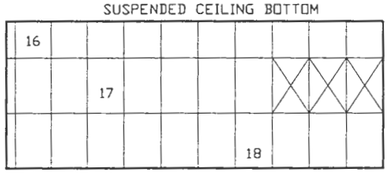
METAL CEILING



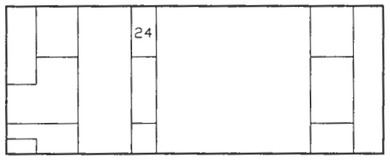
SUSPENDED CEILING TOP



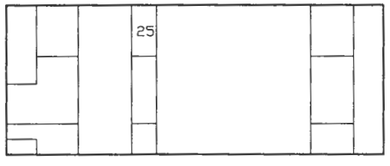
SUSPENDED CEILING BOTTOM

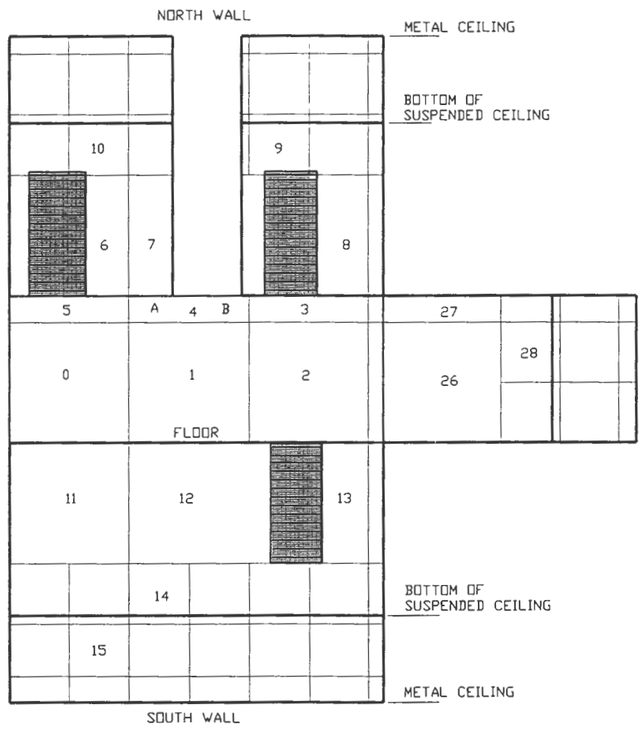


HVAC DUCT BOTTOM

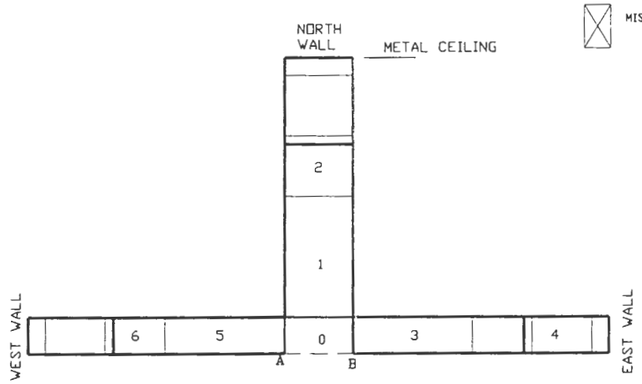


HVAC DUCT TOP





BLDG. 819-6A



BLDG. 819-6B

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

MISSING CEILING TILE

NOTE(S):

1. BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING
DWG NO 730047-01001

BUILDING 819
ROOM 819-6A AND B

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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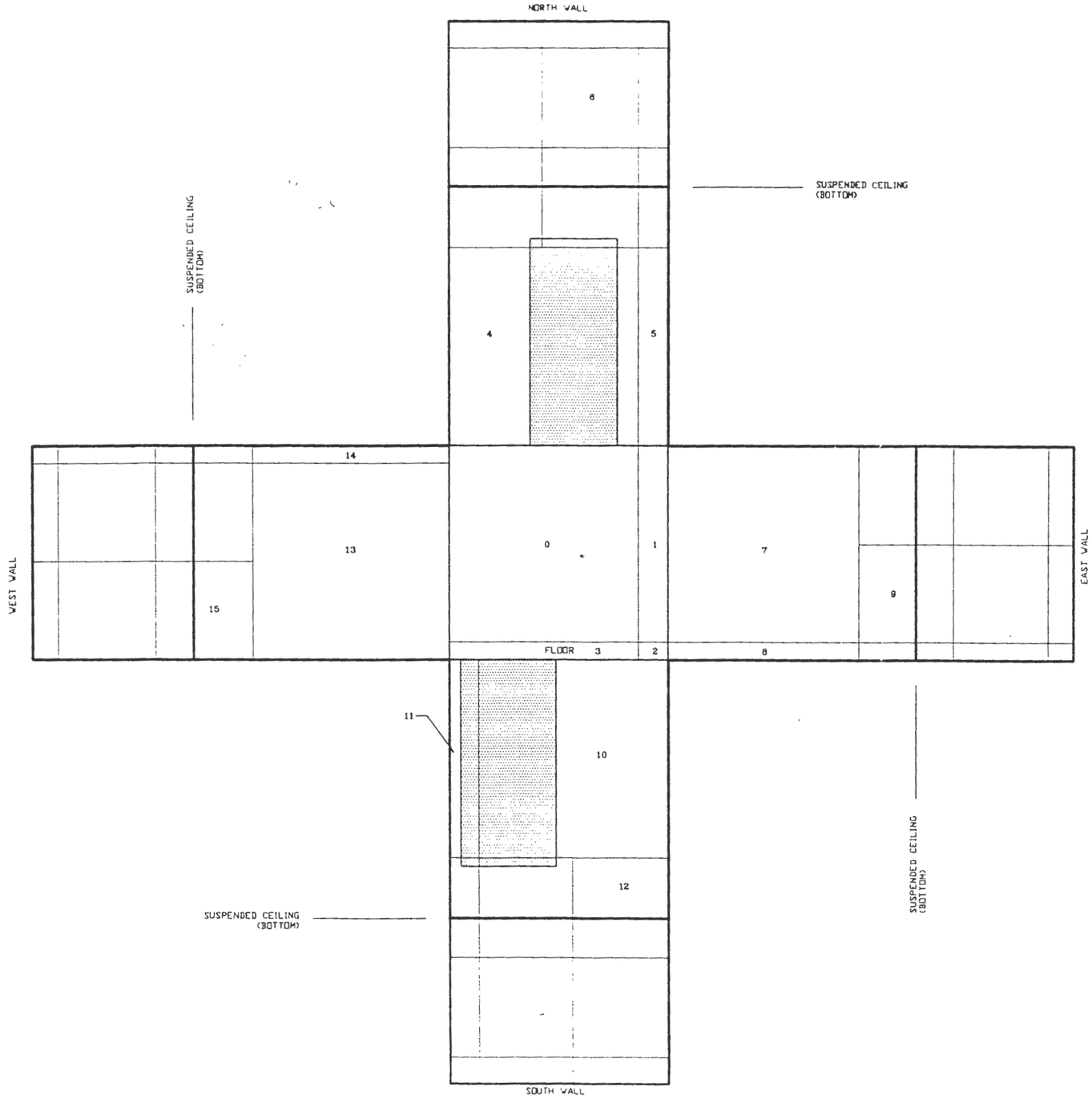
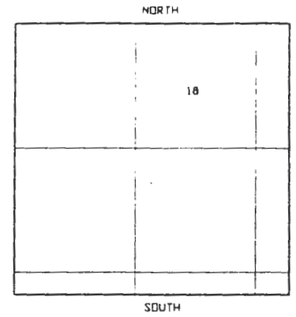
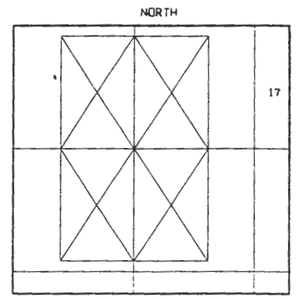


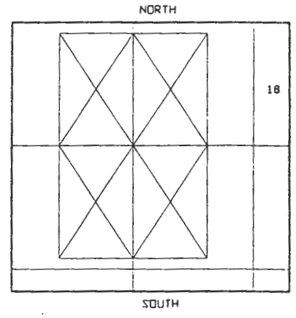
BLDG. 819-7



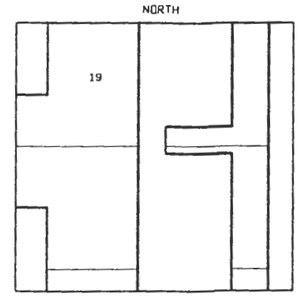
METAL CEILING



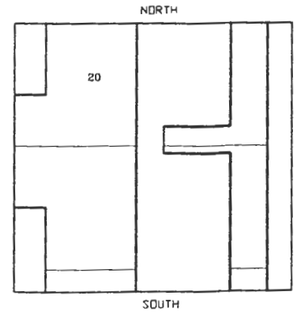
SUSPENDED CEILING (TOP)



SUSPENDED CEILING (BOTTOM)



DUCT (TOP)



DUCT (BOTTOM)

NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY (IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

MISSING CEILING TILE

FEET 0 3 6
METERS 0 1 2
0 2' 4' 6'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-62:, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-345, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

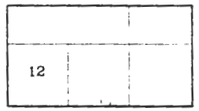
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING | DWG NO: 730047-01001

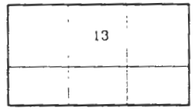
BUILDING 819
ROOM 819-7

SCALE: AS NOTED | DATE: DECEMBER 1990

SUSPENDED CEILING-TOP

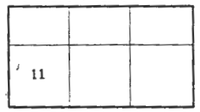


METAL CEILING

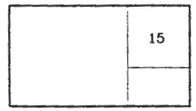


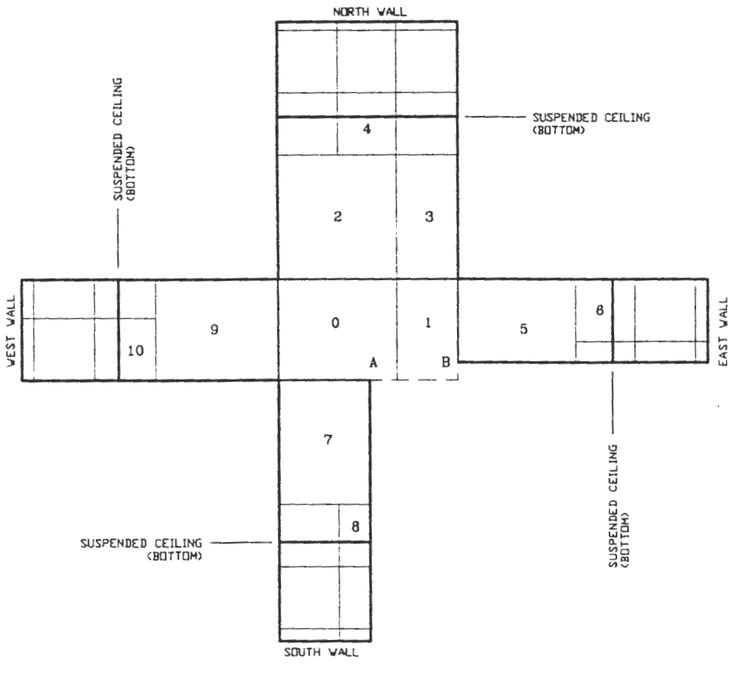
DUCT - BOTTOM

SUSPENDED CEILING - BOTTOM

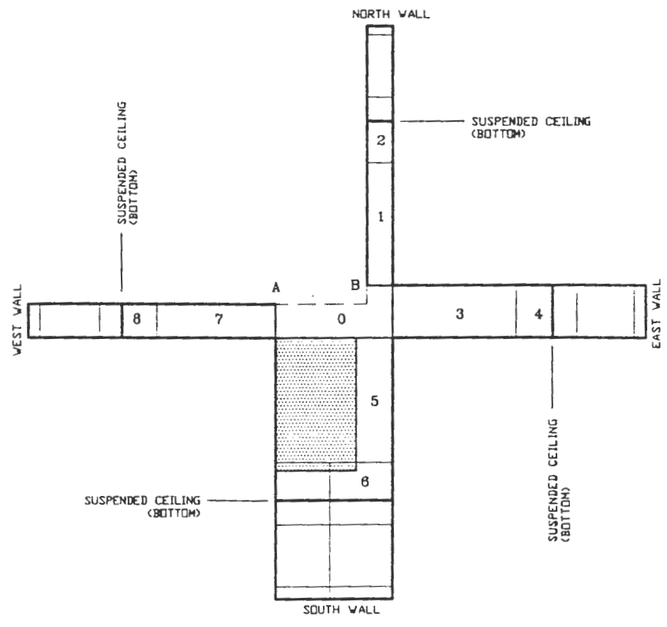


DUCT - TOP





BLDG. 819-8A



BLDG. 819-8B

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

N

NOTE:

CLASS ONE ROOM

2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m)

DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

FEET 0 3 6
METERS 0 1 2

0 4' 8' 12'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING | Dwg. No. 730047-01001

BUILDING 819
ROOM 819-8A AND B

SCALE: AS NOTED | DATE: JANUARY 2000

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NOTE:

CLASS ONE ROOM

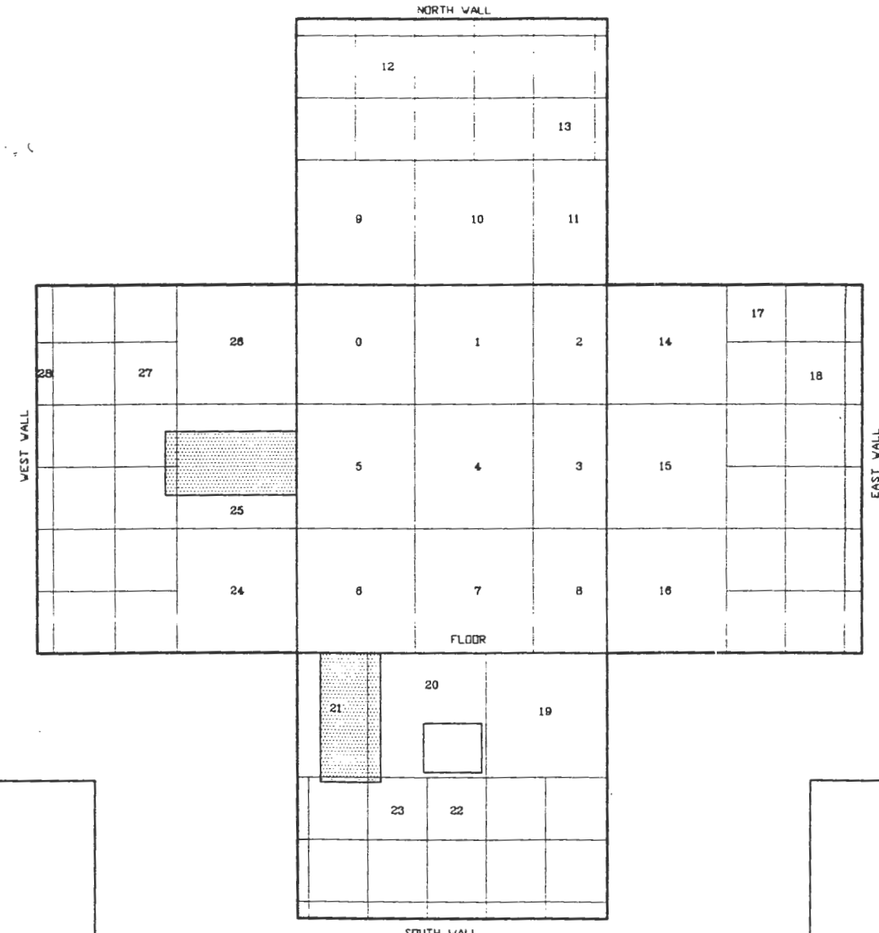
2m x 2m GRIDS, 100% COVERAGE

- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHED ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

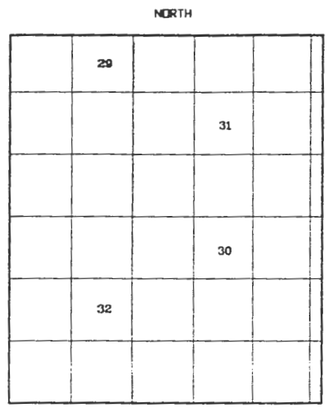
1m x 1m GRIDS, 10% COVERAGE

- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m)

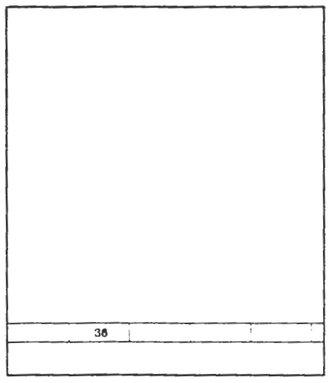
DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)



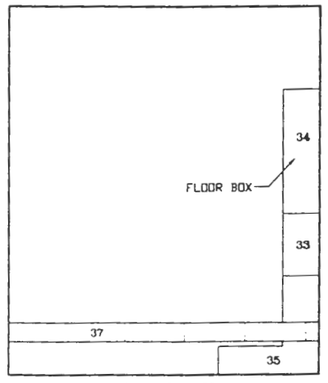
BLDG. 819-9



METAL CEILING



SUSPENDED DUCT - BOTTOM



SUSPENDED DUCT - TOP

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | Dwg No 730047-01001

BUILDING 819
ROOM 819-9

SCALE AS NOTED | DATE JANUARY 2000 | Rev. 1

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NOTE:

CLASS ONE ROOM

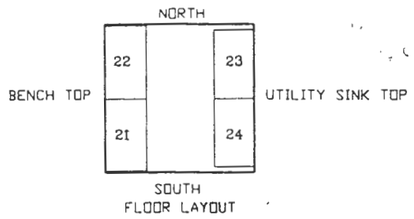
2m x 2m GRIDS, 100% COVERAGE

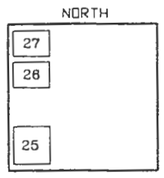
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT

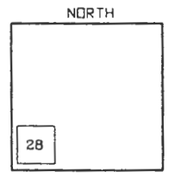
1m x 1m GRIDS, 10% COVERAGE

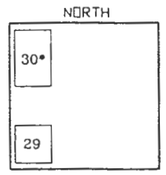
- CEILING (SUSPENDED AND NONSUSTENDED)
- UPPER WALLS (ABOVE 2m)

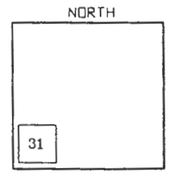
DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

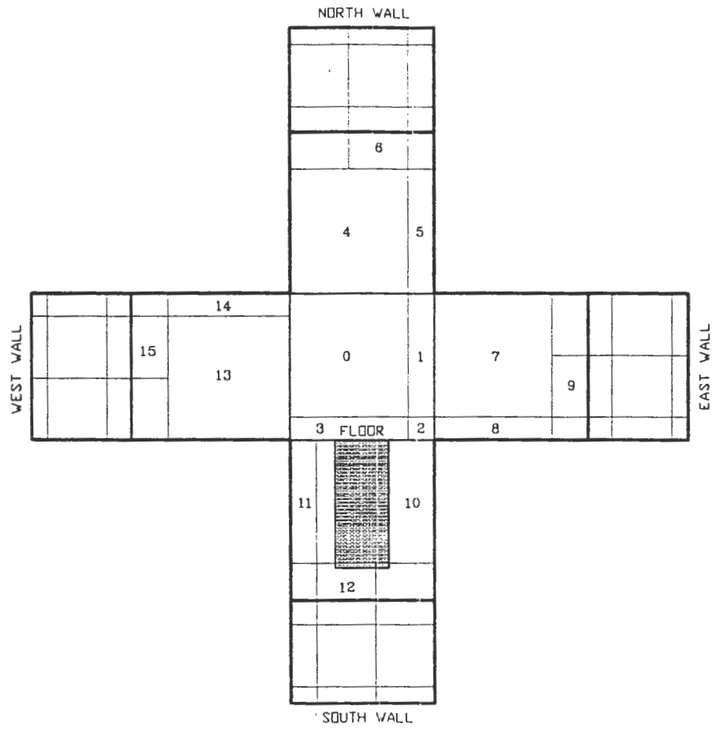




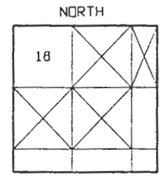


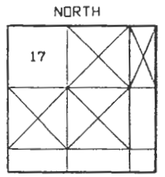


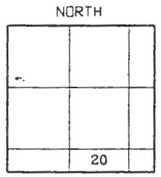


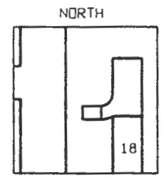


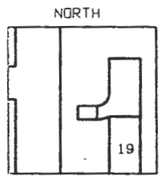
BLDG. 819-10











FEET 0 3 6
METERS 0 1 2
0 4" 8" 12"
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | Dwg. No. 738N7-CB1001

BUILDING 819
ROOM 819-10

SCALE AS NOTED | DATE JANUARY 1989 | REV. A

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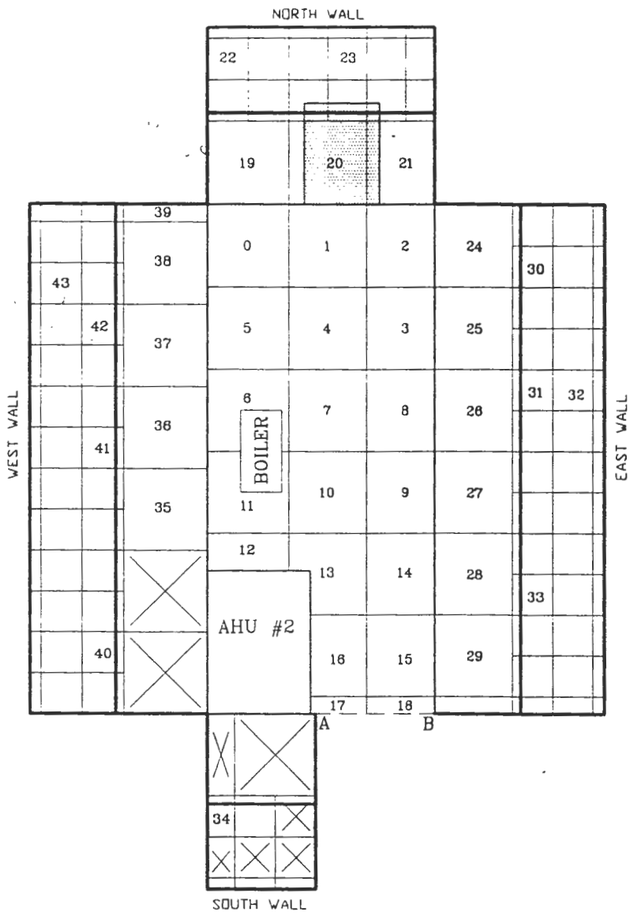
NOTE:

CLASS ONE ROOM
2m x 2m GRIDS, 100% COVERAGE
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT

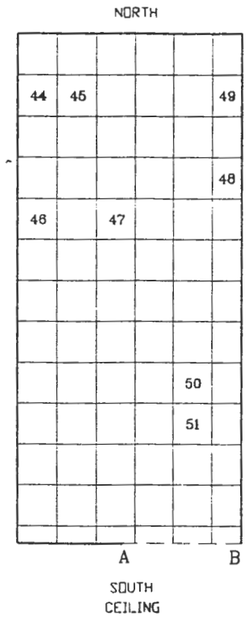
1m x 1m GRIDS, 10% COVERAGE
- CEILING (SUSPENDED AND NONSUSPENDED)
- UPPER WALLS (ABOVE 2m)

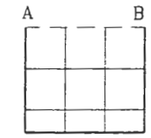
DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

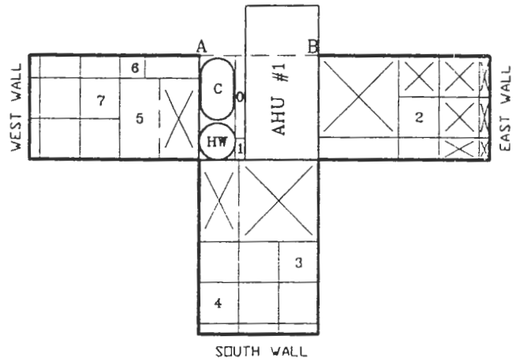
N



BLDG. 819-11A







BLDG. 819-11B

NOTE(S):
BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT: ENVIRONMENTAL ENGINEERING | Dwg. No. 730047-01001

BUILDING 819
ROOM 819-11A AND B

SCALE: AS NOTED | DATE: JANUARY 2000 | REV: A

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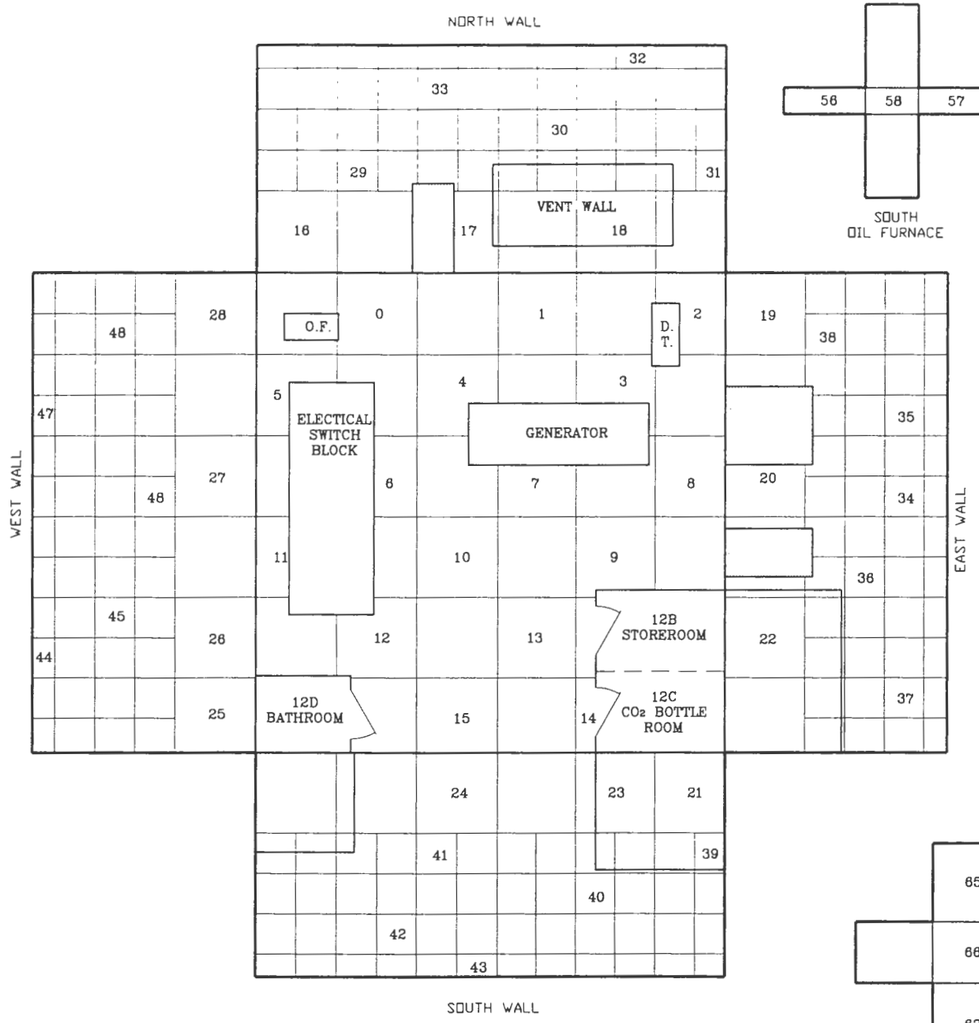
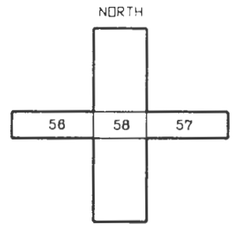
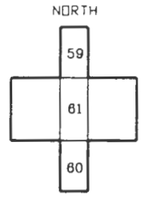
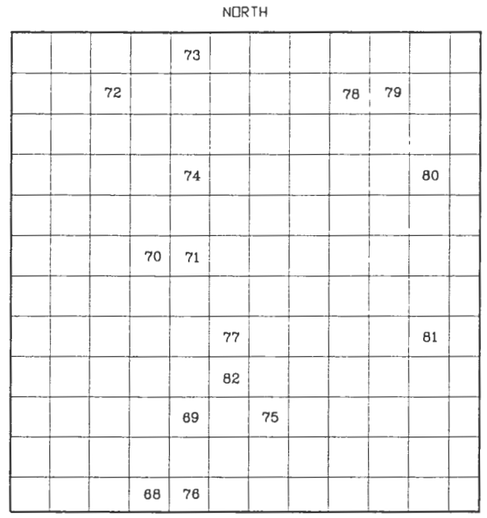








NOTE:

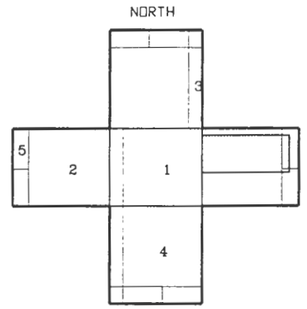
CLASS TWO ROOM
2m x 2m GRIDS, 50% COVERAGE

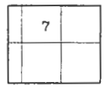
- FLOOR
- WALL SURFACES BELOW 2 METERS
- UNEARTHEN ROOFS WITH DUCTS
- EXTERIOR BUILDING SURFACES 2m FROM ACCESS
- HORIZONTAL SURFACES ABOVE 2m ABOVE FLOOR WHERE DUST OR PARTICLES WOULD DEPOSIT.

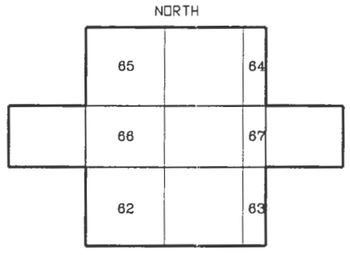
1m x 1m GRIDS, 10% COVERAGE

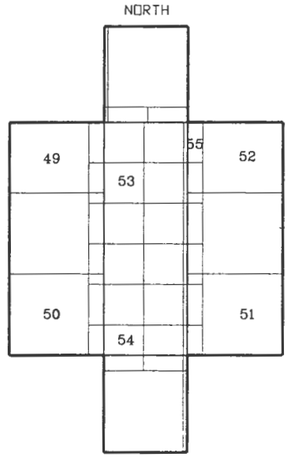
- CEILING (SUSPENDED AND NONSUSCENDED)
- UPPER WALLS (ABOVE 2m)

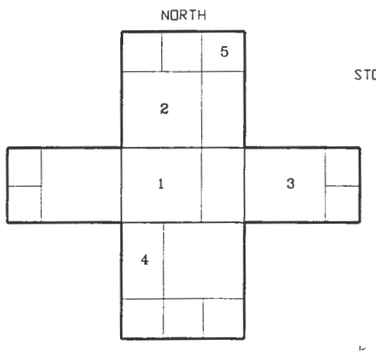
DOORWAY
(IF DOOR PRESENT, CLOSE AND TREAT AS WALL)

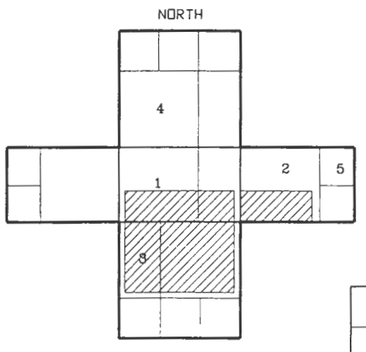


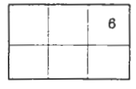


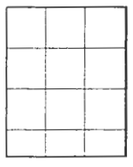


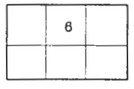












NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-521, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-945, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY

DEPT ENVIRONMENTAL ENGINEERING | D+g No 730047-01001

BUILDING 819
ROOM 819-12A, B, C AND D

SCALE AS NOTED | DATE JANUARY 2000 | REV A

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Appendix Q

Response to comments on the
Draft Radiological Survey Report (SEAD-12),
Phase I and II Surveys (Parsons, August 2002)

Response to Comments from the U.S. Environmental Protection Agency

Subject: Draft Radiological Survey Report for SEAD-12
Seneca Army Depot
Romulus, New York

Comments Dated: September 24, 2002

Date of Comment Response: March 24, 2003

General Comments:

Use of URSA. The URSA data collected was not used as part of the MARSSIM survey. The scanning data and direct alpha, beta and gamma measurements were used for this purpose. The gamma spectroscopy data and exposure (uR) data were additional measurement that were made but were outside of the scope of a MARSSIM survey. However, Parsons did use the gamma spectroscopy (URSA) data to make some conclusions about the source of the elevated levels that were identified during the course of the MARSSIM survey. But, there was no explanation in the report of how they related the gamma spectroscopy data collected (Appendix O) to their conclusions that these elevated measurements are due to naturally-occurring radionuclides.

Laboratory analysis was done on some samples to verify some of the URSA results; however, the laboratory results don't support the URSA results. In most cases, the Pu-239/240 and Am-241 were not detectable. In addition, for the background samples for which Parsons did identify these two radionuclides, they note that the identification is complicated by several radionuclides also having gamma emissions at about the same energy.

While the survey team reached conclusions regarding areas of contamination potentially exceeding the DCGLs and these areas were further investigated with gamma spectroscopy, insufficient information was provided to allow the evaluation of the assumptions based on in situ gamma spectroscopy. The text should be revised to explain the method used to determine that exceedances were the result of elevated natural background. Based on the results of the gamma spectroscopy results (obtained with the URSA technology), a high level of confidence was not established that an accurate isotopic resolution of specific energy peaks was achieved.

Response: The text, tables, and figures of Appendix O were inadvertently omitted from the Draft SEAD-12 Radiological Survey Report (Parsons, August 2002) and Appendix O has been provided for inclusion in this report. A brief summary of the procedure used in collecting and evaluating in-situ gamma spectroscopy measurements explained in Appendix O is provided below.

Locations to analyze with in-situ gamma spectrometry using the URSA system were chosen because they were either an area of potential concern, or the location had the highest gamma measurement in

the survey unit. Upon collection of a gamma energy spectrum, the energy spectrum was analyzed using the URSA Multi-Channel Analyzer (MCA) software. When analyzing the energy spectrum a smoothing factor, or a weighted averaging of the energy data, is applied. Three different smoothing factors were used: 36, 24, and 16; the larger the smoothing factor, the greater the averaging. These three smoothing factors are best used for detectors with wider resolutions, like the NaI-based FIDLER, where the photomultiplier tubes used do not supply a smooth continuum of energies. The choice of smoothing factor eliminates some of the statistical uncertainty inherent in the measurement. After the smoothing factor has been applied, the MCA software then performs an automatic peak search, which may then be supplemented by manual peak identification. Once the peaks have been identified, the software analyzes the energy ranges of the peaks to determine what radionuclides may be present. The radionuclide identification can be completed using two different methods of comparison: identification by peak energy +/- 6 keV, or identification by evaluating the peak's full width at half maximum (FWHM). The FWHM value relates to the shape or resolution of the overall peak. The information is clarified further in Appendix L, Guidance for Spectrum Analysis Process, and in Appendix O, Interpretation of Gamma Spectroscopy Results.

For each radionuclide identification method (energy band or FWHM) and each smoothing factor (36, 24, and 16), an URSA MCA report is generated that contains potential radionuclide identifications. A total of 6 reports were generated for each spectrum collected; these reports are located in Appendix O on the compact disc (provided with the draft report in August, 2002).

Upon generation of the URSA MCA reports, additional analysis is completed that consists of compiling the potential identifications with the corresponding peak energies and FWHM value for that peak. The peak FWHM values are evaluated to determine if the radionuclides that were identified by the MCA software are accurate and reasonable. This evaluation is to determine if the identified peak fractional FWHM value (a measure of the resolution of the energy peak) is less than 10% for primary peaks and 20% for secondary peaks – these percentages are conservative guidelines based on the expected energy resolution (5-10%) of NaI detectors and on the radionuclide specific examples using calibration standards. True radionuclide identifications are then additionally analyzed by evaluating their relation to any other radionuclides identified in the spectrum for radioactivity relationships (e.g., parent/progeny).

Once the true identification analysis is complete, ratios of different radionuclide activities are assessed. Naturally occurring radioactivity exhibits a known set of ratios between parent/progeny radionuclides (U-238 to Th-234) and between different isotopes (i.e., U-238, U-234, and U-235). The same is also true of man-made radionuclides such as the radionuclides associated with weapons grade plutonium. Also the presence or absence of specific radionuclides within the spectrum can determine the nature of the spectrum being analyzed (i.e., the absence of significant amounts of decay progeny in processed uranium materials). At this point, determinations can be made about what radionuclides

were correctly identified in the energy spectrum and if these radionuclides exist as part of a naturally occurring decay scheme.

Material samples were collected within the SEAD-12 buildings, in addition to collecting the in-situ gamma spectroscopy measurements, to verify the results from the Final Status Survey (FSS). A limited amount of material samples were collected based on the results of the gamma radiation survey and sent to an off-site laboratory for isotopic analysis. The laboratory analysis reported mostly non-detect values for the isotopes. Where there were identified isotopes, the results were negligible based on the small quantities measured in relation to the associated error. These results are presented in Table 4-27.

Following the procedure outlined above, Am-241 and Pu-239/240 were identified in the in-situ gamma spectrometer energy spectrums. However, upon completion of the analysis, these radionuclides, which were present with several other radionuclides (Pb-210, Ac-228, U-238, Tl-208, and Th-228) having gamma emissions at 13 keV, were determined to be misidentified based on the presence of progeny and parents present and the historical use of the building.

Specific Comments:

Comment 1: Section 4.5.7, Material Sampling Results. Isotopic information was collected in addition to MARSSIM-based sampling. A minimum of one in situ spectroscopy measurement was collected in each building. A total of 96 measurements were collected. The locations selected in each building were based on actual elevated contamination measurements or the potential for exceeding DCGLs (based on the results of the WRS test). To confirm gamma spectroscopy results, material samples were collected at seven locations. These were analyzed using gamma spectroscopy onsite and then sent offsite for further Pu-239 and Am-241 isotopic analysis.

Although referred to, additional discussion of Table 4-27 is needed. The results presented in this table do not indicate a favorable comparison of results. The laboratory results reported detectable concentrations of Am-241 in all samples, but the gamma results were below detection in six of these. The seventh gamma spectroscopy sample reported levels of both Pu-239 and Am-241, but at much higher levels than the laboratory results. This lack of agreement should be discussed.

Response 1: Isotopic laboratory results indicate detectable concentrations for Pu-239/240 and Am-241 in only two samples; in both cases there is a large error associated with the detection. All other laboratory results for Pu-239/240 and Am-241 were below the MDA and are therefore considered to be non-detect, as noted by the standard "U" qualifier in Table 4-27. The analytical results from the material samples confirm the findings of the in-situ gamma spectroscopy (i.e., that there is no residual Pu-239/240 or Am-241 contamination in the SEAD-12 buildings). The discrepancy in the detected

concentrations for sample BKGD CB1 is a result of the laboratory analyses being conducted using alpha spectroscopy, which is more exact (i.e., the primary alpha energies of the radionuclides potentially present are less similar than their gamma energies). The concentrations reported in Table 4-27 for the gamma spectroscopy results from that sample reflect the contributions of several naturally-occurring radionuclides with low energy gamma emissions. This overlap is not as likely for alpha spectroscopy analyses.

Comment 2: Section 5.2.5, Gamma Spectroscopy. Additional explanation is needed to document the way that the elevated gamma spectroscopy results were inferred as naturally occurring. The text indicates that one other radionuclide (associated with the natural U-238 decay chain") was identified, but it is not noted. The justification for assuming it is in equilibrium with U-238 is not presented. This determination can only be made by examining the radionuclide profile of the sample and comparing the concentrations of various radionuclides within the U-238 decay chain. These data are not presented or discussed.

Response 2: Discussion regarding the in-situ gamma spectroscopy results is presented in the text of Appendix O, which was inadvertently omitted in the Draft SEAD-12 Radiological Survey Report (Parsons, August 2002). The following topics are addressed in Appendix O:

- Man-made radioactive materials;
- Artificially enhanced uranium;
- Naturally-occurring uranium and thorium;
- Assessing the potential for identified spectral peaks being associated with ambient background;
- Radionuclide identification; and
- Specific identifications within SEAD-12 buildings.

Additional rational for concluding that the survey unit that includes location Building 804, room 1, grid 13 (sample number 14) is suitable for release is presented in Section O.6 and Table O-3 of Appendix O. As indicated in Table O-3, sample number 14 identified Pb-210 in addition to U-235. Pb-210 is the radionuclide referred to in Section 5.2.5 of the text as being the one other radionuclide associated with natural U-238 decay chain that was identified.

Response to Comments from the New York Department of Environmental Conservation

Subject: Draft Radiological Survey Report – SEAD-12 Phase I and Phase II Surveys
Seneca Army Depot
Romulus, New York

Comments Dated: February 6, 2003

Date of Comment Response: March 24, 2003

The New York State Department of Health (NYSDOH) has reviewed the above referenced document. Comments are as follows

General Comments:

While the NYSDOH does not agree on all aspects of this report, it does incorporate many of the suggestions offered by NYSDEC, NYSDOH and USEPA in previous correspondence.

Based on our initial review of this report and accompanying data, the NYSDOH find no overwhelming evidence to object to the conclusions arrived at by the US Army that SEAD-12 buildings can be unrestrictedly released, based on the radiological considerations. There are, however, some general and specific questions or concerns relating to MARSSIM Methodology utilized and some conclusions drawn from some data on elevated areas in some buildings.

Since the NYSDOH's initial involvement in reviewing decommissioning plans there was concern that there was little or no historical documentation of activities performed in these buildings. This led to the decision by the Army to conduct a simultaneous characterization and final status survey using MARSSIM approach. We agreed at that time that data obtained during the characterization survey could be incorporated in the final status survey. Because MARSSIM assumes that all decontamination efforts have been completed, a statistical approach for the final status is acceptable.

In this case, physical samples were only obtained from bias elevated scanning locations on a limited basis and not from a random sampling nor pre-determined number of samples. It is difficult, therefore, to justify acceptance solely on the statistics generated, since the procedure was not strictly followed.

Although MARSSIM was not starkly adhered to in this case, there does not appear to be any evidence that remaining contamination would exceed negotiated clean up goals.

Response: The characterization and final status surveys (FSS) within the SEAD-12 buildings were completed simultaneously as agreed upon between the regulators and the Army. The surveys were

planned such that the appropriate data for performing a FSS would be collected so that the appropriate statistical analysis could be performed to demonstrate compliance of the survey unit.

The samples collected during the SEAD-12 Building Surveys included direct alpha, beta, and gamma measurements, exposure rate readings, alpha/beta/gamma radiation smear samples, tritium samples, material samples for laboratory analysis, and in-situ gamma spectroscopy measurements. The sampling design was based on having the total number of direct measurements collected meet the minimum number of samples required for statistical analysis. All other samples collected were beyond what was needed statistically to serve as confirmation of the surface measurements providing additional support for the conclusions made based on the final status survey. The location of all direct measurements collected in the Class I and II survey units was based on a random-start grid; measurements collected in Class III survey units were based on both random and biased locations. MARSSIM does not differentiate between direct measurements and physical samples as long as the data requirements are being met (MARSSIM, September 2000, Section 6.1). Since the main concern in the SEAD-12 buildings was surface contamination, it was appropriate to use direct surface measurements as the primary means of sampling.

Specific Comments:

Comment 1: Section 5.2.1.1, Gamma Measurements: Please explain the necessity of re-converting a gamma measurement expressed in an activity of dpm/100 cm^2 back to a count rate in cpm. The whole purpose is to take a cpm measurement and convert it to an activity or unit area. The end purpose of evaluating an area further if it exceeds background is fine.

Response 1: The FIDLER and count-rate meter combination used to collect gamma measurements provides results in counts per minute (cpm). In order to make a direct comparison of the raw survey data against the $DCGL_W$-adjusted background, the $DCGL_W$–adjusted background data for Am-241 (the most conservative radionuclide) were converted to counts per cpm using the daily instrument. While it is acknowledged that a conversion from cpm-to-dpm could also be performed, it was felt that the cpm-to-dpm conversion would be less straightforward and would involve making assumptions about the efficiencies of the instruments used for the background survey (performed in 1999).

Comment 2: Table 5-5, Building 804: The result of gamma spectroscopy indicates an activity exceeding the $DCGL_W$ for U-235. The conclusion, however, is that the elevated level is naturally occurring. Given that U-235 exists in nature as .07% of the total uranium present; why is there no U-238 or U-234 reported in the sample? Could the result have been misidentified? Building 819 indicated both elevated U-235 and Ra-226 with the conclusion that they are naturally occurring. It is highly unlikely that these levels are found naturally in building materials. It's more likely they have been incorrectly identified due to their similar energies. If not, some additional decontamination may

be warranted. Using an explanation that alpha measurements do not exceed DCGL's is not acceptable, given the possibility of alpha emissions being obscured by paint or other covering.

Response 2: Discussion regarding the in-situ gamma spectroscopy results is presented in Appendix O, which was inadvertently omitted in the Draft SEAD-12 Radiological Survey Report (Parsons, August 2002). This section of Appendix O has been provided for inclusion into the report.

Pb-210, which is a decay product of both U-238 and U-234, was identified in the Building 804, Room 1 sample. Typically, U-238 and U-234 were not specifically identified in the gamma spectroscopy measurements because of the relatively low intensities of their gamma emissions. Rather, the detection of Th-234 (which is a short-lived decay product of U-238) was used as an indicator that U-238 and U-234 were present. It is possible that the ~186 keV identified as U-235 (Table O-3) could instead be Ra-226 (or a combination of both radionuclides). Likewise Th-234 and two other naturally-occurring radionuclides (Pa-234 and Ac-228) have gamma emissions with energies in the ~95 keV range that may contribute to the reported confirmatory peak for U-235 (96.9 keV). In any case, the gamma spectroscopy results support that there is no contamination at this location.

Given the history and known use of Building 819 Room 12 (an engineering space with a separate entry than the rest of the building) it is unlikely that there would be any residual contamination in this room. The detections of Pb-214 (from the U-238 decay series) and Bi-211 (from the U-235 decay series) suggest that the detections of Ra-226 and U-235 are also the result of naturally-occurring material. It should be noted that this worst case Ra-226 concentration (5388 dpm/100cm^2) is still below the ANSI/HPS Ra-226 surface-screening standard for a dose limit of 10 mrem/yr (6000 dpm/100cm^2, from ANSI/HPS N13.12-1999, *Surface and Volume Radioactivity Standards for Clearance*).

Furthermore, if radium contamination were present, it would likely be in the form of radium paint. While chemical processing does remove decay products and parents from the radium used in luminescent paints, isotopic separation of the radium is generally not performed. As a result, both naturally-occurring Ra-226 and Ra-228 (from the Th-232 decay series) would likely be present in any sort of radium paint bearing material. Both Ra-228 and its immediate progeny Ac-228 are beta emitters. It is agreed that any residual alpha surface contamination would not be detected through paint (if it were painted over); however, any potential radium contamination would also have a beta component (particularly from Ac-228) that would be detectable. Since there were no elevated beta measurements in Building 819 Room 12, it is reasonable to conclude that there is no radium contamination present.