Final

Radiological Site Assessment Report

C.R. Layton U.S. Army Reserve Center (FL005)
1125 North East 8th Avenue, Gainesville, Florida

Contract No. W912QR-12-D-0027
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Prepared For:

U.S. Army Corps of Engineers
Louisville District

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Authored By: _____ Date: 4/19/2013

Joseph Green, Health Physicist

STATEMENT OF INDEPENDENT TECHNICAL REVIEW

TerranearPMC (TPMC) has completed the Final Report on Radiological Site Assessment at the C.R. Layton U.S. Army Reserve Center (USARC) (FL005) located in Gainesville, Florida.

Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumptions; methods, procedures, and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps policy.

Significant concerns and the explanation of the resolution are as follows:

- Internal TPMC Technical Review comments are documented in the project file. Changes to the report addressing the comments have been verified by the Project Manager. As noted above, all concerns resulting from independent technical review of the project have been considered.

_____ Date: 4/19/2013
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TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

TABLE OF CONTENTS (CONTINUED)

LIST OF ACRONYMS

ASME	American Society of Mechanical Engineers
cm^2	Square Centimeter
CoC	Chain of Custody
cpm	Counts per Minute
DMA	Defense Mapping Agency
DoD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
ECP	Environmental Condition of Property
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
ES&H	Environmental Safety and Health
FP	Field Procedure
ft^2	Square Feet
GEL	General Engineering Laboratories
gcpm	Gross counts per minute
hr	Hour
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
m^2	Square Meter
MARSSIM	Multi Agency Radiation Survey and Site Investigation Manual
MDA	Minimum Detectable Activity
MEP	Military Equipment Parking
NELAC	National Environmental Laboratory Accreditation Conference
NIST	National Institute of Standards Technology
NORM	Naturally Occurring Radioactive Material
NQA-1	Nuclear Quality Assurance Level -1
NRC	Nuclear Regulatory Commission
OMS	Organizational Maintenance Shop
PM	Project Manager
POC	Point of Contact
POV	Privately Owned Vehicle
pCi/L	Picocuries per Liter
QA	Quality Assurance
QC	Quality Control
QSM	Quality Systems Manual
RADIAC	Radiation Detection, Indication and Computation
RAM	Radioactive Material
RSAR	Radiological Site Assessment Report
RSO	Radiation Safety Officer
TPMC	TerranearPMC, LLC

TABLE OF CONTENTS (CONTINUED)

µR	Micro Roentgen
USACE	U.S. Army Corps of Engineers
USARC	U.S. Army Reserve Center
USAR	U.S. Army Reserve
USEPA	U.S. Environmental Protection Agency

ES 1.0 EXECUTIVE SUMMARY

ES 1.1 INTRODUCTION

This radiological site assessment report (RSAR) describes objectives, procedures, and findings of the radiological assessment activities conducted at the C.R. Layton U.S. Army Reserve Center (USARC) (FL005) located in Gainesville, Florida, hereafter referred to as the "Layton USARC Site" or "the Site".

This report was prepared by TerranearPMC, LLC (TPMC) of Exton, Pennsylvania, to fulfill the requirements of Contract W912QR-12-D-0027, Delivery Order No. 0002 with U.S. Army Corps of Engineers (USACE), Louisville District.

ES 1.2 PROJECT OVERVIEW

Radiological assessment of the Site began with a review of available historical information prior to mobilization in the field. The Site has a low probability for being impacted by residual radioactive materials based on the following three criteria inherent to USARC operations: 1) only small quantities of radioactive materials were used thus presenting an inherently low risk for release or exposure; 2) the radioactive sources used at these sites are typically sealed sources, thus minimizing release to the environment; and 3) standard Army protocols that require strict management, control, and reporting of radioactive material use. This historical information was used to develop the survey approach and methodology used by the field team in performing the radiological site assessment.

The radiological site assessment activities were performed on February 26, 2013. Upon arrival at the Site, the team performed visual inspections of the facility and conducted interviews with key Site personnel to obtain additional information used to refine the survey approach. Once the survey approach was defined, the team conducted radiological surveys for gamma and alpha/beta radiation using hand-held instruments. In addition, the field team obtained smear/wipe samples at various locations for off-site laboratory analysis to determine the presence of removable alpha, beta, and tritium radioactivity.

ES 1.3 FINDINGS AND RECOMMENDATIONS

After review of the related site historical documents, personnel interviews, site inspections, visual walk downs, and radiological surveys, there is no conclusive evidence that radioactive materials/commodities were used or stored at the Layton USARC Site. However based on typical USAR operations and field deployable units, it's reasonable to assume some small quantities of radioactive material were used and/or stored at the Site. Based on our findings, there is no evidence to suggest that radiological commodities were improperly managed at the Site or that radiological material was released to the environment.

During the site visit, the survey team performed a comprehensive radiological survey of all locations where radioactive materials may have been used or stored based on historical evidence, interviews, and site inspection findings. The radiological survey included the following samples and data points: thirty (30) direct alpha and beta measurements, thirty (30) gamma radiation exposure rate measurements; ten (10) smear samples for removable alpha /beta radioactivity; and three (3) tritium wet smear samples. All smear samples were sent to the off-site laboratory for analysis. The surveys identified three (3) locations where the gamma exposure rate measurements were slightly elevated; however further investigation determined

the elevated readings were indicative of Naturally Occurring Radioactive Material (NORM) in building materials. No other survey results exceeded the most restrictive action levels as established by the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide (Reg Guide) 1.86 Table-I limits.

The radiological assessment results documented in this report support the finding that the Layton USARC Site does not currently possess radioactive materials or contain residual radioactivity above the Reg Guide 1.86 Table-I limits. Based on the historical information and supporting survey results, the site may be considered radiologically non-impacted and available for unrestricted use, in accordance with NRC NUREG 1575/EPA 402-R-97-016, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), Revision 1 guidance.

1.0 PROJECT BACKGROUND

1.1 SITE HISTORY, LOCATION AND FEATURES

The C.R. Layton USARC (hereafter referred to as the "Layton USARC Site" or "the Site") is approximately 6.8-acres of land and consists of an administrative building, two petroleum, oil and lubricant (POL) storage buildings and a closed wash pad. Military equipment parking (MEP) area and a privately owned vehicle (POV) parking area are also located on the Property. The Property was transferred to the Department of the Army in 1950 and developed in 1951 to be utilized as a USAR Center. The C. R. Layton USAR Center was occupied by the 257 TC BN and the 399 TC DET until August, 2009 at which time the units relocated to the Gainesville USARC. While the Gainesville USARC was being renovated during FY09, the 7201 USA MED, 342 MED DET, 1437 MED DET and 1469 MED DET unit personnel were temporarily relocated to the C. R. Layton USARC. These units returned to the Gainesville USARC during August 2009.

Administrative building is a two-story structure with a small basement. The building is constructed of steel, concrete and brick mansory skin. The entire building is approximately 35,625 square feet (ft^2). The building was used for training and administrative purposes.

The other two small storage buildings are located approximately 25 feet southwest of the main building (Shed S and Shed N). These buildings were constructed with concrete and mansory.

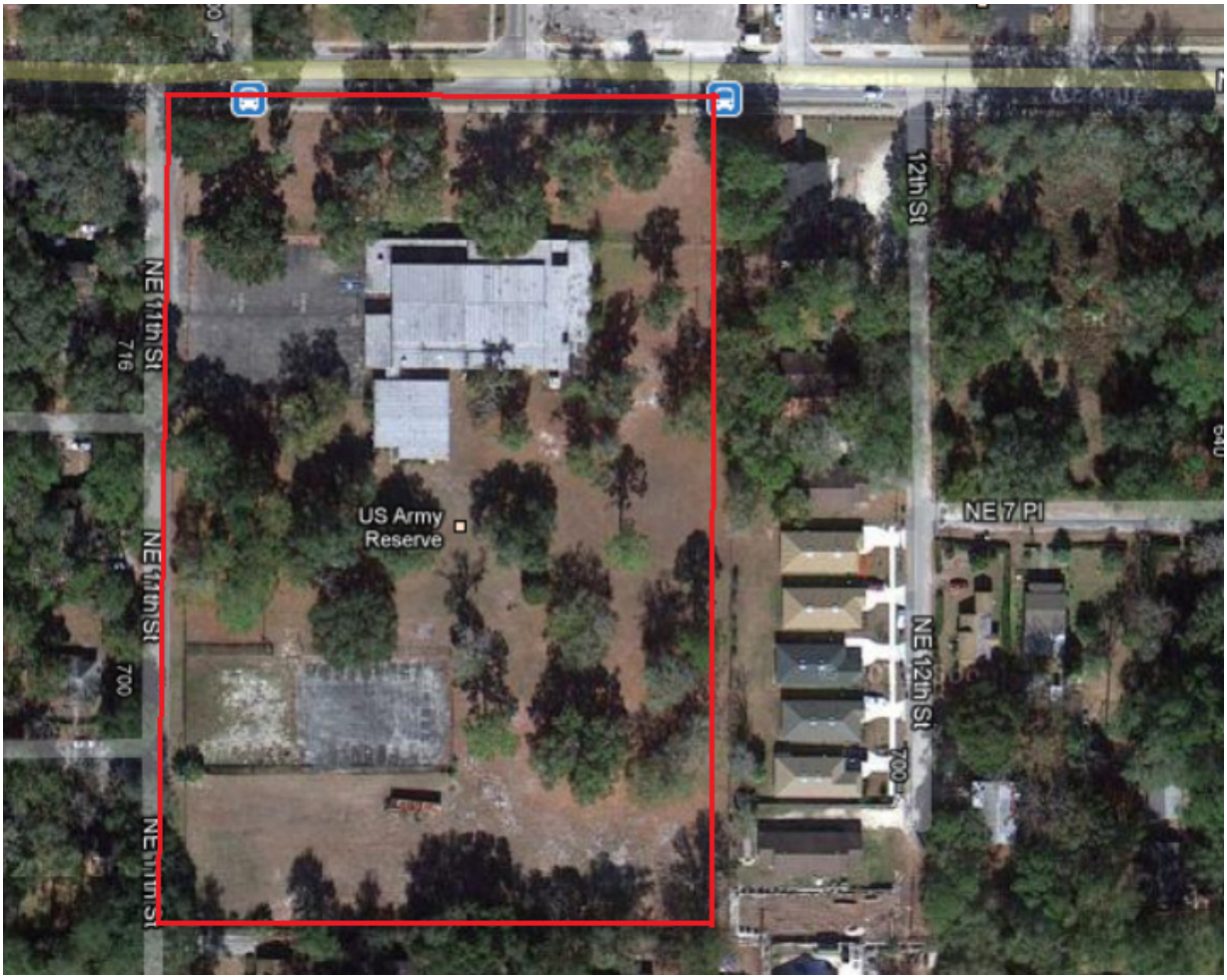
Based on available information, no radiological survey/assessment has been performed at the site. No site specific radon survey data is available.

An aerial image of the Site with boundary outline is provided in Figure 1-1.

1.2 AREAS OF CONCERN

After review of the Site and related historical documents, personnel interviews, site inspections, visual walk downs, and surveys, no indications were found of the past storage or use of radiological commodities at the Layton USARC Site. However, based on nature of material and equipment typically utilized by military and transportation units, it is acceptable to assume that some low-level items were stored here (such as compasses, personal Radiation Detection, Indication and Computation (RADIAC) meters, and small arms weapons sights, etc.) . There was no evidence found to suggest that radiological commodities were improperly managed at the Site or that radiological material was released.

Figure 1-1
Site Aerial View



C.R. Layton U.S. Army Reserve Center (FL005)
1125 North East 8th Avenue, Gainesville, Florida

Note: Red outline shows approximate Site boundary.

2.0 OBJECTIVES AND RADIOLOGICAL ASSESSMENT METHODOLOGY

The overall objectives of the Radiological Site Assessments are 1) to provide sufficient data to demonstrate areas with un-measureable or acceptable levels of radioactive contamination are suitable for release for unrestricted use in accordance with the criteria presented in Section 4.0; and 2) define the nature and extent of any identified contamination or residual radioactive materials. The intent is to provide the stakeholders with sufficient data to support the radiological unrestricted release of the specified facility or to define the nature and extent of any remaining radiological commodities or residual radioactive material.

2.1 RADIOLOGICAL ASSESSMENT METHODOLOGY

The Site assessment was performed in accordance with the MARSSIM guidance document (NRC NUREG 1575) protocols. Survey action levels for alpha and beta radiation levels were obtained from NRC Reg Guide 1.86 Table-I. In accordance with industry practice, the area gamma radiation survey action limit was based on an "indistinguishable from background" determination that is typically 2 to 3 times ambient background radiation levels. The Site did not have a history of radiological releases, accidents, or radioactive waste disposal; and thus the survey was intended to support a MARSSIM non-impacted definition leading to an unrestricted radiological release determination. Survey design was intended to remain flexible to account for any real-time measurements or information that becomes available during the survey process.

For this project, radiological assessment methodology included reviewing available historical and current information; performing visual inspections; conducting interviews; conducting general radiation surveys; obtaining smear and wipe survey samples; laboratory analysis of smear/wipe samples; and evaluation/interpretation of the analytical results. Based on the historical reviews and interviews, no evidence was found to suggest that radiological commodities were improperly managed at the Site, or that radiological material was released. However, based on the fact that the historical record is often incomplete and the potential exists for loss or leakage of radiological commodities, a radiological site assessment is warranted. Based on the existing historical evidence and general USAR knowledge base, the Layton USARC Site qualified for the simplified assessment procedure of Appendix B of Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). This determination is based on the small quantities of mostly sealed radioactive materials likely used and/or stored at the Site, and the fact that no evidence exists for inadvertent loss or release of radioactive materials from the Site.

2.2 FIELDWORK ACTIVITIES

Fieldwork activities may be grouped into two categories:

1. Pre-mobilization Activities
2. Field Activities

2.2.1 Pre-Mobilization Activities

Pre-mobilization activities included those actions required to ensure the team was fully prepared to perform their job tasks upon arrival at the project site.

TPMC separated the pre-mobilization phase into the following activities:

1. Historical Due Diligence

2. Staffing and Training
3. Procurement Actions
4. Shipment of Equipment and Supplies

2.2.1.1 Historical Due Diligence

TPMC initiated due diligence review by researching the available site assessment reports for the Site. In addition, available Army literature regarding radioactive commodity use and storage was reviewed (TB 43-0116). The Site review and associated documentation were logged and referenced for use in field activities.

The results of the historical due diligence review are documented in the Historical Review Checklist (Appendix A). The historical documentation does not specifically identify isotopes used at the Site; however, based on our experience, the following isotopes have the highest probability of being present at the Site based on our knowledge of radioactive sources found in the Army commodity inventory: H-3, Ra-226, Sr-90, Cs-137, Th-232, U-238, Pu-239, Ni-63, Pm-147, Co-60, Am-241. Typical types of radioactive commodities managed at a typical USARC include RADIAC meters; chemical agent detectors; moisture density gauges; lensatic compasses; night-vision goggles; radio-luminescent weapons sights and wristwatches; and armored vehicle dials and gauges.

2.2.1.2 Staffing and Training

TPMC delegated full responsibility and authority to the Project Manager (PM) regarding project performance and management of project staff. The PM had direct access to top-level management of TPMC and the subcontractors so that contract, management, and staff needs were immediately met. In addition, key personnel were selected based on their expertise, credentials, relevant experience, communication skills, flexibility, and history/institutional knowledge.

TPMC management, technical support personnel, and field teams worked together as a fully integrated team. The infrastructure to accomplish this was in place and employed existing TPMC corporate processes and procedures. The TPMC corporate Radiation Safety Officer (RSO) conducted initial radiological, and health and safety training for field personnel. Project personnel received awareness training on the following topics:

- General Employee Training
- Hazardous Communications
- Personnel Protective Equipment
- Blood-Borne Pathogens
- Confined Space
- Applicable Site-Required Training, if required
- Radiological Field Procedures and related forms

2.2.1.3 Procurement Actions

TPMC's Procurement Manager controlled the purchase, leasing and subcontracting for material, equipment, and manpower support required for this project. Procured items included, but were not limited to, the following items:

- Ludlum Model 19 MicroR survey meter (area gamma radiation)
- Ludlum Model 2360 scalar/rate meter with data logging capabilities

- Ludlum Model 43-93 Dual alpha/beta scintillation detector
- Instrumentation check sources (thorium-230, technetium-99 and cesium-137)
- Support tools (i.e. hand-tools, masslin mops, flashlights, tape measures, etc)
- Recording equipment/documents
- Communication devices
- Digital cameras with media storage cards
- Personnel Protective Equipment

2.2.1.4 Shipment of Supplies

To expedite field activities while decreasing the amount of equipment and supplies carried by field staff during initial mobilization, TPMC shipped field supplies to the Site location via common carrier. These materials and supplies included items listed in Section 2.2.1.3.

Radioactive check sources were transported in full compliance with Department of Transportation (DOT) 49 Code of Federal Regulations (CFR) Part 173 as excepted radioactive materials, instrument and article shipments.

2.2.2 Field Activities

Field activities were grouped into the following categories:

- Site Walkdown
  - Interviews with key POCs
  - Visual Inspection of Site
- Documentation of Final Survey Approach
- Radiation Surveys
  - Area gamma radiation measurements
  - Direct alpha/beta measurements (total contamination)
  - Qualitative removable alpha/beta contamination (large area wipes)
  - Quantitative removable alpha/beta contamination (100 square centimeter (cm^2) smear samples; dry for alpha /beta and wet for tritium analysis)
- Shipment of Samples to Off-site Laboratory

2.2.2.1 Site Walkdown including Visual Inspection and Interviews with key POCs

Upon arrival on-site, the TPMC Team met with Site personnel to gather background information regarding the Site, and to receive site-specific training/indoctrination as required. The team conducted a visual inspection of the Site to identify any radioactive commodities, radiation use areas, or locations where radiation could be present. The Site POC, Nickolas Ivey, indicated that he was not aware of any radiological commodities that were stored at the Site. Results of the visual inspection survey are provided in Appendix B, and the personnel interviews are documented in Appendix C.

2.2.2.2 Documentation of Survey Approach

The TPMC Field Team used historical due diligence reviews, visual inspections, and interviews to finalize the overall survey strategy ultimately implemented at the Site. Visual Inspections, interviews, and historical documentation do not indicate any radioactive commodities stored in the Site. Based on the mission of the Army Reserve units stationed at Layton USARC Site, it is acceptable to assume that some low-level items were also stored here (such as compasses, personal RADIAC meters, and small arms weapons sights, etc.).

This Site was considered as one MARSSIM survey unit based on small size of the site. The radiological evaluation included an area gamma radiation survey with a MicroR meter (minimum thirty (30) exposure rate measurements) and an alpha, beta, and tritium radiation contamination survey. Although these facilities would typically be considered MARSSIM Class 3 survey units with only judgmental survey and sampling required, the survey team designed the survey using modified Class 2 survey protocols for increased survey coverage – 30 survey points over 1000 m^2 and 10 sample locations. The Survey Approach Documentation Form for this Site is provided in Appendix C.

2.2.2.3 Radiation Surveys

The Field Team was equipped with the necessary instruments and supplies to perform the radiological assessment surveys in accordance with methodology previously defined. The types of analyses, instrumentation, and detection methods are detailed in Table 2-1 below.

Table 2-1
Portable Instrumentation

Type of Measurement	Type of Instrument	Detection Method
Direct measurements for total alpha and beta contamination	Ludlum Model 2360 rate meter with Ludlum Model 43-89 or 43-93 probe	Scintillation/Dual Phosphor
Wipe tests for removable alpha and beta contamination	Ludlum Model 2360 rate meter with Ludlum Model 43-89 or 43-93 probe	Scintillation/Dual Phosphor
Low-level gamma radiation exposure rate survey	Ludlum Model 19 MicroR Meter (or equivalent)	Sodium Iodide (NaI) Scintillator

Prior to taking survey measurements, the team chose a background location as a temporary base of operations to conduct instrument quality control and performance checks. This background or reference area was selected to have a very low probability of being impacted by radioactive materials use or storage, floor surfaces representative of the greater building/Site conditions, and in a location remote from any known or probable radioactive use or storage areas. This background reference area was also the location where smear/wipe samples were counted and instrument performance verified pre and post survey.

The radiological evaluation included an area gamma radiation survey and surveys to detect residual alpha and beta radioactivity. The area gamma radiation survey was performed using a highly sensitive Ludlum MicroR radiation meter (minimum thirty [30] exposure rate measurements) and the survey was focused primarily on identifying radioactive sources or areas of elevated radioactivity. The alpha/beta radiation survey consisting of three components: qualitative removable contamination using large area wipes to identify areas of gross removable contamination; total (fixed plus removal) contamination measurements (thirty [30] direct measurements); and quantitative removable contamination measurements (100 cm^2 smear tests; (3) wet smears for tritium) for each survey unit. The alpha/beta radiation survey utilized a Ludlum Model 2360 Scalar/Ratemeter mated to a dual phosphor alpha/beta scintillation probe for direct measurements and field assessment of removable contamination. The qualitative removable contamination measurements were used to sample a large area to determine if any removable contamination was detectable above ambient background levels. If

contamination was detected with a large area wipe or a direct measurement, the team expanded their survey area to determine the nature and extent of the contamination.

Since field instruments may not have the required sensitivity (MDAs) to effectively measure the removable contamination at the Reg Guide 1.86 action levels, the field measurements of the dry smear samples are considered qualitative measurements, and the definitive/quantitative results removable alpha/beta radioactive measurements are provided by the DoD ELAP approved off-site laboratory. The field team uses this qualitative field data to identify significantly elevated radiation levels, in order to direct additional survey, and to prevent shipping samples with elevated radioactivity to the laboratory without proper notice. While on-site, direct measurements and dry qualitative smear samples results were compared to applicable Reg Guide 1.86 Table-I Limits. Radiation exposure rate levels were compared to Site ambient background levels. Radiological surveys were documented on a standardized survey form that included information on the instrumentation, background levels, measurement type, survey location (maps and/or photos), and survey results.

Wet and dry smears samples were shipped by overnight express shipment to the selected off-site independent Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) Accredited laboratory, GEL (located in Charleston, South Carolina), for quantitative radiological (gross alpha, beta, and tritium) analysis. Chain of Custody (CoC) forms were completed for all samples, and samples were shipped by traceable means.

2.2.2.4 Sample Custody and Control

The handling and transport of samples destined for analysis at GEL was coordinated by the Team Lead. As a result, each sample was properly labeled and tracked/controlled on a CoC form provided by the laboratory.

Tritium samples were placed inside plastic vials containing a small quantity of de-ionized water, which in turn were placed inside plastic bags to ensure the smears remained moist during transit per GEL instructions. The alpha/beta smears were placed into a plastic bag and sealed. All sample containers were sealed with a tamper resistant label to ensure no tampering during shipment. The samples were then packaged in a Federal Express (FedEx) overnight pouch with air bills completed for shipment and overnight delivery to the GEL laboratory facility. Since the sample media were not suspected of being a hazardous material per DOT, the shipment was handled as non-regulated sample media.

3.0 SAMPLE COLLECTION AND DATA ANALYSIS

3.1 REMOVABLE SMEAR SAMPLING

A total of thirteen (13) quantitative smear samples (100 cm^2 smear tests) were taken at the Site. This included ten (10) dry smear samples that were collected and analyzed for removable alpha/beta contamination, and three (3) wet smear samples analyzed for tritium contamination. The following sections provide details of the sample collection and analytical methods.

3.2 SAMPLE IDENTIFICATION

The sample identification (ID) numbers were documented on sample field sheets. Sample ID numbers were used on sample labels or tags, field data sheets and/or logbooks and CoC.

3.3 SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES

Gross alpha/beta smear samples were placed in plastic bags per GEL direction. Tritium smears were placed in plastic vials containing a small quantity of de-ionized water per GEL instructions. Preservation and holding times did not apply to these samples.

3.4 ANALYTICAL METHODS

Samples sent to GEL were analyzed for the following parameters, using the corresponding methods:

- Tritium by Liquid Scintillation: GL-RAD-A-002
- Gross alpha/beta by Gas-Flow Proportional Counting: EPA 900.0/SW846 9310/SM 7110B Modified

3.5 QUALITY ASSURANCE/QUALITY CONTROL

Quality Control (QC) was maintained on this project at all stages including portable instrument use / handling, sample integrity, and analytical laboratory data. Requested laboratory reporting limits (RL) were one tenth (1/10) of the action limits in Reg Guide 1.86 Table-I.

3.5.1 Instrument Use / Handling

The team was equipped with hand-held, portable survey instruments, each of which was calibrated by a National Institute of Standards & Technology (NIST) certified off-site facility. Copies of the calibration certificates used for this project are included as Appendix D.3, “Instrument Calibration Sheets”. In addition, each day on-site the team performed Instruments Checks (pre- and post-survey) to ensure the instruments were operating within their established ranges.

As data was collected by the field team, the Team Lead provided oversight with regard to the survey methods used, as well as the data sheets generated during execution of the field work. Essentially the Team Lead functioned as first-line reviewer for the project.

3.5.2 Analytical Data Quality and Review

GEL Laboratories has a mature Quality Assurance (QA) program that has been audited and certified by recognized organizations including: DoD Quality Systems Manual (QSM) ELAP, National Environmental Laboratory Accreditation Conference (NELAC), American Society of Mechanical Engineers Nuclear Quality Assurance, Level -1 (ASME/NQA-1), and International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) Guide 17025. The high standards built as part of GEL's QA program were directly applied to the handling, analysis, and data reporting associated with the smear samples generated by this project.

In addition, TPMC personnel routinely reviewed all data packages to ensure the completeness and accuracy of each of the sample reports. This review was performed with the goal to ensure that the sample results received accurately and completely matched the parameters of the Site's sample locations.

4.0 SUMMARY OF FIELD INVESTIGATION AND LABORATORY RESULTS

This section provides a summary of field and laboratory observations, results, data, and interpretation results associated with the radiological site assessment. Summarized results of both field and laboratory activities are provided in Table 4-1. This is followed by a brief discussion of the supporting data obtained during this project.

4.1 RESULTS SUMMARY

Table 4-1 provides a summary record of the data obtained in the field along with the corresponding analytical results from the GEL off-site analytical laboratory. Note that the shaded area highlights the three results that exceeded NRC Reg Guide 1.86 Table-I limits. It is further described in more detail in Section 4.2. As presented in the table, all other survey data and analytical results were either less than the ambient background radiation levels, less than instrument detection limits, or below the conservative NRC Reg Guide 1.86 Table-I limits. The detailed survey results are provided in Appendix E, and sample location details are provided in Appendix F. A survey sketch identifying sample locations is provided in Appendix G.

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Table 4-1
Summary Results Table

Survey Location Number	Contamination					Exposure Rate	
	Direct Field		Removable / Smear (Off-site Lab Results)			Surface Contact	One meter Above Surface
	(dpm / 100 cm^2)		(dpm /100 cm^2)			(µR/hr)	(µR/hr)
	α	β	α	β	Tritium		
Location / Area : Admin, Conex and 2 Sheds							
1	<BKG	<BKG	ND	ND	-	5.0	6.0
2	1.7	906.6	0.68	2.42	-	15.0	16.0
3	5.9	<BKG	ND	1.08	-	5.0	7.0
4	5.9	778.1	-	-	-	12.0	10.0
5	<BKG	<BKG	-	-	-	3.0	5.0
6	<BKG	<BKG	-	-	-	3.0	3.0
7	<BKG	<BKG	1.21	1.68	ND	3.0	4.0
8	<BKG	<BKG	-	-	-	4.0	4.0
9	<BKG	<BKG	-	-	-	5.0	5.0
10	<BKG	<BKG	ND	ND	-	5.0	5.0
11	5.9	<BKG	ND	ND	ND	5.0	6.0
12	1.7	<BKG	-	-	-	5.0	5.0
13	18.5	<BKG	-	-	-	4.0	5.0
14	<BKG	<BKG	ND	ND	-	5.0	5.0
15	1.7	<BKG	-	-	-	5.0	7.0
16	5.9	<BKG	-	-	-	5.0	6.0
17	5.9	717.6	-	-	-	10.0	11.0
18	5.9	<BKG	ND	ND	-	6.0	6.0
19	<BKG	<BKG	-	-	-	2.0	1.0
20	<BKG	<BKG	-	-	-	7.0	7.0
21	10.1	<BKG	-	-	-	1.0	1.0
22	5.9	<BKG	-	-	-	7.0	7.0
23	1.7	<BKG	-	-	-	6.0	8.0
24	1.7	<BKG	-	-	-	6.0	6.0
25	10.1	<BKG	-	-	-	2.0	2.0
26	1.7	<BKG	ND	ND	-	5.0	6.0
27	<BKG	<BKG	-	-	-	4.0	5.0
28	<BKG	<BKG	-	-	-	6.0	5.0
29	<BKG	<BKG	0.657	1.27	ND	5.0	5.0
30	10.1	<BKG	-	-	-	3.0	3.0

Notes:

ND - Analyte was analyzed for, but not detected above the laboratory detection limit. Detection limit is lower than the site assessment criteria shown in Table 4-2. Laboratory data package is provided in Appendix J.

dpm – disintegrations per minute, cm^2 – square centimeters, µR – micro-Roentgen, hr - hour

<BKG – Results less than site-specific background levels.			
	= Results exceed the site assessment criteria shown in Table 4-2.		
Site-specific Background Measurements			
Location/Area	**α (dpm / 100 cm^2)**	**β (dpm / 100 cm^2)**	**γ (µR/hr)**
Admin, Conex and 2 Sheds	6.7	726.7	4.5

The data in Table 4-1 was compared the site assessment criteria which was extracted from Reg Guide 1.86 Table-I. The Reg Guide 1.86 Table-I criteria are summarized in Table 4-2 and for this survey; all measurements were below this established criteria.

Table 4-2
Site Assessment Criteria

	Direct Measurements	**Removable / Smear Measurements**	**Ambient Exposure Rates**
Alpha (dpm/100 cm^2)	**100**	**20**	**-**
Beta (dpm/100 cm^2)	**1000**	**200**	**-**
Tritium (dpm/100 cm^2)	**5000**	**1000**	**-**
Gamma (µR/hr)	**-**	**-**	**> 2 x Average Background**
Note: Alpha, beta, and tritium values extracted from NRC Regulatory Guide 1.86 Table-I dpm – disintegrations per minute cm^2 – square centimeters µR/hr – micro-Roentgen per hour			

4.2 FIELD INVESTIGATION RESULTS

4.2.1 Site Interviews / Visual Inspection

The site-specific historical document reviews did not identify any previous radioactive commodity use or storage at the Site. The team conducted a visual inspection of the Site that resulted in no areas identified as suspect, or requiring additional investigation. The visual inspections and interviews verified that there were no radioactive commodities on-site. The result of the visual inspection is documented in Appendix B, “Visual Inspection / Site Survey Checklist”.

In addition to the visual inspection, the Team Lead conducted an interview with on-site POC. The results of this interview are recorded in the Survey Approach Documentation Form provided in Appendix C. The interview resulted in no areas requiring additional survey or investigation.

4.2.2 Field Measurements

All field measurements obtained by the survey team are included in Appendix E of this report. Following data was recorded:

- Total (fixed and removable) alpha (cpm and dpm/100 cm^2)
- Total (fixed and removable) beta (cpm and dpm/100 cm^2)
- Removable / Smear (cpm/100 cm^2 and dpm/100 cm^2)

  - Note: This was a qualitative measurement performed and used by field personnel that is superseded by analytical data received by GEL Laboratories.
- Removable Large Area Wipes (cpm)
- Area gamma radiation exposure rate measurements on contact and at one meter vertically off the floor (μR/hr)

The survey record tool was set up to convert "cpm" values to "dpm" using instrument specific calibration sheets, enabling the Field Team to see in real-time the corresponding field measurements in disintegrations per minute (dpm) for direct comparison with the Reg Guide 1.86 Table-I criteria (Table 4-2).

In addition to the Survey Record, the Sample Description Log is included in Appendix F. This document provides supplementary descriptions of the survey locations in addition to the information provided in the Survey Record. Survey Sketches (Appendix G) provide pictorial representations of the specific locations where direct measurements and smear samples were taken.

Although most of the survey results were indicative of background radiation levels and less than Reg Guide 1.86 Table-I limits, gamma exposure rate measurements slightly exceeded twice background (2x background) action level at three locations (2, 4 and 17) in the Administration building.

The field measurements at these locations (building restrooms) were taken over a tile floor and with surround tile wall covering. Tile and tile glazing materials often contain elevated concentrations of Naturally Occurring Radiological Materials (NORM) which can result in elevated ambient gamma radiation levels. Given this known condition (Reference Table B-1 in NUREG 1575 Appendix B Supp. 1), it is not unexpected to find gamma radiation measurements in areas with tile materials to exceed the very restrictive 2x background action level. In addition, our background gamma exposure rate level of 4.5 microR/hour is very low compared to other ambient radiation levels. Therefore, it was determined the slightly elevated gamma radiation measurements at survey locations 2, 4, and 17 were indicative of NORM from building materials, hence no further investigation was warranted.

4.3 LABORATORY RESULTS

All laboratory results are provided in Appendix J. In addition to the analytical results, this appendix includes: Certificate of Analysis Report, QC Summary, copy of CoC, Sample Receipt and Review Form, and a listing of GEL's current certifications.

These results, received from GEL Laboratories, support the initial field team findings that there are no areas displaying radioactivity in excess of the respective actions levels. All sample results were less than the most restrictive Reg Guide 1.86 removable contamination limits of 20 dpm/100 cm^2 alpha, 200 dpm/100 cm^2 beta, or 1000 dpm/100 cm^2 tritium. As a result, no additional investigation was warranted.

5.0 CONCLUSIONS

All data collected and survey results support the conclusion that there is no evidence of radiological contamination or radioactive material present at the Layton USARC Site. In accordance with the MARSSIM guidance document and based on the data presented in this report, the Layton USARC Site can be considered radiologically non-impacted and available for unrestricted use with respect to radiological hazards.

6.0 RECOMMENDATIONS

TPMC recommends using the results of this Site Radiological Assessment as evidence that the Layton USARC Site is free of residual radiological contamination and unsecured radioactive material. Thus the Site can be considered radiologically non-impacted and available for unrestricted use relative to radiological hazards.

7.0 REFERENCES

DoD, DOE, USEPA, and Nuclear Regulatory Commission (NRC), 2000, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev.1, EPA 402-R-97-016, Rev. 1, DOE/EH-0624, Rev. 1*, August.

ECP, 2010, Environmental Condition of Property (ECP) Report for C. R. Layton USARC, Gainesville, FL, April, 2010

TB 43-0116 “Identification of Radioactive Items in the Army”

U.S. Atomic Energy Commission Regulatory Guide, NRC Reg Guide 1.86, *Termination of Operating Licenses for Nuclear Reactors*, June 1974

APPENDIX A
HISTORICAL REVIEW CHECKLIST

SITE HISTORICAL DATA REVIEW
Validation of MARSSIM Appendix B Approach

Site: C. R. Layton U.S. Army Reserve Center, Gainesville, FL (FL005)

Team Lead / Reviewer: J. Green **Date reviewed:** 2/19/13

Documents reviewed:

All historical documents provided by 81st Regional Supporting Command (RSC) Point of Contact (POC) were reviewed to guide radiological assessment at the site.

Site summary:

A review of the site Environmental Condition of Property Report (ECP, 2010) indicated that the Property is located at 1125 NE 8th Avenue, Gainesville, Alachua County, Florida, 32601, and includes approximately 6.8 acres of land improved with four structures: an administrative building, two petroleum, oil and lubricant (POL) storage buildings and a closed wash pad. Military equipment parking (MEP) area and a privately owned vehicle (POV) parking area are also located on the Property. The Property was transferred to the Department of the Army in 1950 and developed in 1951 to be utilized as a USAR Center. The C. R. Layton USAR Center was occupied by the 257 TC BN and the 399 TC DET until August, 2009 at which time the units relocated to the Gainesville USARC. While the Gainesville USARC was being renovated during FY09, the 7201 USA MED, 342 MED DET, 1437 MED DET and 1469 MED DET unit personnel were temporarily relocated to the C. R. Layton USARC. These units returned to the Gainesville USARC during August 2009.

Administrative building is a two-story structure with a small basement. The building is constructed of steel, concrete and brick mansory skin. The entire building is approximately 35,625 square feet (ft^2). The building was used for training and administrative purposes.

The other two small storage buildings are located approximately 25 feet southwest of the main building (Shed S and Shed N). These buildings were constructed with concrete and mansory.

Based on available information, no radiological survey/assessment has been performed at the site. No site specific radon survey data is available.

Potential for radioactive commodity use, handling, or storage:

During the site reconnaissance and records review process, no indications were found of the past storage or use of radiological commodities in any of the buildings. However based on the mission of the Army Reserve units stationed at the site, it is acceptable to assume that some low-level items were stored here (such as compasses, personal Radiation Detection, Indication and Computation (RADIAC) meters, and small arms weapons sights, etc. There is no evidence to suggest that any radiological commodities were ever improperly used or stored at the site or that any radioactive materials were released to the environment.

Findings, if any:

No specific radiological concerns exist.

Conclusion:

There is no evidence to suggest that radioactive commodities were ever stored or improperly managed at the site, or that any radionuclides within seal-source items were ever released. Therefore, the site qualifies for the simplified assessment procedure of Appendix B of MARSSIM.

References:

- ECP, 2010, Environmental Condition of Property (ECP) Report for C. R. Layton USARC, Gainesville, FL, March, 2010

APPENDIX B
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

Site Location: C. R. Layton U.S. Army Reserve Center, Gainesville, FL (FL005)
Date: 2/26/13 **Team Lead**: J. Green

Item #	Areas for Review	YES	NO	OBSERVED	NOT OBSERVED	N/A	COMMENTS
Key Indicators to look for							
1	Stain spots in vault, storage, supply room. Could be indication of an instrument or equipment that broke at some point in the past		X				
2	Presence of stored liquids		X				
3	Signs that may have radioactive material. (Exit Signs, smoke detector etc.)		X				
4	Any areas marked, or previously marked, with RAD signs		X				
5	Identified any radioactive commodities? (What are they, condition, etc.)		X				
6	Problems accessing site? (Can't contact POC, scheduling conflict, etc.)		X				
7	Any areas at site not accessible? (Locked Connex, area, storage cabinet, etc.)		X				Locked cage: used bolt cutters for access
8	Any radioactive signage? (Is the radioactive commodity there or is it historical in nature)		X				
Areas with higher potential of radiological components							
9	Rooms that may have previously stored ammunition or explosives (Could be an indication of potential DU)	X					Arms Vault
10	Medical rooms where x-ray equipment was stored or used – typically only radioactive signage/no RAM		X				
11	Areas that CBRN detecting equipment may have been stored (Storage, supply, vault)	X					
12	Maintenance areas, especially where radioactive components/commodities may have managed		X				
13	Areas where Engineer/Construction units used/stored soil moisture/density gauges		X				
14	Small arms storage areas (Indication of radio-luminescent aiming sights or night vision equipment use and storage)	X					
15	Depleted Uranium munitions use or storage NOTE: these items are only used in large caliber guns such as Bradley Fighting Vehicle, Mini Gun Systems, and Main Battle Tanks. Normally not found at USARCs.		X				

APPENDIX C
DOCUMENTATION OF SURVEY APPROACH

Survey Approach Documentation Form

Site Location: C. R. Layton U.S. Army Reserve Center, Gainesville, FL (FL005)

Date: 2/26/13 **Team Lead**: J. Green

Personnel Interviewed:

Nickolas Ivey, Area Facility Operations Specialist	Mr. Ivey provided access to facility. He was not aware of any radiological commodities that were stored at the site.

Narrative Documenting Preliminary Survey Approach:

In designing the survey, the survey team initially assume that the site has a low probability for being impacted by residual radioactive materials based on the following three criteria inherent to Army Reserve operations: 1) only small quantities of radioactive materials were used, thus presenting an inherently low risk for release or exposure; 2) the radioactive sources used at these sites are typically sealed sources thus minimizing release to the environment; and 3) standard Army protocols that require strict management, control, and reporting of radioactive material use. Based on the low probability of residual radioactive materials remaining at Army Reserve sites, initial survey approach is to follow the MARSSIM simplified survey approach as outlined in MARSSIM Appendix B. This simplified survey approach allows use of a more streamlined and flexible survey strategy incorporating historical process knowledge and data with radiation survey results to determine whether the site is impacted by residual radioactive material above the Nuclear Regulatory Commission (NRC) Regulatory Guide (Reg Guide) 1.86 Table-I limits.

Visual Inspections, interviews, and historical documentation did not indicate any radioactive commodities stored at the site. Based on nature of material and equipment typically utilized by military and transportation units, it is acceptable to assume that some low-level items were stored here (such as compasses, personal RADIAC meters, and small arms weapons sights, etc.).

This site will be considered as one survey unit. The radiological evaluation will include an area radiation survey with a MicroR meter (minimum thirty (30) exposure rate measurements) and a contamination survey consisting of three components for each survey unit:

- Fixed contamination [minimum thirty (30) direct measurements]
- Qualitative removable contamination (large area wipes, as appropriate)
- Quantitative removable contamination [100 cm^2 smear tests; minimum ten (10) dry wipes for gross alpha/beta and three (3) wet smears for Tritium].

Before collecting the samples; the survey team will perform exposure dose measurement readings. Biased sample locations were then determined based on the exposure dose measurements if required. Systematic random samples will then be collected so as to obtain good distribution of sampling location throughout the site. The administrative areas and offices will be provided only a few sample/survey locations due to the reduced probability of radioactive

materials storage or use in these areas.

Amended Survey Approach as Needed During Real-Time Survey Findings:

Not required.

APPENDIX D
QUALITY CONTROL DATA

D.1 – Operating Range

D.2 – Instrument Daily Checks

D.3 – Instrument Calibration Sheets

Initial Alpha, Beta-Gamma and Exposure Rate Operating Range
Admin, Conex and 2 Sheds, C R Layton USARC, Gainesville, FL (FL005)

Team JEG/SS

ALPHA Instrument			
Date	02/26/13	Technician / Initials	JEG
Instrument Model #	Ludlum 2360	Detector Model #	Ludlum 43-93
Instrument Serial #	278616	Detector Serial #	PR308282
Instrument Cal Due	09/05/13	Detector Cal Due	09/05/13
Source Isotope	Th-230	Det Active Area (cm^2)	100
Source ID #	69054-710	Source Activity (μCi)	0.00448
Background cpm 1	2	Source gcpm 1	1406
Background cpm 2	1	Source gcpm 2	1359
Background cpm 3	0	Source gcpm 3	1414
Background cpm 4	1	Source gcpm 4	1390
Background cpm 5	2	Source gcpm 5	1396
Background cpm 6	2	Source gcpm 6	1325
Background cpm 7	2	Source gcpm 7	1390
Background cpm 8	0	Source gcpm 8	1369
Background cpm 9	4	Source gcpm 9	1375
Background cpm 10	2	Source gcpm 10	1403
Average Bckgrd cpm	1.6	Average Source gcpm	1,382.7
Average Bckgrd dpm/100 cm^2	6.7		
Detector Efficiency	0.238	Lower Range (gcpm) -20%	1106
Cable Length (ft)	3	Upper Range (gcpm) +20%	1659
Direct Alpha Action Level (gcpm)	**49.2**		

BETA Instrument			
Date	02/26/13	Technician / Initials	JEG
Instrument Model #	Ludlum 2360	Detector Model #	Ludlum 43-93
Instrument Serial #	278616	Detector Serial #	PR308282
Instrument Cal Due	09/05/13	Detector Cal Due	09/05/13
Source Isotope	Tc-99	Det Active Area (cm^2)	100
Source ID #	69053-710	Source Activity (μCi)	0.32
Background cpm 1	189	Source gcpm 1	60123
Background cpm 2	195	Source gcpm 2	60382
Background cpm 3	202	Source gcpm 3	60005
Background cpm 4	194	Source gcpm 4	60481
Background cpm 5	190	Source gcpm 5	60441
Background cpm 6	201	Source gcpm 6	59897
Background cpm 7	164	Source gcpm 7	60399
Background cpm 8	185	Source gcpm 8	60277
Background cpm 9	194	Source gcpm 9	60270
Background cpm 10	208	Source gcpm 10	60341
Average Bckgrd cpm	192.2	Average Source gcpm	60,261.6
Average Bckgrd dpm/100 cm^2	726.7		
Detector Efficiency	0.2645	Lower Range (gcpm) -20%	48209
Cable Length (ft)	3	Upper Range (gcpm) +20%	72314
Direct Beta Action Level (gcpm)	**456.7**		

Gamma/Exposure Rate Instrument			
Date	02/26/13	Technician / Initials	JEG
Instrument Model #	Ludlum 19	Source Isotope	Cs-137
Instrument Serial #	156437	Source ID #	1314
Instrument Cal Due	09/05/13	Source Activity (μCi)	1.00
Background μR/hr 1	5	Source μR/hr 1	295
Background μR/hr 2	4	Source μR/hr 2	360
Background μR/hr 3	5	Source μR/hr 3	360
Background μR/hr 4	4	Source μR/hr 4	260
Background μR/hr 5	4	Source μR/hr 5	320
Background μR/hr 6	5	Source μR/hr 6	270
Average Bkg μR/hr	4.5	Average Source μR/hr	310.8
		Lower Range (μR/hr) -20%	248.7
		Upper Range (μR/hr) +20%	373.0

DAILY INSTRUMENT PERFORMANCE CHECK LOG

Team No. : JEG/SS

Admin, Conex and 2 Sheds, C R Layton USARC, Gainesville, FL (FL005)

Exposure Rate Meter Manufacturer	Ludlum	Model #	Ludlum 19	Serial #	156437	Cal Due Date	9/5/13
Detector / Probe Manufacturer	Ludlum	Model #	Ludlum 43-93	Serial #	PR308282	Cal Due Date	9/5/13
Instrument / Meter Manufacturer	Ludlum	Model #	Ludlum 2360	Serial #	278616	Cal Due Date	9/5/13

Alpha	Source #	69054-710	Isotope	Th-230	Activity (μCi)	0.00448	± 20% Range 1106-1659
Beta	Source #	69053-710	Isotope	Tc-99	Activity (μCi)	0.32	± 20% Range 48209-72314
Gamma	Source #	1314	Isotope	Cs-137	Activity (μCi)	1.00	± 20% Range 249-373

Detector/ Probe Efficiency (a) : 0.238

Detector/Probe Efficiency (β) : 0.2645

Date	Time Pre / Post	Instrument Physical Check Sat (Y / N)	Instrument & Detector in Calibration (Y / N)	Battery Check Sat (Y / N)	Source Alpha (cpm)	Source Beta (cpm)	Source Gamma (μR/hr)	Response Chk – Init Net Value (cpm, μR)	Response Chk – End Net Value (cpm, μR)	Response Check Technic. Initials
02/26/13	9:00 AM	Y	Y	Y	1382.7	60261.6	310.833	ok	ok	JEG
	3:40 PM	Y	Y	Y	1252	55530	340	ok	ok	JEG

Alpha and beta background and source counts are measured for one minute

MJW Technical Services
243 Root St.
Suite 100
Olean, New York 14760
Voice: (716) 372-5300
Fax: (716) 372-5307
243 Root Street Suite 100
Olean, New York 14760

140274G MOD

Certificate Of Calibration

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

Customer		Instrument	
Customer Name: T G Adams and Associates		Manufacturer: Ludlum Measurements	
Address: 11 W Main St, Springville, NY 14141		Model: 2360	Serial Number: 278616
		Detector Manufacturer: Ludlum Measurements	
Contact Name: Ted Adams		Det. Model: 43-93	Serial Number: PR308282
Customer PO/ CC. Number:	Work Order Number: 2012-3936	Calibration Method: Electronic	

Instrument Received: ☑ Within Tolerance ☐ Out of Tolerance ☐ Repairs required ☐ Other (See Comments)

☑ Geotropism ☑ Meter Zero ☑ Mech. Ck. ☑ HV Readout ☑ Battery Check ☑ Reset

☑ Audio ☑ Window Status ☐ FS Response ☐ Linearity ☐ Background Subtract ☐ Alarm Set

Temperature: 71.5 F Humidity: 51 % Pressure: 28.4 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier\Range	Calibration Point	Instrument Response	
		Before Calibration	After Calibration
X 1	100 cpm	102 cpm	102 cpm
X 1	400 cpm	400 cpm	400 cpm
X 10	1 kcpm	1 kcpm	1 kcpm
X 10	4 kcpm	4 kcpm	4 kcpm
X 100	10 kcpm	10 kcpm	10 kcpm
X 100	40 kcpm	40 kcpm	40 kcpm
X 1K	100 kcpm	100 kcpm	100 kcpm
X 1K	400 kcpm	400 kcpm	400 kcpm
Digital Scaler	40 cpm	40 cpm	40 cpm
Digital Scaler	400 cpm	400 cpm	400 cpm
Digital Scaler	4 kcpm	3.998 kcpm	3.998 kcpm
Digital Scaler	40 kcpm	39.981 kcpm	39.981 kcpm
Digital Scaler	400 kcpm	399.802 kcpm	399.802 kcpm

Reference instruments and / or Sources

Pulser: 500-2	220100		
Pu239	C7-640	Th230	C7-643
Sr90	C7-630	Tc99	C7-642
Pu239	C7-640	Th230	C7-643

Comments

		Isotope		Efficiency	Distance
Inst. Voltage:	800 V	Pu239	4π	23.8%	0 inch
Window Status		Th230	4π	21.1%	0 inch
Beta threshold:	120 mV	Sr90	2π	52.9%	0 inch
Alpha threshold:	3.5 mV	Tc99	2π	23.1%	0 inch
Alpha window:	30 mV	Pu239	2π	47.6%	0 inch
		Th230	2π	42.3%	0 inch

Ref. Voltage 1: 500 V
Inst. Voltage 1: 500 V
Ref. Voltage 2: 1500 V
Inst. Voltage 2: 1500 V

If applicable, the 6 month calibration due date is 03/05/2013.

Statement of Certification

MJW Technical Services, 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 ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated By: [signature] Reviewed By: [signature] Date 9-5-12

Calibration Date: 09/05/2012 Calibration Due: 09/05/2013

MJW Technical Services
243 Root St.
Suite 100
Olean, New York 14760
Voice: (716) 372-5300
Fax: (716) 372-5307
243 Root Street Suite 100
Olean, New York 14760

140274G MOD

Certificate Of Calibration

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

Customer

Customer Name: T G Adams and Associates

Address: 11 W Main St
Springville, NY 14141

Contact Name: Ted Adams

Customer PO/
CC. Number:

Work Order
Number: 2012-3936

Instrument

Manufacturer: Ludlum Measurements

Model: 19 Serial Number: 156437

Detector Manufacturer: Ludlum Measurements

Det. Model: Internal Scintillator Serial Number: n/a

Calibration Method: Electronic and Source

Instrument Received: ☐ Within Tolerance ☑ Out of Tolerance ☐ Repairs required ☐ Other (See Comments)

☑ Geotropism ☑ Meter Zero ☑ Mech. Ck. ☐ HV Readout ☑ Battery Check ☑ Reset

☑ Audio ☐ Window Status ☑ FS Response ☑ Linearity ☐ Background Subtract ☐ Alarm Set

Temperature: 71.3 F Humidity: 52 % Pressure: 28.4 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier\Range	Calibration Point	Instrument Response	
		Before Calibration	After Calibration
25 uR/hr	5 uR/hr	830 cpm	767 cpm
25 uR/hr	20 uR/hr	3.34 kcpm	3.09 kcpm
50 uR/hr	20 uR/hr	3.24 kcpm	3.09 kcpm
50 uR/hr	40 uR/hr	6.6 kcpm	3.28 kcpm
250 uR/hr	50 uR/hr	8.3 kcpm	7.67 kcpm
250 uR/hr	200 uR/hr	33.3 kcpm	30.9 kcpm
250 uR/hr	200 uR/hr	173 uR/hr	202 uR/hr
500 uR/hr	200 uR/hr	32.3 kcpm	30.9 kcpm
500 uR/hr	200 uR/hr	182 uR/hr	202 uR/hr
500 uR/hr	400 uR/hr	65.8 kcpm	63.2 kcpm
500 uR/hr	400 uR/hr	355 uR/hr	382 uR/hr
5000 uR/hr	1000 uR/hr	830 uR/hr	1000 uR/hr
5000 uR/hr	4000 uR/hr	3400 uR/hr	3900 uR/hr

Reference instruments and / or Sources

Pulser: 500-2	220100	
Cs137	7753CM	

Comments

Inst. Voltage: 840 V

Input Sensitivity: 33 mV

If applicable, the 6 month calibration due date is 03/05/2013.

Statement of Certification

MJW Technical Services, 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 ISO/IEC 17025 and ANSI N323. The Instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Instrument Calibrated By: K T Relyea

Reviewed By: [signature] Date 9-5-12

Calibration Date: 09/05/2012

Calibration Due: 09/05/2013

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

69054-710

Th-230 47.1 mm Diameter x 0.9 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electro-deposition of Th-230 onto a stainless steel disk. Th-230 activity was determined with a ZnS scintillation detector. The calibration was checked by alpha spectroscopy after source preparation.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

ISOTOPE:	Th-230
ACTIVITY (dps):	1.654 E2
HALF-LIFE:	77000 years
CALIBRATION DATE:	October 4, 2004 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	5.0%

Diameter of active area: 43 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

P O NUMBER LTERC-C4013-1623 OJ-C/O 1, Item 11

SOURCE CALIBRATED BY: Daniel M. Montgomery, Radiochemist

Q A APPROVED: 10-06-2004

Cs-137
1.0 µ Ci, 30.2 yrs
Radioactive Material
1314
Beta/Gamma
MAY 2005
Spectrum Techniques
USNRC and State License
Exempt Quantity

No CERTIFICATION REQUIRED

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

69053-710

Tc-99 47.1 mm Diameter x 0.9 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electro-deposition of Tc-99 onto a stainless steel disk. The 2Π beta emission rate was measured with a 2Π beta scintillation system which was calibrated with a similar source calibrated by NIST.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

ISOTOPE:	Tc-99
2Π EMISSION RATE (β/sec):	4.964 E3
RELATIVE EXPANDED UNCERTAINTY (k=2):	5.0%
HALF-LIFE:	2.111 E5 years
CALIBRATION DATE:	October 4, 2004 12:00 EST

Diameter of active area: 43 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

P O NUMBER LTERC-C4013-1623 OJ-C/O 1, Item 10

SOURCE CALIBRATED BY: _____
Daniel M. Montgomery, Radiochemist

Q A APPROVED: _____ 10-06-2004

APPENDIX E
SURVEY RECORD FORM

Radiological Survey Record Form

Date : 02/26/13 | Team No. : JEG/SS

Site Name : C R Layton USARC | Location : Gainesville, FL (FL005)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Admin, Conex and 2 Sheds

Location / Area : Admin, Conex and 2 Sheds

Meter/Probe Model	Meter/Probe Serial #	Probe Active Area (cm^2)	Cal. Date	Efficiency (c/d)		Background ($dpm/100cm^2$ or µR/hr)			MDA ($dpm/100\ cm^2$)	
				α	β	α	β	γ	α	β
Ludlum 43-93	PR308282	100	09/05/12	0.238	0.2645	6.7	726.7	N/A	29.7	191.1
Ludlum 19	156437	N/A	09/05/12	N/A	N/A	N/A	N/A	4.5	N/A	N/A

Instrument Notes: Ludlum 43-93 with Ludlum 2360

For MDA calculations, the background count time is assumed to be 10 minutes and sample count time 1 minute, so the formula combined the different sampling/background count times into a factor of 1.1, that equates to [{bkg cpm/sample count time + bkg cpm/bkg count time} which is the same as {(1/1min+1/10min)* bkg cpm}]
Instrument background measurements taken on like survey surfaces (poured concrete surface)

Reg Guide 1.86 Action Level ($gcpm/100\ cm^2$)	
α	β
49.2	456.7

	Contamination													Exposure Rate	
	Direct Field (gcpm)		Direct Field ($dpm / 100\ cm^2$)		Removable / Smear Field ($cpm / 100\ cm^2$)		Removable / Smear Field ($dpm / 100\ cm^2$)		Removable Lg Area Wipe Field (cpm)		Removable / Smear Lab Data ($dpm /100\ cm^2$)			Contact (µR/hr)	One meter elevation (µR/hr)
	α	β	α	β	α	β	α	β	α	β	α	β	Tritium		
1	0	162	-6.7	-114.2	0	154	-6.7	-144.4	-	-	0.284 U	0.449 U	-	5.0	6.0
2	2	432	1.7	906.6	1	156	-2.5	-136.9	-	-	0.68	2.42	-	15.0	16.0
3	3	183	5.9	-34.8	1	173	-2.5	-72.6	-	-	0.0788 U	1.08	-	5.0	7.0
4	3	398	5.9	778.1	-	-	-	-	-	-	-	-	-	12.0	10.0
5	0	169	-6.7	-87.7	-	-	-	-	0	190	-	-	-	3.0	5.0
6	0	155	-6.7	-140.6	-	-	-	-	2	182	-	-	-	3.0	3.0
7	0	184	-6.7	-31.0	3	156	5.9	-136.9	-	-	1.21	1.68	-17.9 U	3.0	4.0
8	0	165	-6.7	-102.8	-	-	-	-	-	-	-	-	-	4.0	4.0
9	1	144	-2.5	-182.2	-	-	-	-	-	-	-	-	-	5.0	5.0
10	1	143	-2.5	-186.0	2	154	1.7	-144.4	-	-	0.109 U	0.246 U	-	5.0	5.0
11	3	163	5.9	-110.4	2	174	1.7	-68.8	-	-	0.28 U	0.125 U	-83.2 U	5.0	6.0
12	2	132	1.7	-227.6	-	-	-	-	1	161	-	-	-	5.0	5.0
13	6	187	18.5	-19.7	-	-	-	-	-	-	-	-	-	4.0	5.0
14	1	146	-2.5	-174.7	1	190	-2.5	-8.3	-	-	0.452 U	0.183 U	-	5.0	5.0
15	2	128	1.7	-242.7	-	-	-	-	1	182	-	-	-	5.0	7.0

Survey Notes:

Large area wipes should be approximately 1 m^2 or greater in area.
Ludlum 43-89/93 w/ active area of 100 cm^2 is assumed in direct field $dpm/100cm^2$ calculations.
Dose rates were collected in every room.
* Removable/Smear Field values are qualitative measurements.
U - Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. (Non-detect)
Negative results occur when a previously determined counting instrument background value is subtracted from a sample value that is less than the background value. Negative values represent a portion of the statistical distribution of negative and positive values around zero for samples containing very little or no detectable radioactivity.

Surveyed by: Joe Green, Health Physicist
Spencer Spane

Radiological Survey Record Form
(continuation sheet)

Date : 02/26/13 Team No. : JEG/SS

Site Name : C R Layton USARC Location Gainesville, FL (FL005)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Admin, Conex and 2 Sheds

Location / Area : Admin, Conex and 2 Sheds

	Contamination													Exposure Rate	
	Direct (cpm)		Direct Field (dpm / 100 cm^2)		Removable / Smear (cpm / 100 cm^2)		Removable / Smear Field (dpm / 100 cm^2)		Removable Lg Area Wipe Field (cpm)		Removable / Smear Lab Data (dpm / 100 cm^2)			Contact (µR/hr)	one meter (µR/hr)
	α	β	α	β	α	β	α	β	α	β	α	β	Tritium		
16	3	153	5.9	-148.2	-	-	-	-	-	-	-	-	-	5.0	6.0
17	3	382	5.9	717.6	-	-	-	-	-	-	-	-	-	10.0	11.0
18	3	151	5.9	-155.8	1	175	-2.5	-65.0	-	-	0.222 U	0.48 U	-	6.0	6.0
19	0	98	-6.7	-356.1	-	-	-	-	0	164	-	-	-	2.0	1.0
20	1	170	-2.5	-83.9	-	-	-	-	2	189	-	-	-	7.0	7.0
21	4	166	10.1	-99.1	-	-	-	-	-	-	-	-	-	1.0	1.0
22	3	162	5.9	-114.2	-	-	-	-	2	209	-	-	-	7.0	7.0
23	2	143	1.7	-186.0	-	-	-	-	2	153	-	-	-	6.0	8.0
24	2	154	1.7	-144.4	-	-	-	-	0	170	-	-	-	6.0	6.0
25	4	127	10.1	-246.5	-	-	-	-	-	-	-	-	-	2.0	2.0
26	2	134	1.7	-220.0	0	166	-6.7	-99.1	-	-	0.0478 U	0.356 U	-	5.0	6.0
27	0	141	-6.7	-193.6	-	-	-	-	2	163	-	-	-	4.0	5.0
28	1	154	-2.5	-144.4	-	-	-	-	-	-	-	-	-	6.0	5.0
29	1	149	-2.5	-163.3	1	165	-2.5	-102.8	-	-	0.657	1.27	-6.69 U	5.0	5.0
30	4	167	10.1	-95.3	-	-	-	-	3	155	-	-	-	3.0	3.0
31															
32															
33															
34															
35															
36															
37															

Survey Notes:

Large area wipes should be approximately 1 m2 or greater in area.
Ludlum 43-89/93 w/ active area of 100 cm2 is assumed in direct field dpm/100cm2 calculations.
Dose rates were collected in every room.
* Removable/Smear Field values are qualitative measurements.
U - Analyte was analyzed for, but not detected above the MDL, MDA, or LOD. (Non-detect)
Negative results occur when a previously determined counting instrument background value is subtracted from a sample value that is less than the background value. Negative values represent a portion of the statistical distribution of negative and positive values around zero for samples containing very little or no detectable radioactivity.

Surveyed by: Joe Green, Health Physicist
Spencer Spane

APPENDIX F
SAMPLE DESCRIPTION LOG

SAMPLE LOCATION DESCRIPTION LOG

Survey Location: Admin, Conex and 2 Sheds, C R Layton USARC, Gainesville, FL (FL005)

No.	Survey Location	Data Type {Large Area Wipe (LAW), Wipe Test (100 cm^2)(Wipe) Direct}	Lab Sample ID	Sample Location (Starting Point is SE Corner)	Description of Location (Samples collected on concrete unless otherwise noted.)
1	Admin	WIPE,Direct	Layton USARC_Sample 1AB	5'N 11'W	Rm 107 cage
2	Admin	WIPE, Direct	Layton USARC_Sample 2AB	1'N 3'W	Rm 107 shower (tile)
3	Admin	WIPE,Direct	Layton USARC_Sample 3AB	2'N 4'W	Rm 107 janitor closet
4	Admin	Direct	-	11'N 6'W	Restroom (tile)
5	Admin	Direct	-	12'N 4'W	Entryway
6	Admin	Direct	-	16'N 24'W	Rm 17 vault
7	Admin	WIPE,Direct	Layton USARC_Sample 7ABT	16'N 6'W	Rm 17 vault
8	Admin	Direct	-	2'N 2'W	Rm 17 vault
9	Admin	Direct	-	60'N 9'W	Rm 17 outside vault
10	Admin	WIPE,Direct	Layton USARC_Sample 10AB	5'N 4'W	downstairs closet
11	Admin	WIPE,Direct	Layton USARC_Sample 11ABT	92'N 15'W	Old firing range
12	Admin	Direct	-	88'N 3'W	Old firing range
13	Admin	Direct	-	44'N 5'W	Old firing range
14	Admin	WIPE,Direct	Layton USARC_Sample 14AB	11'N 4'W	Rm 121 (linoleum)
15	Admin	LAW,Direct	-	15'N 33'W	Rm 217 (linoleum)
16	Admin	Direct	-	15'N 4'W	Rm 217 (linoleum)
17	Admin	Direct	-	13'N 3'W	Restroom (tile)
18	Admin	WIPE,Direct	Layton USARC_Sample 18AB	3'N 3'W	Rm 104A
19	Conex	LAW,Direct	-	3'N 19'W	Conex (wood)
20	Admin	Direct	-	26'N 3'W	Rm 104A
21	Shed N	Direct	-	4'N 2'W	Shed N
22	Admin	LAW,Direct	-	26'N 7'W	Rm 104A front
23	Admin	Direct	-	3'N 3'W	Entryway
24	Admin	LAW,Direct	-	24'N 3'W	Rm 105A
25	Shed S	Direct	-	4'N 2'W	Shed S
26	Admin	WIPE,Direct	Layton USARC_Sample 26AB	6'N 19'W	Rm 105A cage
27	Admin	LAW,Direct	-	1'N 33'W	Rm 105A
28	Admin	Direct	-	12'N 2'W	Vault
29	Admin	WIPE,Direct	Layton USARC_Sample 29ABT	2'N 12'W	Vault
30	Admin	LAW,Direct	-	24'N 7'E***	Bay rollup door

APPENDIX G
SURVEY SKETCH

Radiological Survey Record - Survey Locations

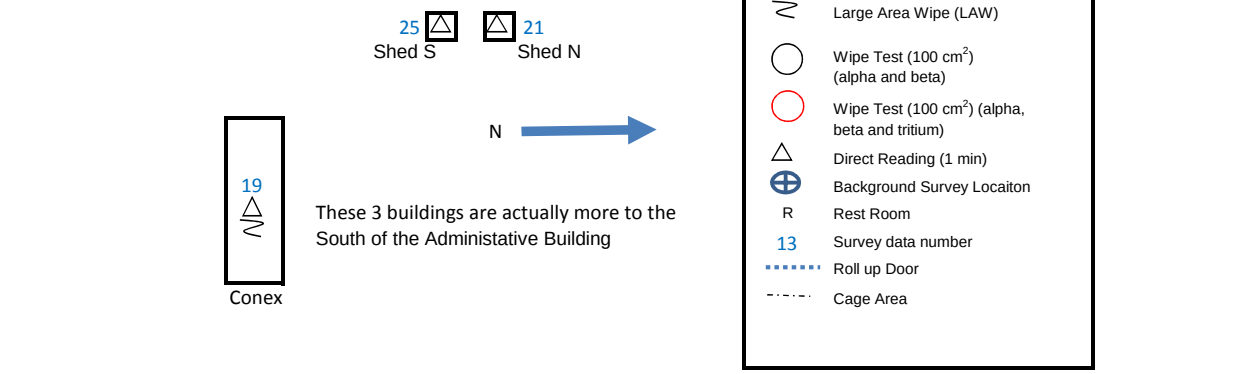
Date : 02/26/13

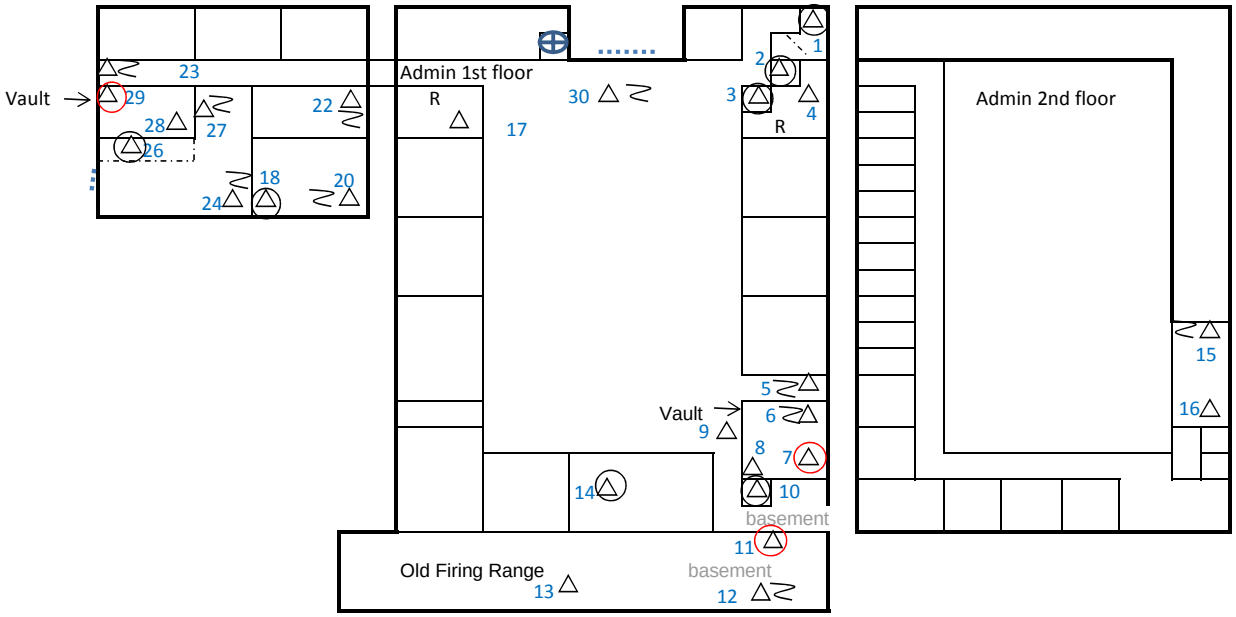
Location Admin, Conex and 2 Sheds, C R Layton USARC, Gainesville, FL (FL005)

Team : JEG/SS

Survey Sketch

Note: Coordinates on Sample Description Log use the SE corner of each room.





Scale: Not to Scale

Performed by:
JEG

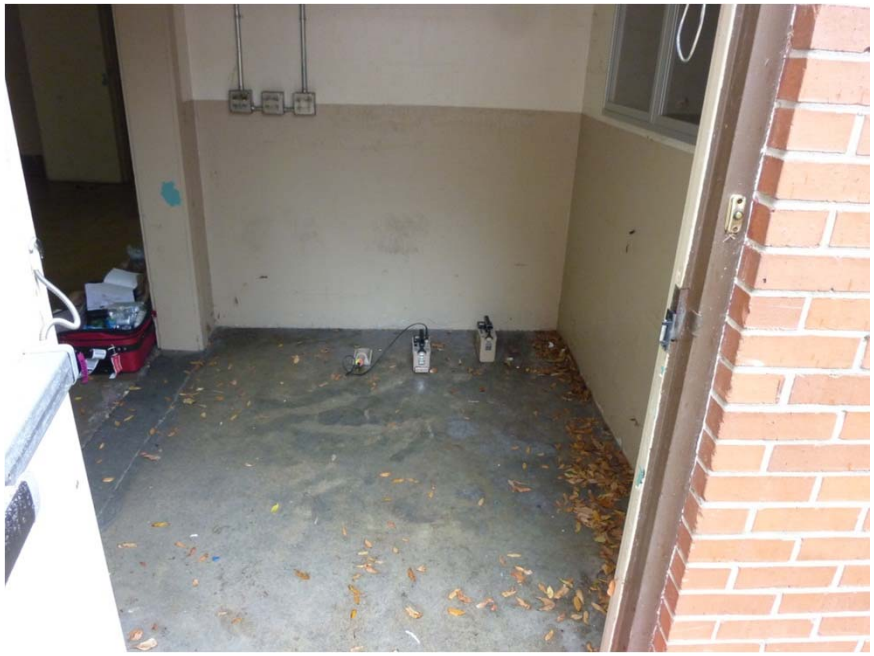
APPENDIX H
HIGH RESULTS NARRATIVE

Site : C. R. Layton USARC, Gainesville, FL (FL005)

Sample Location	Remarks
2,4,17	The field measurements at these locations (building restrooms) were taken over a tile floor and with surround tile wall covering. Tile and tile glazing materials often contain elevated concentrations of Naturally Occurring Radiological Materials (NORM) which can result in elevated ambient gamma radiation levels. Given this known condition (Reference Table B-1 in NUREG 1575 Appendix B Supp. 1), it is not unexpected to find gamma radiation measurements in areas with tile materials to exceed the very restrictive 2x background action level. In addition, our background gamma exposure rate level of 4.5 microR/hour is very low compared to other ambient radiation levels. Therefore, it was determined the slightly elevated gamma radiation measurements at survey locations 2, 4, and 17 were indicative of NORM from building materials, hence no further investigation was warranted.

APPENDIX I
SITE PHOTOS

Layton USARC_Front



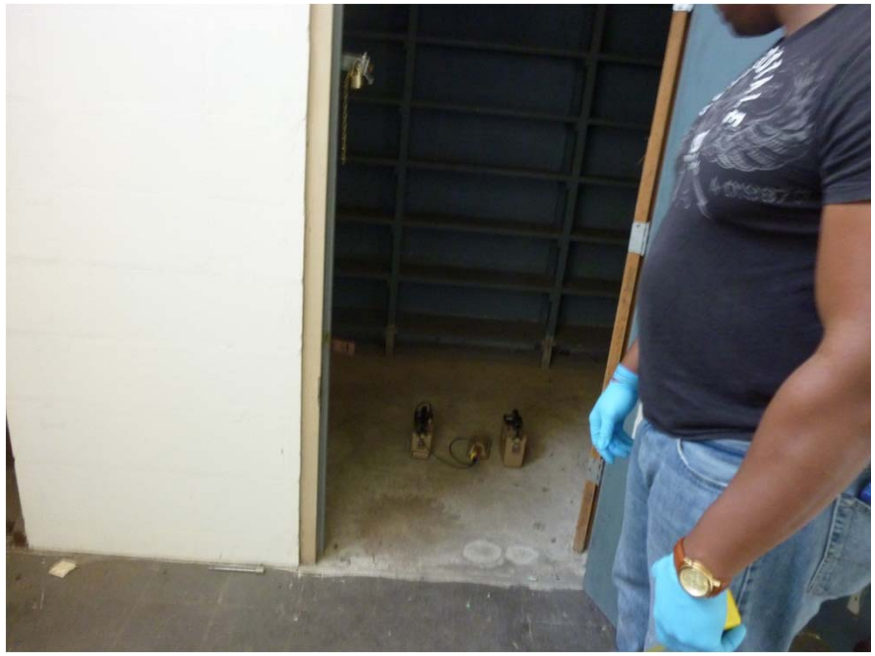
Layton USARC_Background entryway near rollup door

Layton USARC_Sample 1AB

Layton USARC_Sample 2AB

Layton USARC_Sample 3AB

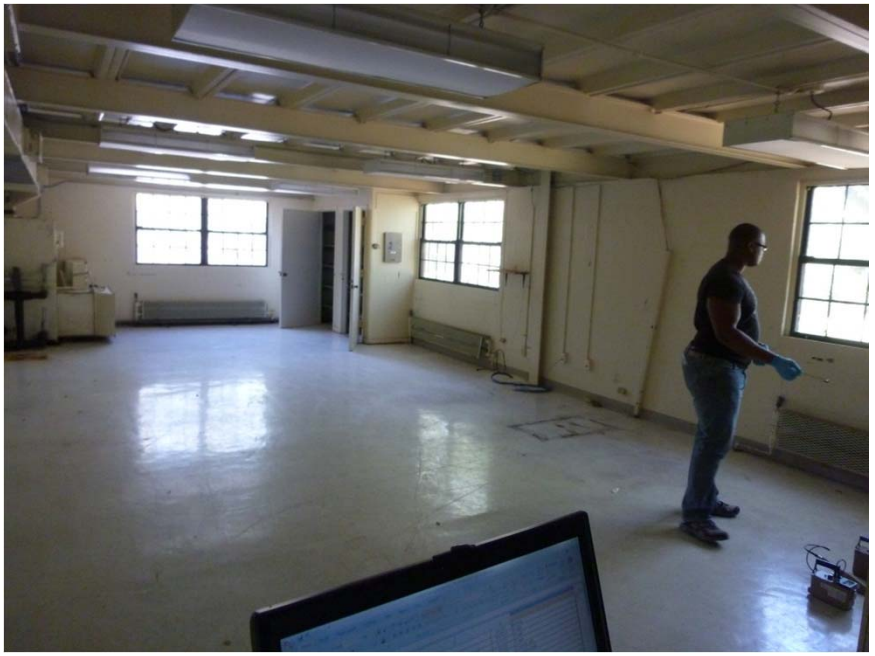
Layton USARC_Sample 7ABT



Layton USARC_Sample 10AB

Layton USARC_Sample 11ABT

Layton USARC_Sample 14AB

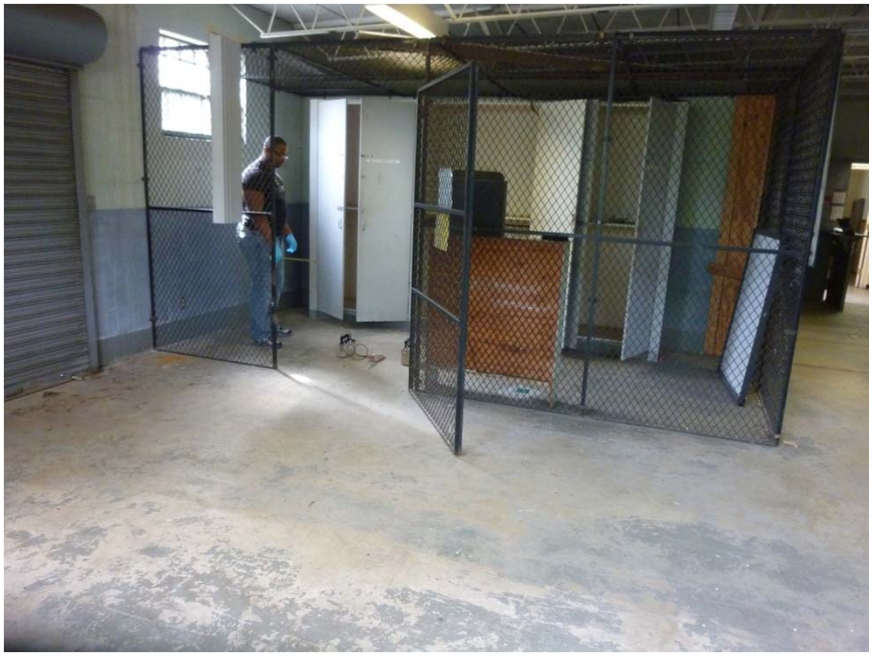


Layton USARC_Sample 16

Layton USARC_Sample 18AB

Layton USARC_Sample 19

Layton USARC_Sample 21, 25 Sheds



Layton USARC_Sample 26AB

Layton USARC_Sample 29ABT

Layton USARC_Sample 30

APPENDIX J
ANALYTICAL RESULTS

GEL Laboratories LLC
a member of The GEL Group INC

140274G MOD

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171 F 843.766.1178

www.gel.com

March 01, 2013

Daniel F. Caputo
TerranearPMC, LLC
222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341

Re: TerranearPMC, LLC (Project No. 46142) Layton USARC (FL005)
Work Order: 321009

Dear Daniel Caputo:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 27, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4707.

Sincerely,

LaToya D. Hughes

LaToya Hughes
Project Manager

Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

TPMC005 TerranearPMC, LLC (Project No. 46142)

Client SDG: 321009 GEL Work Order: 321009

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a surrogate compound

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, LaToya Hughes.

Reviewed by LaToya D. Hughes

Certificate of Analysis

Report Date: March 1, 2013

Company :	TerranearPMC, LLC
Address :	222 Valley Creek Blvd. Suite 210 Exton, Pennsylvania 19341
Contact:	Daniel F. Caputo
Project:	TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID:	Layton USARC Bldg 1 Sample 7T	Project:	TPMC00504
Sample ID:	321009001	Client ID:	TPMC005
Matrix:	Swipe		
Collect Date:	26-FEB-13 11:00		
Receive Date:	27-FEB-13		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Liquid Scintillation Analysis											
LSC, Direct Tritium, Filter "As Received"											
Tritium	U	-17.9	38.4	100	dpm/Filter		BYS1	02/27/13	2056	1285361	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	GL-RAD-A-002	

Certificate of Analysis

Report Date: March 1, 2013

Company :	TerranearPMC, LLC
Address :	222 Valley Creek Blvd. Suite 210 Exton, Pennsylvania 19341
Contact:	Daniel F. Caputo
Project:	TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID:	Layton USARC Bldg 1 Sample 11T	Project:	TPMC00504
Sample ID:	321009002	Client ID:	TPMC005
Matrix:	Swipe		
Collect Date:	26-FEB-13 12:00		
Receive Date:	27-FEB-13		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Liquid Scintillation Analysis											
LSC, Direct Tritium, Filter "As Received"											
Tritium	U	-83.2	91.5	100	dpm/Filter		BYS1	02/28/13	1242	1285361	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	GL-RAD-A-002	

Certificate of Analysis

Report Date: March 1, 2013

Company :	TerranearPMC, LLC
Address :	222 Valley Creek Blvd. Suite 210 Exton, Pennsylvania 19341
Contact:	Daniel F. Caputo
Project:	TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID:	Layton USARC Bldg 1 Sample 29T	Project:	TPMC00504
Sample ID:	321009003	Client ID:	TPMC005
Matrix:	Swipe		
Collect Date:	26-FEB-13 14:00		
Receive Date:	27-FEB-13		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Liquid Scintillation Analysis											
LSC, Direct Tritium, Filter "As Received"											
Tritium	U	-6.69	30.1	100	dpm/Filter		BYS1	02/27/13	2129	1285361	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	GL-RAD-A-002	

Certificate of Analysis

Report Date: March 1, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID: Layton USARC Bldg 1 Sample 1AB
Project: TPMC00504
Sample ID: 321009004
Client ID: TPMC005
Matrix: Swipe
Collect Date: 26-FEB-13 11:00
Receive Date: 27-FEB-13
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha	U	0.284	0.398	0.500	dpm/Filter		JXR1	03/01/13	0747	1285242	1
Beta	U	0.449	0.548	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company :	TerranearPMC, LLC
Address :	222 Valley Creek Blvd. Suite 210 Exton, Pennsylvania 19341
Contact:	Daniel F. Caputo
Project:	TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID:	Layton USARC Bldg 1 Sample 2AB	Project:	TPMC00504
Sample ID:	321009005	Client ID:	TPMC005
Matrix:	Swipe		
Collect Date:	26-FEB-13 11:00		
Receive Date:	27-FEB-13		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha		0.680	0.478	0.500	dpm/Filter		JXR1	02/28/13	1504	1285242	1
Beta		2.42	0.609	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company :	TerranearPMC, LLC
Address :	222 Valley Creek Blvd. Suite 210 Exton, Pennsylvania 19341
Contact:	Daniel F. Caputo
Project:	TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID:	Layton USARC Bldg 1 Sample 3AB	Project:	TPMC00504
Sample ID:	321009006	Client ID:	TPMC005
Matrix:	Swipe		
Collect Date:	26-FEB-13 11:00		
Receive Date:	27-FEB-13		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha	U	0.0788	0.463	0.500	dpm/Filter		JXR1	02/28/13	1504	1285242	1
Beta		1.08	0.835	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID: Layton USARC Bldg 1 Sample 7AB
Project: TPMC00504
Sample ID: 321009007
Client ID: TPMC005
Matrix: Swipe
Collect Date: 26-FEB-13 11:00
Receive Date: 27-FEB-13
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha		1.21	0.620	0.500	dpm/Filter		JXR1	02/28/13	0923	1285242	1
Beta		1.68	1.22	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID: Layton USARC Bldg 1 Sample 10AB
Project: TPMC00504
Sample ID: 321009008
Client ID: TPMC005
Matrix: Swipe
Collect Date: 26-FEB-13 11:00
Receive Date: 27-FEB-13
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha	U	0.109	0.481	0.500	dpm/Filter		JXR1	02/28/13	1505	1285242	1
Beta	U	0.246	0.536	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company :	TerranearPMC, LLC
Address :	222 Valley Creek Blvd. Suite 210 Exton, Pennsylvania 19341
Contact:	Daniel F. Caputo
Project:	TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID:	Layton USARC Bldg 1 Sample 11AB	Project:	TPMC00504
Sample ID:	321009009	Client ID:	TPMC005
Matrix:	Swipe		
Collect Date:	26-FEB-13 11:00		
Receive Date:	27-FEB-13		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha	U	0.280	0.491	0.500	dpm/Filter		JXR1	02/28/13	1505	1285242	1
Beta	U	0.125	0.593	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID: Layton USARC Bldg 1 Sample 14AB
Project: TPMC00504
Sample ID: 321009010
Client ID: TPMC005
Matrix: Swipe
Collect Date: 26-FEB-13 11:00
Receive Date: 27-FEB-13
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha	U	0.452	0.472	0.500	dpm/Filter		JXR1	02/28/13	1528	1285242	1
Beta	U	0.183	0.502	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID: Layton USARC Bldg 1 Sample 18AB
Project: TPMC00504
Sample ID: 321009011
Client ID: TPMC005
Matrix: Swipe
Collect Date: 26-FEB-13 11:00
Receive Date: 27-FEB-13
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha	U	0.222	0.497	0.500	dpm/Filter		JXR1	02/28/13	1528	1285242	1
Beta	U	0.480	0.537	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID: Layton USARC Bldg 1 Sample 26AB
Project: TPMC00504
Sample ID: 321009012
Client ID: TPMC005
Matrix: Swipe
Collect Date: 26-FEB-13 11:00
Receive Date: 27-FEB-13
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha	U	0.0478	0.497	0.500	dpm/Filter		JXR1	02/28/13	0924	1285242	1
Beta	U	0.356	1.11	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

Certificate of Analysis

Report Date: March 1, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)~WORK_ORDER_DESCRIPTION~

Client Sample ID: Layton USARC Bldg 1 Sample 29AB
Project: TPMC00504
Sample ID: 321009013
Client ID: TPMC005
Matrix: Swipe
Collect Date: 26-FEB-13 11:00
Receive Date: 27-FEB-13
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, filter "As Received"											
Alpha		0.657	0.422	0.500	dpm/Filter		JXR1	02/28/13	0924	1285242	1
Beta		1.27	1.03	2.00	dpm/Filter						

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 900.0/SW846 9310/SM 7110B Modified	

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

QC Summary

Report Date: March 1, 2013

TerranearPMC, LLC
222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania
Contact: **Daniel F. Caputo**

Workorder: **321009**

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gas Flow												
Batch 1285242												
QC1202835015 321009004 DUP												
Alpha		U	0.284	U	0.361	dpm/Filter	0.00		N/A	JXR1	03/01/13	10:28
Beta		U	0.449	U	0.534	dpm/Filter	0.00		N/A			
QC1202835014 MB												
Alpha				U	0.0175	dpm/Filter					02/28/13	10:48
Beta				U	0.190	dpm/Filter						
Rad Liquid Scintillation												
Batch 1285361												
QC1202835278 LCS												
Tritium	219				211	dpm/Filter		96.3	(75%-125%)	BYS1	02/27/13	22:01
QC1202835279 LCSD												
Tritium	219				220	dpm/Filter	4.23	100	(0%-20%)		02/27/13	22:18
QC1202835277 MB												
Tritium				U	-10.2	dpm/Filter					02/27/13	21:45

Notes:
The Qualifiers in this report are defined as follows:

**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
A	The TIC is a suspected aldol-condensation product
B	For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
F	Estimated Value
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	Matrix Related Failure
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit

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QC Summary

Workorder: **321009**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GEL Laboratories LLC
Form GEL−DER

DER Report No.: 1166878
Revision No.: 2

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
28−FEB−13	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LSC	GL−RAD−A−002	Filter	TPMC
Batch ID:	**Sample Numbers:**		
1285361	see below		

Potentially affected work order(s)(SDG): 321009

Application Issues:

Result is more negative than the three sigma TPU

Specification and Requirements Exception Description:	DER Disposition:
1. Sample 321009002(Layton USARC Bldg 1 Sample 11T) has a negative result that is greater than three times the absolute value of the 1−sigma TPU.	1. The sample was recounted for verification. The recount result confirms the negative activity. Reporting results.

Originator's Name:

Jennifer Landingham 28−FEB−13

Data Validator/Group Leader:

Lyndsey Pace 01−MAR−13

Page: ______ of ______
Project #: 46142.08
GEL Quote #:
COC Number [1]: 1
PO Number:

GEL Chain of Custody and Analytical Request

GEL Work Order Number: 321009

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: Tetra Tech PMC — Phone #: 215-586-1092
Project/Site Name: Layton USARC (FL005) — Fax #:
Address:
Collected by: [signature] — Send Results To: K Shoff, D Caputo, J Green

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Radioactive	TSCA Regulated	Total number of containers	Gross Alpha/Beta	Tritium	Comments (Note: extra sample is required for sample specific QC)
Layton USARC Bldg 1_Samples 7T 11T 29T	2-26-13		N	NA	P			3		X	*refer to
Layton USARC Bldg 1 Samples 1AB, 2AB, 3AB 7AB 10AB	2-26-13		N	NA	P			5	X		sample labels
Layton USARC Bldg 1 Samples 11AB, 14AB 18AB 26AB 29AB	2-26-13		N	NA	P			5	X		for time collected

<-- Preservative Type (6)

TAT Requested: Normal: 7 Rush: ______ Specify: ______ (Subject to Surcharge) Fax Results: Yes / No (circled: No)

Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sampling to verify existing conditions

Sample Collection Time Zone: Eastern (circled) / Central / Mountain / Pacific / Other ______

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	[signature]	Feb 26, 2013	1610	[signature]	2/27/13	0855
2						
3						

Sample Shipping and Delivery Details

GEL PM: LaToya Hughes
Method of Shipment: Fedex — Date Shipped: Feb 26, 2013
Airbill #: 8993 6186 4103
Airbill #:

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 16 C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite
3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.
4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* - 3, *6010B/7470A* - 1).
6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY **YELLOW = FILE** **PINK = CLIENT**

140274G MOD

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

140274G MOD

Client: TPMC	**SDG/AR/COC/Work Order:** 321009
Received By: SC	**Date Received:** 2.27.13

Suspected Hazard Information	**Yes**	**No**	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0
Classified Radioactive II or III by RSO?		✓	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		✓	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		✓	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	**Yes**	**NA**	**No**	**Comments/Qualifiers (Required for Non-Conforming Items)**
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius 16
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 6152/6049 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?			✓	Sample ID's affected: AB samples - 1100 7T-1100 11T-1200 29T-1400
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	✓		✓	
13	COC form is properly signed in relinquished/received sections?	✓			
14	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 8993 6018 4103

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JH Date 2-27-13 Page 1 of 1

List of current GEL Certifications as of 01 March 2013

State	Certification
Arkansas	88−0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−12−00283, P330−12−00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M−SC012
Nevada	SC000122011−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68−00485
Plant Material Permit	PDEP−12−00260
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235−12−7
Utah NELAP	SC00012
Vermont	VT87156
Virginia NELAP	460202
Washington	C780−12
Wisconsin	999887790