

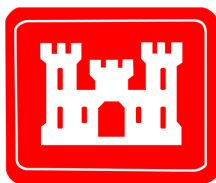
Final

Radiological Site Assessment Report

**Sievers Sandberg United States Army Reserve Center (NJ013)
Route 130 & Artillery Avenue
Pedricktown, NJ**

**Contract No. W912QR-12-D-0027
Delivery Order No. 0002**

Prepared For:



**U.S. Army Corps of Engineers
Louisville District**

Prepared By:

Terranear **PMC**

**222 Valley Creek Blvd., Suite 210
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July 2013

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Radiological Site Assessment Report**

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Pedricktown, NJ**

Authored By: 

Date: 7/15/2013

Joseph Green, Health Physicist

STATEMENT OF INDEPENDENT TECHNICAL REVIEW

TerranearPMC (TPMC) has completed the Final Report on Radiological Site Assessment at the Sievers Sandburg United States Army Reserve Center located in Pedricktown, New Jersey.

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.



Daniel F. Caputo, P.E., CHP
Project Manager, TPMC

Date: 7/15/2013



Walter Wujcik, P.E., PMP
Independent Technical Review Team Leader, TPMC

Date: 7/15/2013

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LIST OF ACRONYMS

ABAR	Alternate Battery Acquisition Radar
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
EBS	Environmental Baseline Survey
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
NBC	Nuclear Biological Chemical
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
PAARNG	Pennsylvania Army National Guard
PM	Project Manager
POC	Point of Contact
POL	Petroleum, Oils and Lubricants
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

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RSO	Radiation Safety Officer
TPMC	TerranearPMC, LLC
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 Sievers Sandburg United States Army Reserve Center (USARC) located in Pedricktown, New Jersey, hereafter referred to as the "Sievers Sandburg 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 U.S. Army Reserve (USAR) 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 May 7-9, 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. The field team was unable to access the vault in Building 404 and basement in building 273. The field team remobilized on May 21, 2013 to conduct radiological survey at inaccessible areas during the first site visit.

ES 1.3 FINDINGS AND RECOMMENDATIONS

All U.S. Army Reserve (USAR) personnel and equipment have vacated the Site. After review of the related site historical documents, personnel interviews, site inspections, visual walk downs, and radiological surveys, there is evidence that radioactive materials/commodities were used or stored at the Sievers Sandburg Site. However, 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: one hundred fifty six (156) direct alpha and beta measurements, one hundred fifty six (156) gamma radiation exposure rate measurements; fifty eight (58) smear samples for removable alpha /beta radioactivity; and twenty four (24) tritium wet smear samples. All samples were sent to the off-site laboratory for analysis. None of the 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 Sievers Sandburg 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 Sievers Sandburg United States Army Reserve Center (USARC) Site (hereafter referred to as the “Sievers Sandburg Site” or “the Site”) includes approximately 40 acres of land improved with eleven buildings, four detached garages and three storage sheds. A military vehicle parking area also exists on the northwest corner of the Property. According to historical documentation, in 1917, the USACE began acquiring farms along the Delaware River to serve as the Delaware Ordnance Depot. In 1954, the Delaware Ordnance Depot was redesignated by the Army as the Raritan-Delaware Storage Activity. The Camp Pedricktown property was transferred to Fort Dix in 1962. In 1965, 42 facilities were leased to the Salem County Technical Institute until the late 1960s. The federal government declared 23 acres of the Philadelphia Air Defense Site as surplus, and transferred the property to Salem County in 1972. In 1975, 11 of the 23 acres were transferred to Salem County Community College. In 1993, jurisdiction of the 23 acre property was given to the 79th Army Reserve Command (ARCOM). In 1996, the property was expanded to the present-day size of 40 acres (ECP,2013).

Building 171

It is a three story concrete block with brick exterior structure built in 1942. Its use was for Headquarters administrative purposes and is 7,067 square feet (ft²).

Building 173

It is a one story concrete block structure built in 1961. Its use was for officer’s mess hall purposes and is 7,215 ft².

Building 190

It is a one story concrete block with brick exterior structure. Its use was for guard shed purposes and is 50 ft².

Building 273

It is a three story concrete block with brick exterior structure built in 1939. Its use was for enlisted barracks and more recently office purposes and is 15,073 ft².

Building 274

It is a two story concrete block with brick exterior structure built in 1939. It was used as old post hospital/dispensary purposes and is 4,191 ft².

Building 285

It is a one story wood exterior structure on concrete pad. Its use was for garage storage purposes and is 500 ft².

Building 404

It is a large brick structure that was divided into a firehouse, train roundhouse, and automotive garage. The fire garage section contains three vehicular openings with two round windows. It is one story with some 2nd level storage, concrete block with brick exterior structure, built in 1942, and 22,205 ft².

Building 413

Building 413 was formerly a gas station used to fuel motor pool vehicles and more recently storage. It is a one story concrete block structure built in 1931 and is 257 ft².

Building 434

This general storage building is a long one-story rectangular structure with an elevated concrete loading platform. Ten roll-up doors allowed materials to be unloaded directly from trucks into the warehouse. It was built in 1951 and is 15,040 ft².

Building 464

It is a low, elongated one-story building built in 1951 and is 15,040 ft². There are several irregularly spaced steel entry doors throughout.

Building 475

It is a one story concrete block. Its use was for latrine purposes and is 100 ft².

Houses and Garages

These facilities should not have stored any radioactive material except smoke detectors and were not surveyed.

According to an Environmental Baseline Survey (EBS) conducted in 2003, radon monitoring occurred at the Property in 1992 at Buildings 171, 173, 273, and 404. None of these buildings had radon levels exceeding 4.0 pCi/L. Additional radon testing was conducted in 1998 at Buildings 171, 273, 274, 404, 434 and 464. Radon concentrations ranged from 0.1-0.5 pCi/L (ECP, 2013).

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, indications were found of the past storage and use of radiological commodities at the Sievers Sandburg Site. Based on the mission of the Army Reserve units stationed at the Site, it is reasonable to assume that some low-level radioactive commodities were also stored/used at the Site (such as lensatic 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 improperly used or stored at the Site or that any radioactive materials from these items were released to the environment.

**Figure 1-1
Site Aerial View**



Sievers Sandburg USARC
Route 130 & Artillery Avenue
Pedricktown, NJ

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-measurable 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 Sievers Sandburg Site qualified for the simplified assessment procedure of Appendix B of 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 Radiation Detection, Indication and Computation (RADIAC) meters; chemical agent detectors; moisture density gauges; lensatic compasses; night-vision goggles; radio-luminescent weapon sights, and wristwatches; and armored vehicle equipment 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 (cm²) 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. 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 indicated that radioactive commodities were stored in the Site.

This Site was considered as five MARSSIM survey units. The 1st survey unit included buildings 434, 464 and 475, 2nd survey unit included buildings 171, 173 and 190, 3rd survey unit included buildings 404 and 413, 4th survey unit included building 273 and the last survey unit included buildings 274 and 285. Although these facilities would typically be considered MARSSIM Class

3 survey units with only judgmental survey and sampling required, the survey team attempted to initially design the survey using modified Class 2 survey protocols to increase the survey quality – 30 survey points over 1000 m² 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.

**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 background locations as temporary base of operations to conduct instrument quality control and performance checks. These background or reference area(s) were 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. These background reference areas were also the locations where smear/wipe samples were counted and instrument performance verified pre and post survey.

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, General Engineering Laboratories (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 eighty two (82) quantitative smear samples (100 cm² smear tests) were taken at the Site. This included fifty eight (58) dry smear samples that were collected and analyzed for removable alpha/beta contamination, and twenty four (24) 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. As presented in the table, all 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. Photos of sample locations are provided in Appendix I.

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**Table 4-1
Summary Results Table**

Survey Location Number	Contamination					Exposure Rate	
	Direct Field		Removable / Smear			Surface Contact	One meter Above Surface
	(dpm / 100 cm ²)		Lab (dpm /100 cm ²)			(µR/hr)	(µR/hr)
	α	β	α	β	Tritium		
Location / Area : Survey Unit 1 (Buildings 434,464 and 475)							
1	<BKG	<BKG	ND	ND	-	7.0	7.5
2	3.8	<BKG	-	-	-	7.0	7.0
3	<BKG	<BKG	-	-	-	6.0	6.0
4	8.0	<BKG	-	-	-	5.0	5.0
5	<BKG	<BKG	-	-	-	5.0	5.0
6	<BKG	<BKG	-	-	-	5.0	5.5
7	3.8	<BKG	ND	ND	ND	5.5	5.5
8	3.8	<BKG	-	-	-	5.0	5.0
9	<BKG	<BKG	-	-	-	9.0	9.0
10	<BKG	<BKG	-	-	-	6.0	5.5
11	<BKG	<BKG	-	-	-	5.0	5.5
12	<BKG	<BKG	-	-	-	4.5	5.0
13	<BKG	<BKG	ND	ND	ND	6.5	7.0
14	<BKG	<BKG	-	-	-	6.0	6.0
15	<BKG	<BKG	ND	ND	ND	8.5	9.0
16	<BKG	<BKG	ND	ND	-	6.0	6.0
17	<BKG	<BKG	ND	ND	ND	10.0	10.5
18	<BKG	45.7	0.648	ND	-	7.5	7.5
19	<BKG	<BKG	-	-	-	5.5	6.0
20	3.8	<BKG	-	-	-	7.5	7.0
21	3.8	<BKG	0.703	1.34	ND	4.0	4.0
22	<BKG	<BKG	-	-	-	4.5	4.5
23	<BKG	<BKG	-	-	-	4.5	5.0
24	3.8	<BKG	0.736	1.16	-	3.5	4.0
25	8.0	<BKG	-	-	-	4.0	4.0
26	<BKG	<BKG	-	-	-	4.0	4.0
27	3.8	<BKG	-	-	-	4.5	5.0
28	<BKG	<BKG	-	-	-	4.0	4.0
29	<BKG	<BKG	0.735	0.848	ND	4.0	4.0
30	<BKG	<BKG	ND	ND	-	4.0	3.5
Location / Area : Survey Unit 2 (Buildings 171, 173 and 190)							
31	1.7	149.0	ND	ND	-	10.0	10.0
32	<BKG	<BKG	-	-	-	5.0	5.0

Survey Location Number	Contamination					Exposure Rate	
	Direct Field		Removable / Smear			Surface Contact	One meter Above Surface
	(dpm / 100 cm ²)		Lab (dpm /100 cm ²)			(μR/hr)	(μR/hr)
	α	β	α	β	Tritium		
33	1.7	<BKG	-	-	-	10.0	10.0
34	1.7	<BKG	-	-	-	4.0	4.5
35	<BKG	<BKG	0.715	1.03	ND	4.0	4.0
36	10.1	<BKG	ND	ND	-	3.0	3.0
37	1.7	<BKG	-	-	-	3.5	4.0
38	<BKG	<BKG	0.766	1.71	ND	4.5	5.0
39	<BKG	<BKG	-	-	-	5.0	5.0
40	1.7	<BKG	ND	ND	-	3.5	4.0
41	<BKG	<BKG	-	-	-	4.5	4.0
42	<BKG	<BKG	ND	ND	-	6.5	6.5
43	<BKG	<BKG	-	-	-	6.0	6.5
44	<BKG	<BKG	1.07	3.83	ND	6.5	7.0
45	1.7	<BKG	-	-	-	7.0	6.5
46	<BKG	<BKG	ND	ND	-	6.0	6.0
47	<BKG	<BKG	-	-	-	7.5	7.5
48	10.1	682.0	-	-	-	10.0	10.5
49	1.7	<BKG	-	-	-	6.5	6.5
50	<BKG	<BKG	-	-	-	7.0	7.0
51	<BKG	700.9	-	-	-	11.0	11.5
52	1.7	<BKG	-	-	-	7.0	7.0
53	<BKG	<BKG	-	-	-	6.5	6.5
54	1.7	<BKG	-	-	-	7.0	6.5
55	<BKG	<BKG	-	-	-	5.5	5.5
56	10.1	<BKG	-	-	-	8.5	8.0
57	<BKG	<BKG	ND	0.769	-	6.0	6.0
58	1.7	175.4	-	-	-	10.5	10.5
59	5.9	<BKG	ND	ND	-	7.0	7.5
60	1.7	<BKG	-	-	-	9.5	9.5
Location / Area : Survey Unit 3 (Buildings 404 and 413)							
61	<BKG	<BKG	ND	0.894	ND	6.0	6.0
62	0.0	<BKG	-	-	-	7.0	7.0
63	0.0	<BKG	-	-	-	8.0	8.0
64	<BKG	<BKG	-	-	-	9.0	8.5
65	0.0	951.2	-	-	-	11.0	10.5
66	<BKG	<BKG	ND	ND	-	9.5	9.0
67	<BKG	108.1	-	-	-	11.0	11.5
68	<BKG	<BKG	ND	0.892	-	8.0	8.5

Survey Location Number	Contamination					Exposure Rate	
	Direct Field		Removable / Smear			Surface Contact	One meter Above Surface
	(dpm / 100 cm ²)		Lab (dpm /100 cm ²)			(μR/hr)	(μR/hr)
	α	β	α	β	Tritium		
69	<BKG	981.5	ND	0.86	-	10.5	10.5
70	4.2	<BKG	-	-	-	9.0	9.0
71	<BKG	<BKG	-	-	-	9.0	9.5
72	0.0	<BKG	ND	1.17	-	6.5	6.0
73	<BKG	40.1	ND	3.93	-	6.5	7.0
74	0.0	62.8	-	-	-	7.5	8.0
75	<BKG	2.3	-	-	-	11.5	11.0
76	<BKG	81.7	-	-	-	7.0	7.5
77	0.0	<BKG	-	-	-	10.0	10.5
78	8.4	<BKG	-	-	-	9.0	9.5
79	<BKG	<BKG	-	-	-	8.0	8.0
80	0.0	74.1	-	-	-	12.5	13.0
81	0.0	2.3	-	-	-	7.5	7.5
82	<BKG	96.8	-	-	-	10.0	10.0
83	<BKG	6.0	ND	ND	ND	6.5	7.0
84	0.0	<BKG	ND	0.775	-	7.5	7.5
85	4.2	<BKG	-	-	-	7.0	7.7
86	0.0	62.8	ND	ND	ND	10.0	10.5
87	4.2	168.6	-	-	-	10.5	11.0
88	<BKG	<BKG	ND	ND	-	5.0	5.5
89	4.2	425.7	0.619	2.64	-	10.0	10.5
90	16.8	172.4	-	-	-	9.5	10.0
151	<BKG	<BKG	5.44	8.82	ND	5.0	5.5
152	0.0	<BKG	4.59	7.07	ND	5.5	5.5
Location / Area : Survey Unit 4 (Building 273)							
91	0.4	<BKG	-	-	-	4.5	5.0
92	<BKG	<BKG	0.682	2.15	ND	4.5	5.0
93	<BKG	<BKG	ND	ND	ND	4.5	5.0
94	<BKG	<BKG	-	-	-	5.0	5.0
95	<BKG	<BKG	0.796	1.88	-	5.0	5.0
96	<BKG	<BKG	-	-	-	6.0	6.0
97	0.4	<BKG	-	-	-	6.0	6.0
98	<BKG	<BKG	-	-	-	7.5	7.5
99	0.4	<BKG	0.66	0.935	ND	5.0	5.0
100	<BKG	<BKG	0.523	0.934	-	5.0	5.0
101	<BKG	<BKG	ND	1.16	-	5.0	5.5
102	<BKG	<BKG	0.494	0.59	ND	6.0	5.5

Survey Location Number	Contamination					Exposure Rate	
	Direct Field		Removable / Smear			Surface Contact	One meter Above Surface
	(dpm / 100 cm ²)		Lab (dpm /100 cm ²)			(μR/hr)	(μR/hr)
	α	β	α	β	Tritium		
103	<BKG	<BKG	-	-	-	5.0	5.0
104	<BKG	<BKG	ND	ND	ND	5.5	5.5
105	0.4	<BKG	-	-	-	8.5	9.0
106	<BKG	90.4	-	-	-	12.5	13.0
107	0.4	<BKG	-	-	-	8.0	8.0
108	<BKG	823.8	-	-	-	18.0	18.0
109	0.4	<BKG	-	-	-	10.0	10.5
110	0.4	<BKG	-	-	-	9.0	8.5
111	<BKG	<BKG	0.579	0.781	-	8.0	8.0
112	<BKG	<BKG	-	-	-	8.0	8.0
113	<BKG	<BKG	-	-	-	12.0	12.0
114	0.4	<BKG	-	-	-	10.5	11.0
115	<BKG	<BKG	-	-	-	8.5	9.0
116	4.6	687.7	-	-	-	14.0	14.5
117	0.4	990.2	-	-	-	16.5	16.5
118	<BKG	846.5	-	-	-	14.5	14.5
119	<BKG	<BKG	0.644	1.9	ND	7.5	8.0
120	<BKG	<BKG	-	-	-	8.5	8.5
153	<BKG	64.5	ND	ND	ND	9.0	9.0
154	4.5	532.4	0.439	ND	-	14.0	14.5
155	22.3	465.1	0.65	1.93	-	10.5	10.5
156	4.5	501.8	-	-	-	14.0	14.0
Location / Area : Survey Unit 5 (Building 274 and 285)							
121	<BKG	<BKG	ND	ND	-	5.0	5.0
122	<BKG	<BKG	-	-	-	4.0	4.0
123	<BKG	<BKG	-	-	-	6.0	6.0
124	<BKG	0.8	-	-	-	4.5	4.5
125	5.5	<BKG	ND	0.591	ND	5.0	5.5
126	<BKG	15.9	ND	ND	-	5.0	5.0
127	<BKG	700.2	-	-	-	8.5	9.0
128	13.9	828.7	0.771	ND	-	12.0	11.5
129	5.5	<BKG	ND	ND	-	5.0	5.0
130	<BKG	<BKG	-	-	-	6.5	7.0
131	<BKG	34.8	-	-	-	7.0	7.0
132	<BKG	<BKG	-	-	-	6.5	7.0
133	<BKG	31.0	-	-	-	7.0	6.5
134	13.9	957.3	ND	ND	-	11.5	11.5

Survey Location Number	Contamination					Exposure Rate	
	Direct Field		Removable / Smear			Surface Contact	One meter Above Surface
	(dpm / 100 cm ²)		Lab (dpm /100 cm ²)			(μR/hr)	(μR/hr)
	α	β	α	β	Tritium		
135	<BKG	919.5	0.664	0.96	ND	10.0	9.5
136	1.3	91.5	-	-	-	8.0	8.5
137	<BKG	983.7	-	-	-	9.5	9.5
138	<BKG	<BKG	-	-	-	8.0	8.0
139	<BKG	<BKG	-	-	-	6.5	7.0
140	<BKG	152.0	ND	ND	-	7.5	7.5
141	<BKG	<BKG	-	-	-	7.5	7.5
142	<BKG	31.0	-	-	-	7.0	7.0
143	<BKG	<BKG	-	-	-	7.0	7.0
144	9.7	<BKG	-	-	-	7.0	7.0
145	9.7	998.9	-	-	-	5.5	6.0
146	<BKG	870.3	0.508	ND	ND	10.0	10.0
147	1.3	12.1	ND	ND	-	6.5	6.5
148	13.9	<BKG	-	-	-	5.0	5.5
149	5.5	46.1	-	-	-	7.5	7.5
150	<BKG	121.7	ND	ND	-	6.5	6.5

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, cm² – square centimeters, μR – micro-Roentgen, hr - hour

<BKG – Results less than site-specific background levels.

Site-specific Background Measurements

Location/Area	α (dpm / 100 cm ²)	β (dpm / 100 cm ²)	γ (μR/hr)
Survey Unit 1	4.6	744.4	6.0
Survey Unit 2	6.7	688.6	8.2
Survey Unit 3	8.4	719.8	7.7
Survey Unit 4	8.0	756.5	9.5
Survey Unit 5	7.1	649.5	8.0

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 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 presently 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 specific 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 cm²)
- Total (fixed and removable) beta (cpm and dpm/100 cm²)
- Removable / Smear (cpm/100 cm² and dpm/100 cm²)
 - 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.

All survey results were found to be indicative of background radiation levels and were less than Reg Guide 1.86 Table-I limits.

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 cm² alpha, 200 dpm/100 cm² beta, or 1000 dpm/100 cm² 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 Sievers Sandburg Site. In accordance with the MARSSIM guidance document and based on the data presented in this report, the Sievers Sandburg 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 Radiological Site Assessment as evidence that the Sievers Sandburg 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, 2013, Environmental Condition of Property (ECP) Report for Sievers-Sandberg USARC, Pedricktown, NJ, January 2013

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: Sievers Sandberg U.S. Army Reserve Center, Route 130 and Artillery Avenue
Pedricktown, NJ 08067 (NJ013)

Team Lead / Reviewer: J. Green

Date reviewed: 4/29/13

Documents reviewed:

All historical documents provided by 99th 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, 2013) indicated that the site includes approximately 40 acres of land improved with eleven buildings, four detached garages and three storage sheds. A military vehicle parking area also exists on the northwest corner of the Property. According to historical documentation, in 1917, the USACE began acquiring farms along the Delaware River to serve as the Delaware Ordnance Depot. In 1954, the Delaware Ordnance Depot was redesignated by the Army as the Raritan-Delaware Storage Activity. The Camp Pedricktown property was transferred to Fort Dix in 1962. In 1965, 42 facilities were leased to the Salem County Technical Institute until the late 1960s. The federal government declared 23 acres of the Philadelphia Air Defense Site as surplus, and transferred the property to Salem County in 1972. In 1975, 11 of the 23 acres were transferred to Salem County Community College. In 1993, jurisdiction of the 23 acre property was given to the 79th Army Reserve Command (ARCOM). In 1996, the property was expanded to the present-day size of 40 acres (ECP, 2013).

Building 171

It is a three story concrete block with brick exterior structure built in 1942. Its use was for Headquarters administrative purposes and is 7,067 square feet (ft²).

Building 173

It is a one story concrete block structure built in 1961. Its use was for officer's mess hall purposes and is 7,215 ft².

Building 190

It is a one story concrete block with brick exterior structure. Its use was for guard shed purposes and is 50 ft².

Building 273

It is a three story concrete block with brick exterior structure built in 1939. Its use was for enlisted barracks and more recently office purposes and is 15,073 ft².

Building 274

It is a two story concrete block with brick exterior structure built in 1939. It was used as old post hospital/dispensary purposes and is 4,191 ft².

Building 285

It is a one story wood exterior structure on concrete pad. Its use was for garage storage purposes and is 500 ft².

Building 404

It is a large brick structure that was divided into a firehouse, train roundhouse, and automotive garage. The fire garage section contains three vehicular openings with two round windows. It is one story with some 2nd level storage, concrete block with brick exterior structure, built in 1942, and 22,205 ft².

Building 413

Building 413 was formerly a gas station used to fuel motor pool vehicles and more recently storage. It is a one story concrete block structure built in 1931 and is 257 ft².

Building 434

This general storage building is a long one-story rectangular structure with an elevated concrete loading platform. Ten roll-up doors allowed materials to be unloaded directly from trucks into the warehouse. It was built in 1951 and is 15,040 ft².

Building 464

It is a low, elongated one-story building built in 1951 and is 15,040 ft². There are several irregularly spaced steel entry doors throughout.

Building 475

It is a one story concrete block. Its use was for latrine purposes and is 100 ft².

Houses and Garages

These facilities should not have stored any radioactive material except smoke detectors and were not surveyed.

Based on available information, no radiological survey/assessment has been performed at the site. According to an Environmental Baseline Survey (EBS) conducted in 2003, radon monitoring occurred at the Property in 1992 at Buildings 171, 173, 273, and 404. None of these buildings had radon levels exceeding 4.0 pCi/L. Additional radon testing was conducted in 1998 at Buildings 171, 273, 274, 404, 434 and 464. Radon concentrations ranged from 0.1-0.5 pCi/L.

Potential for radioactive commodity use, handling, or storage:

As documented in Section 6.2.5 of the ECP, *“According to the EBS report, an industrial radiation survey was conducted at Building 274 (old hospital/dispensary) in 1998. No radiological health hazards were identified. At the time of the February 2012 site inspection there was no evidence to suggest that any radiological commodities were ever improperly managed at the Property, or that any radionuclide was ever released.”* 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, 2013, Environmental Condition of Property (ECP) Report for Sievers Sandberg USARC, Pedricktown, NJ, January 2013

APPENDIX B
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

Site Location: Sievers Sandberg U.S. Army Reserve Center, Pedricktown, NJ (NJ013)

Date: 5/7/13 **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			Debris and stains in several locations
2	Presence of stored liquids			X			Mainly cleaning supplies
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					Garage bays and Vault in Bldg 404, basement in 273*
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					Vaults
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			Several locations
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					Vaults
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				

* Second site visit was completed on 5/21/13 to survey inaccessible areas during the first site visit.

APPENDIX C
DOCUMENTATION OF SURVEY APPROACH

Survey Approach Documentation Form

Site Location: Sievers Sandberg U.S. Army Reserve Center, Pedricktown, NJ (NJ013)

Date: 5/7/13 **Team Lead:** J. Green

Personnel Interviewed:

Chuck Martin, Area Facility Operations Specialist	Mr. Martin provided access to facility. He was not aware of any radiological commodities that were stored at the site.
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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 five survey units because of the size of the site. The 1st survey unit will be buildings 434, 464 and 475, 2nd will be buildings 171,173 and 190, 3rd will be buildings 404 and 413, 4th will be building 273 and the last will be buildings 274 and 285. 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 cm² 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:

Below table summarizes the number of samples collected in the field based on visual observation and professional judgment.

Survey Unit Number	Buildings	Date	Direct alpha and beta	Gamma radiation exposure rate	Alpha /Beta Smears	Tritium Smears	Sample Location No.
Survey Unit 1	434,464 and 475	5/7/13	30	30	11	6	1-30
Survey Unit 2	171,173 and 190	5/8/13	30	30	10	3	31-60
Survey Unit 3	404 and 413	5/8/13 and 5/21/13	32	32	13	5	61-90 and 151-152
Survey Unit 4	273	5/9/13 and 5/21/13	34	34	13	7	91-120 and 153-156
Survey Unit 5	274 and 285	5/9/13	30	30	11	3	121-150

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
Bldgs 434, 464 and 475, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)**

Team JEG/BGC
Survey Unit 1

ALPHA Instrument			
Date	05/07/13	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	0	Source gcpm 1	1463
Background cpm 2	0	Source gcpm 2	1441
Background cpm 3	4	Source gcpm 3	1531
Background cpm 4	3	Source gcpm 4	1520
Background cpm 5	0	Source gcpm 5	1503
Background cpm 6	0	Source gcpm 6	1497
Background cpm 7	0	Source gcpm 7	1532
Background cpm 8	1	Source gcpm 8	1543
Background cpm 9	2	Source gcpm 9	1581
Background cpm 10	1	Source gcpm 10	1507
Average Bckgrd cpm	1.1	Average Source gcpm	1,511.8
Average Bckgrd dpm/100 cm ²	4.6		
Detector Efficiency	0.238	Lower Range (gcpm) -20%	1209
Cable Length (ft)	3	Upper Range (gcpm) +20%	1814
Direct Alpha Action Level (gcpm)	24.9		

BETA Instrument			
Date	05/07/13	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	193	Source gcpm 1	57590
Background cpm 2	227	Source gcpm 2	57557
Background cpm 3	189	Source gcpm 3	57771
Background cpm 4	189	Source gcpm 4	57557
Background cpm 5	208	Source gcpm 5	57686
Background cpm 6	194	Source gcpm 6	58078
Background cpm 7	203	Source gcpm 7	58461
Background cpm 8	206	Source gcpm 8	58181
Background cpm 9	170	Source gcpm 9	58422
Background cpm 10	190	Source gcpm 10	58112
Average Bckgrd cpm	196.9	Average Source gcpm	57,941.5
Average Bckgrd dpm/100 cm ²	744.4		
Detector Efficiency	0.2645	Lower Range (gcpm) -20%	46353
Cable Length (ft)	3	Upper Range (gcpm) +20%	69530
Direct Beta Action Level (gcpm)	461.4		

Gamma/Exposure Rate Instrument			
Date	05/07/13	Technician / Initials	JEG
Instrument Model #	Ludlum 19	Source Isotope	Cs-137
Instrument Serial #	276748	Source ID #	1314
Instrument Cal Due	09/07/13	Source Activity (μCi)	1.00
Background μR/hr 1	6	Source μR/hr 1	260
Background μR/hr 2	5	Source μR/hr 2	280
Background μR/hr 3	5.5	Source μR/hr 3	270
Background μR/hr 4	7	Source μR/hr 4	290
Background μR/hr 5	6	Source μR/hr 5	280
Background μR/hr 6	6.5	Source μR/hr 6	270
Average Bkg μR/hr	6.0	Average Source μR/hr	275.0
		Lower Range (μR/hr) -20%	220.0
		Upper Range (μR/hr) +20%	330.0

**Initial Alpha, Beta-Gamma and Exposure Rate Operating Range
Bldgs 171, 173 and 190, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)**

Team JEG/BGC
Survey Unit 2

ALPHA Instrument			
Date	05/08/13	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	1586
Background cpm 2	0	Source gcpm 2	1635
Background cpm 3	2	Source gcpm 3	1566
Background cpm 4	2	Source gcpm 4	1517
Background cpm 5	4	Source gcpm 5	1589
Background cpm 6	2	Source gcpm 6	1607
Background cpm 7	0	Source gcpm 7	1519
Background cpm 8	0	Source gcpm 8	1564
Background cpm 9	1	Source gcpm 9	1509
Background cpm 10	3	Source gcpm 10	1570
Average Bckgrd cpm	1.6	Average Source gcpm	1,566.2
Average Bckgrd dpm/100 cm ²	6.7		
Detector Efficiency	0.238	Lower Range (gcpm) -20%	1253
Cable Length (ft)	3	Upper Range (gcpm) +20%	1879
Direct Alpha Action Level (gcpm)	25.4		

BETA Instrument			
Date	05/08/13	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	200	Source gcpm 1	58569
Background cpm 2	173	Source gcpm 2	58556
Background cpm 3	203	Source gcpm 3	58838
Background cpm 4	167	Source gcpm 4	58735
Background cpm 5	164	Source gcpm 5	58520
Background cpm 6	187	Source gcpm 6	58739
Background cpm 7	186	Source gcpm 7	58340
Background cpm 8	165	Source gcpm 8	58669
Background cpm 9	207	Source gcpm 9	58708
Background cpm 10	164	Source gcpm 10	58536
Average Bckgrd cpm	181.6	Average Source gcpm	58,621.0
Average Bckgrd dpm/100 cm ²	686.6		
Detector Efficiency	0.2645	Lower Range (gcpm) -20%	46897
Cable Length (ft)	3	Upper Range (gcpm) +20%	70345
Direct Beta Action Level (gcpm)	446.1		

Gamma/Exposure Rate Instrument			
Date	05/08/13	Technician / Initials	JEG
Instrument Model #	Ludlum 19	Source Isotope	Cs-137
Instrument Serial #	276748	Source ID #	1314
Instrument Cal Due	09/07/13	Source Activity (μCi)	1.00
Background μR/hr 1	8.5	Source μR/hr 1	270
Background μR/hr 2	7.5	Source μR/hr 2	280
Background μR/hr 3	8	Source μR/hr 3	290
Background μR/hr 4	8	Source μR/hr 4	280
Background μR/hr 5	8.5	Source μR/hr 5	270
Background μR/hr 6	8.5	Source μR/hr 6	280
Average Bkg μR/hr	8.2	Average Source μR/hr	278.3
		Lower Range (μR/hr) -20%	222.7
		Upper Range (μR/hr) +20%	334.0

**Initial Alpha, Beta-Gamma and Exposure Rate Operating Range
Bldgs 404 and 413, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)**

Team JEG/BGC

Survey Unit 3

ALPHA Instrument			
Date	05/08/13	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	1586
Background cpm 2	2	Source gcpm 2	1635
Background cpm 3	2	Source gcpm 3	1566
Background cpm 4	3	Source gcpm 4	1517
Background cpm 5	1	Source gcpm 5	1589
Background cpm 6	2	Source gcpm 6	1607
Background cpm 7	2	Source gcpm 7	1519
Background cpm 8	1	Source gcpm 8	1564
Background cpm 9	3	Source gcpm 9	1509
Background cpm 10	2	Source gcpm 10	1570
Average Bckgrd cpm	2.0	Average Source gcpm	1,566.2
Average Bckgrd dpm/100 cm ²	8.4		
Detector Efficiency	0.238	Lower Range (gcpm) -20%	1253
Cable Length (ft)	3	Upper Range (gcpm) +20%	1879
Direct Alpha Action Level (gcpm)	25.8		

BETA Instrument			
Date	05/08/13	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	200	Source gcpm 1	58569
Background cpm 2	171	Source gcpm 2	58556
Background cpm 3	179	Source gcpm 3	58838
Background cpm 4	210	Source gcpm 4	58735
Background cpm 5	195	Source gcpm 5	58520
Background cpm 6	196	Source gcpm 6	58739
Background cpm 7	188	Source gcpm 7	58340
Background cpm 8	184	Source gcpm 8	58669
Background cpm 9	209	Source gcpm 9	58708
Background cpm 10	172	Source gcpm 10	58536
Average Bckgrd cpm	190.4	Average Source gcpm	58,621.0
Average Bckgrd dpm/100 cm ²	719.8		
Detector Efficiency	0.2645	Lower Range (gcpm) -20%	46897
Cable Length (ft)	3	Upper Range (gcpm) +20%	70345
Direct Beta Action Level (gcpm)	454.9		

Gamma/Exposure Rate Instrument			
Date	05/08/13	Technician / Initials	JEG
Instrument Model #	Ludlum 19	Source Isotope	Cs-137
Instrument Serial #	276748	Source ID #	1314
Instrument Cal Due	09/07/13	Source Activity (μCi)	1.00
Background μR/hr 1	7.5	Source μR/hr 1	270
Background μR/hr 2	7	Source μR/hr 2	280
Background μR/hr 3	7.5	Source μR/hr 3	290
Background μR/hr 4	8	Source μR/hr 4	280
Background μR/hr 5	8.5	Source μR/hr 5	270
Background μR/hr 6	7.5	Source μR/hr 6	280
Average Bkg μR/hr	7.7	Average Source μR/hr	278.3
		Lower Range (μR/hr) -20%	222.7
		Upper Range (μR/hr) +20%	334.0

**Initial Alpha, Beta-Gamma and Exposure Rate Operating Range
Bldg 273, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)**

Team JEG/BGC

Survey Unit 4

ALPHA Instrument			
Date	05/09/13	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	1	Source gcpm 1	1441
Background cpm 2	2	Source gcpm 2	1478
Background cpm 3	1	Source gcpm 3	1467
Background cpm 4	3	Source gcpm 4	1469
Background cpm 5	1	Source gcpm 5	1520
Background cpm 6	3	Source gcpm 6	1518
Background cpm 7	2	Source gcpm 7	1410
Background cpm 8	0	Source gcpm 8	1473
Background cpm 9	4	Source gcpm 9	1456
Background cpm 10	2	Source gcpm 10	1450
Average Bckgrd cpm	1.9	Average Source gcpm	1,468.2
Average Bckgrd dpm/100 cm ²	8.0		
Detector Efficiency	0.238	Lower Range (gcpm) -20%	1175
Cable Length (ft)	3	Upper Range (gcpm) +20%	1762
Direct Alpha Action Level (gcpm)	25.7		

BETA Instrument			
Date	05/09/13	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	188	Source gcpm 1	55505
Background cpm 2	210	Source gcpm 2	56149
Background cpm 3	204	Source gcpm 3	56091
Background cpm 4	216	Source gcpm 4	55790
Background cpm 5	204	Source gcpm 5	55668
Background cpm 6	209	Source gcpm 6	56208
Background cpm 7	183	Source gcpm 7	55778
Background cpm 8	190	Source gcpm 8	55985
Background cpm 9	205	Source gcpm 9	55713
Background cpm 10	192	Source gcpm 10	55808
Average Bckgrd cpm	200.1	Average Source gcpm	55,869.5
Average Bckgrd dpm/100 cm ²	756.5		
Detector Efficiency	0.2645	Lower Range (gcpm) -20%	44696
Cable Length (ft)	3	Upper Range (gcpm) +20%	67043
Direct Beta Action Level (gcpm)	464.6		

Gamma/Exposure Rate Instrument			
Date	05/09/13	Technician / Initials	JEG
Instrument Model #	Ludlum 19	Source Isotope	Cs-137
Instrument Serial #	276748	Source ID #	1314
Instrument Cal Due	09/07/13	Source Activity (μCi)	1.00
Background μR/hr 1	8.5	Source μR/hr 1	270
Background μR/hr 2	10	Source μR/hr 2	280
Background μR/hr 3	9.5	Source μR/hr 3	280
Background μR/hr 4	10	Source μR/hr 4	290
Background μR/hr 5	9.5	Source μR/hr 5	270
Background μR/hr 6	9.5	Source μR/hr 6	280
Average Bkg μR/hr	9.5	Average Source μR/hr	278.3
		Lower Range (μR/hr) -20%	222.7
		Upper Range (μR/hr) +20%	334.0

**Initial Alpha, Beta-Gamma and Exposure Rate Operating Range
Bldg 274 and 285, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)**

Team JEG/BGC

Survey Unit 5

ALPHA Instrument				BETA Instrument			
Date	05/09/13	Technician / Initials	JEG	Date	05/09/13	Technician / Initials	JEG
Instrument Model #	Ludlum 2360	Detector Model #	Ludlum 43-93	Instrument Model #	Ludlum 2360	Detector Model #	Ludlum 43-93
Instrument Serial #	278616	Detector Serial #	PR308282	Instrument Serial #	278616	Detector Serial #	PR308282
Instrument Cal Due	09/05/13	Detector Cal Due	09/05/13	Instrument Cal Due	09/05/13	Detector Cal Due	09/05/13
Source Isotope	Th-230	Det Active Area (cm ²)	100	Source Isotope	Tc-99	Det Active Area (cm ²)	100
Source ID #	69054-710	Source Activity (μCi)	0.00448	Source ID #	69053-710	Source Activity (μCi)	0.32
Background cpm 1	1	Source gcpm 1	1441	Background cpm 1	175	Source gcpm 1	55505
Background cpm 2	3	Source gcpm 2	1478	Background cpm 2	175	Source gcpm 2	56149
Background cpm 3	1	Source gcpm 3	1467	Background cpm 3	166	Source gcpm 3	56091
Background cpm 4	1	Source gcpm 4	1469	Background cpm 4	167	Source gcpm 4	55790
Background cpm 5	0	Source gcpm 5	1520	Background cpm 5	179	Source gcpm 5	55668
Background cpm 6	3	Source gcpm 6	1518	Background cpm 6	155	Source gcpm 6	56208
Background cpm 7	2	Source gcpm 7	1410	Background cpm 7	166	Source gcpm 7	55778
Background cpm 8	3	Source gcpm 8	1473	Background cpm 8	186	Source gcpm 8	55985
Background cpm 9	3	Source gcpm 9	1456	Background cpm 9	154	Source gcpm 9	55713
Background cpm 10	0	Source gcpm 10	1450	Background cpm 10	195	Source gcpm 10	55808
Average Bckgrd cpm	1.7	Average Source gcpm	1,468.2	Average Bckgrd cpm	171.8	Average Source gcpm	55,869.5
Average Bckgrd dpm/100 cm ²	7.1			Average Bckgrd dpm/100 cm ²	649.5		
Detector Efficiency	0.238	Lower Range (gcpm) -20%	1175	Detector Efficiency	0.2645	Lower Range (gcpm) -20%	44696
Cable Length (ft)	3	Upper Range (gcpm) +20%	1762	Cable Length (ft)	3	Upper Range (gcpm) +20%	67043
Direct Alpha Action Level (gcpm)	25.5			Direct Beta Action Level (gcpm)	436.3		

Gamma/Exposure Rate Instrument			
Date	05/09/13	Technician / Initials	JEG
Instrument Model #	Ludlum 19	Source Isotope	Cs-137
Instrument Serial #	276748	Source ID #	1314
Instrument Cal Due	09/07/13	Source Activity (μCi)	1.00
Background μR/hr 1	8.5	Source μR/hr 1	270
Background μR/hr 2	7	Source μR/hr 2	280
Background μR/hr 3	5.5	Source μR/hr 3	280
Background μR/hr 4	9	Source μR/hr 4	290
Background μR/hr 5	9	Source μR/hr 5	270
Background μR/hr 6	9	Source μR/hr 6	280
Average Bkg μR/hr	8.0	Average Source μR/hr	278.3
		Lower Range (μR/hr) -20%	222.7
		Upper Range (μR/hr) +20%	334.0

**Initial Alpha, Beta-Gamma and Exposure Rate Operating Range
Bldg 273 Basement and 404 Vault, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)**

Team JEG/BGC

Survey Unit 3 and 4

ALPHA Instrument			
Date	05/21/13	Technician / Initials	JEG
Instrument Model #	Ludlum 2360	Detector Model #	Ludlum 43-93
Instrument Serial #	287657	Detector Serial #	PR323018
Instrument Cal Due	04/05/14	Detector Cal Due	04/05/14
Source Isotope	Po-210	Det Active Area (cm ²)	100
Source ID #	5-2013	Source Activity (μCi)	0.1
Background cpm 1	4	Source gcpm 1	31821
Background cpm 2	0	Source gcpm 2	31667
Background cpm 3	1	Source gcpm 3	31498
Background cpm 4	2	Source gcpm 4	31682
Background cpm 5	1	Source gcpm 5	31670
Background cpm 6	1	Source gcpm 6	32840
Background cpm 7	3	Source gcpm 7	32435
Background cpm 8	1	Source gcpm 8	32677
Background cpm 9	2	Source gcpm 9	32508
Background cpm 10	5	Source gcpm 10	32282
Average Bckgrd cpm	2.0	Average Source gcpm	32,108.0
Average Bckgrd dpm/100 cm ²	8.9		
Detector Efficiency	0.224	Lower Range (gcpm) -20%	25686
Cable Length (ft)	3	Upper Range (gcpm) +20%	38530
Direct Alpha Action Level (gcpm)	24.4		

BETA Instrument			
Date	05/21/13	Technician / Initials	JEG
Instrument Model #	Ludlum 2360	Detector Model #	Ludlum 43-93
Instrument Serial #	287657	Detector Serial #	PR323018
Instrument Cal Due	04/05/14	Detector Cal Due	04/05/14
Source Isotope	Sr-90	Det Active Area (cm ²)	100
Source ID #	4-2013	Source Activity (μCi)	0.1
Background cpm 1	117	Source gcpm 1	76940
Background cpm 2	132	Source gcpm 2	77050
Background cpm 3	136	Source gcpm 3	77056
Background cpm 4	127	Source gcpm 4	77192
Background cpm 5	138	Source gcpm 5	77328
Background cpm 6	164	Source gcpm 6	78839
Background cpm 7	155	Source gcpm 7	78578
Background cpm 8	155	Source gcpm 8	79249
Background cpm 9	137	Source gcpm 9	78791
Background cpm 10	148	Source gcpm 10	79181
Average Bckgrd cpm	140.9	Average Source gcpm	78,020.4
Average Bckgrd dpm/100 cm ²	430.9		
Detector Efficiency	0.327	Lower Range (gcpm) -20%	62416
Cable Length (ft)	3	Upper Range (gcpm) +20%	93624
Direct Beta Action Level (gcpm)	467.9		

Gamma/Exposure Rate Instrument			
Date	05/21/13	Technician / Initials	JEG
Instrument Model #	Ludlum 19	Source Isotope	Cs-137
Instrument Serial #	296424	Source ID #	292
Instrument Cal Due	04/03/14	Source Activity (μCi)	1.00
Background μR/hr 1	8	Source μR/hr 1	310
Background μR/hr 2	7.5	Source μR/hr 2	300
Background μR/hr 3	7	Source μR/hr 3	320
Background μR/hr 4	8	Source μR/hr 4	300
Background μR/hr 5	8.5	Source μR/hr 5	310
Background μR/hr 6	8	Source μR/hr 6	310
Average Bkg μR/hr	7.8	Average Source μR/hr	308.3
		Lower Range (μR/hr) -20%	246.7
		Upper Range (μR/hr) +20%	370.0

DAILY INSTRUMENT PERFORMANCE CHECK LOG

Team No. : JEG/BGC

Bldgs 434, 464 and 475, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 1

Exposure Rate Meter	Manufacturer	Ludlum	Model #	Ludlum 19	Serial #	276748	Cal Due Date	9/7/13
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	1209-1814
Beta	Source #	69053-710	Isotope	Tc-99	Activity (μCi)	0.32	± 20% Range	46353-69530
Gamma	Source #	1314	Isotope	Cs-137	Activity (μCi)	1.00	± 20% Range	220-330
Detector/ Probe Efficiency (α) :		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? (Y / N)	Source	Source	Source	Response	Response	Response
					Alpha (cpm)	Beta (cpm)	Gamma (μR/hr)	Chk – Init Net Value (cpm, μR)	Chk – End Net Value (cpm, μR)	Check Technic. Initials
05/07/13	12:40 PM	Y	Y	Y	1511.8	57941.5	275	ok	ok	JEG
	4:52 PM	Y	Y	Y	1420	60301	280	ok	ok	JEG

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

DAILY INSTRUMENT PERFORMANCE CHECK LOG

Team No. : JEG/BGC
Survey Unit 2

Bldgs 171, 173 and 190, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Exposure Rate Meter	Manufacturer	Ludlum	Model #	Ludlum 19	Serial #	276748	Cal Due Date	9/7/13
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	1253-1879
Beta	Source #	69053-710	Isotope	Tc-99	Activity (μCi)	0.32	± 20% Range	46897-70345
Gamma	Source #	1314	Isotope	Cs-137	Activity (μCi)	1.00	± 20% Range	223-334
Detector/ Probe Efficiency (α) :		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 ? (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
05/08/13	12:50 PM	Y	Y	Y	1566.2	58621	278.333	ok	ok	JEG
	3:05 PM	Y	Y	Y	1495	59439	280	ok	ok	JEG

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

DAILY INSTRUMENT PERFORMANCE CHECK LOG

Team No. : JEG/BGC

Bldgs 404 and 413, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 3

Exposure Rate Meter	Manufacturer	Ludlum	Model #	Ludlum 19	Serial #	276748	Cal Due Date	9/7/13
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	1253-1879
Beta	Source #	69053-710	Isotope	Tc-99	Activity (μCi)	0.32	± 20% Range	46897-70345
Gamma	Source #	1314	Isotope	Cs-137	Activity (μCi)	1.00	± 20% Range	223-334
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? (Y / N)	Source	Source	Source	Response	Response	Response
					Alpha (cpm)	Beta (cpm)	Gamma (μR/hr)	Chk – Init Net Value (cpm, μR)	Chk – End Net Value (cpm, μR)	Check Technic. Initials
05/08/13	8:20 AM	Y	Y	Y	1566.2	58621	278.333	ok	ok	JEG
	11:30 AM	Y	Y	Y	1459	58203	270	ok	ok	JEG

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

DAILY INSTRUMENT PERFORMANCE CHECK LOG

Team No. : JEG/BGC

Bldg 273, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 4

Exposure Rate Meter		Manufacturer	Ludlum	Model #	Ludlum 19	Serial #	276748	Cal Due Date	9/7/13
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	1175-1762	
Beta	Source #	69053-710	Isotope	Tc-99	Activity (μCi)	0.32	± 20% Range	44696-67043	
Gamma	Source #	1314	Isotope	Cs-137	Activity (μCi)	1.00	± 20% Range	223-334	
Detector/ Probe Efficiency (α) :			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 ? (Y / N)	Source	Source	Source	Response	Response	Response
					Alpha (cpm)	Beta (cpm)	Gamma (μR/hr)	Chk – Init Net Value (cpm, μR)	Chk – End Net Value (cpm, μR)	Check Technic. Initials
05/09/13	12:05 PM	Y	Y	Y	1468.2	55869.5	278.333	ok	ok	JEG
	2:20 PM	Y	Y	Y	1538	58546	280	ok	ok	JEG

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

DAILY INSTRUMENT PERFORMANCE CHECK LOG

Team No. : JEG/BGC

Bldg 274 and 285, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 5

Exposure Rate Meter	Manufacturer	Ludlum	Model #	Ludlum 19	Serial #	276748	Cal Due Date	9/7/13
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	1175-1762
Beta	Source #	69053-710	Isotope	Tc-99	Activity (μCi)	0.32	± 20% Range	44696-67043
Gamma	Source #	1314	Isotope	Cs-137	Activity (μCi)	1.00	± 20% Range	223-334
Detector/ Probe Efficiency (α) :		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 ? (Y / N)	Source	Source	Source	Response	Response	Response
					Alpha (cpm)	Beta (cpm)	Gamma (μR/hr)	Chk – Init Net Value (cpm, μR)	Chk – End Net Value (cpm, μR)	Check Technic. Initials
05/09/13	8:20 AM	Y	Y	Y	1468.2	55869.5	278.333	ok	ok	JEG
	10:40 AM	Y	Y	Y	1445	54360	280	ok	ok	JEG

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

DAILY INSTRUMENT PERFORMANCE CHECK LOG

Team No. : JEG/BGC

Bldg 273 Basement and 404 Vault, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 3 and 4

Exposure Rate Meter		Manufacturer	Ludlum	Model #	Ludlum 19	Serial #	296424	Cal Due Date	4/3/14
Detector / Probe		Manufacturer	Ludlum	Model #	Ludlum 43-93	Serial #	PR323018	Cal Due Date	4/5/14
Instrument / Meter		Manufacturer	Ludlum	Model #	Ludlum 2360	Serial #	287657	Cal Due Date	4/5/14
Alpha	Source #	5-2013	Isotope	Po-210	Activity (μCi)	0.1	± 20% Range	25686-38530	
Beta	Source #	4-2013	Isotope	Sr-90	Activity (μCi)	0.1	± 20% Range	62416-93624	
Gamma	Source #	292	Isotope	Cs-137	Activity (μCi)	1.00	± 20% Range	247-370	
Detector/ Probe Efficiency (α) :			0.224		Detector/Probe Efficiency (β) :			0.327	

Date	Time	Instrument Physical Check Sat	Instrument & Detector in Calibration	Battery Check?	Source Alpha	Source Beta	Source Gamma	Response Chk – Init	Response Chk – End	Response Check
	Pre / Post	(Y / N)	(Y / N)	(Y / N)	(cpm)	(cpm)	(μR/hr)	Net Value (cpm, μR)	Net Value (cpm, μR)	Technic. Initials
05/21/13	9:05 AM	Y	Y	Y	32108	78020.4	308.333	ok	ok	JEG
	11:00 AM	Y	Y	Y	32518	80771	290	ok	ok	JEG

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



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

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
Contact Name: Ted Adams		Detector Manufacturer: Ludlum Measurements	
Customer PO/ CC. Number:		Det. Model: 43-93	Serial Number: PR308282
Work Order Number: 2012-3936		Calibration Method: Electronic	
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs required <input type="checkbox"/> Other (See Comments)			
<input checked="" type="checkbox"/> Geotropism <input checked="" type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck. <input checked="" type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset			
<input checked="" type="checkbox"/> Audio <input checked="" type="checkbox"/> Window Status <input type="checkbox"/> FS Response <input type="checkbox"/> Linearity <input type="checkbox"/> Background Subtract <input type="checkbox"/> Alarm Set			
Temperature: 71.5F		Humidity: 51 %	
		Pressure: 29.4 In Hg	
		Altitude: 1450 ft	

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response		Reference instruments and / or Sources			
		Before Calibration	After Calibration	Pu239	C7-640	Th230	C7-843
X 1	100 cpm	102 cpm	102 cpm	Pu239	C7-640	Th230	C7-843
X 1	400 cpm	400 cpm	400 cpm	Sr90	C7-630	Tc99	C7-842
X 10	1 kcpm	1 kcpm	1 kcpm	Pu239	C7-840	Th230	C7-843
X 10	4 kcpm	4 kcpm	4 kcpm	Comments Inst. Voltage: 800 V Isotope Efficiency Distance Window Status Pu239 4% 23.8% 0 inch Beta threshold: 120 mV Th230 4% 21.1% 0 inch Alpha threshold: 3.5 mV Sr90 2% 52.9% 0 inch Alpha window: 30 mV Tc99 2% 23.1% 0 inch Pu239 2% 47.6% 0 inch Th230 2% 42.3% 0 inch Ref. Voltage 1: 500 V Inst. Voltage 1: 500 V Ref. Voltage 2: 1500 V Inst. Voltage 2: 1500 V			
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				

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	Reviewed By: <i>[Signature]</i>	Date: 9-5-12
Calibrated By: <i>[Signature]</i>		
Calibration Date: 09/05/2012	Calibration Due: 09/05/2013	



Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER TERRANEAR PMC, LLC

ORDER NO. 20219349

Mfg. Ludlum Measurements, Inc. Model 19 Serial No. 2910424
Mfg. NIA Model NIA Serial No. NIA
Cal. Date 3-Apr-13 Cal Due Date 3-Apr-14 Cal. Interval 1 Year Meterface 202-1070

Check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 25 % Alt 705.8 mm Hg

- New Instrument Instrument Received Within Toler. +10% 10-20% Out of Tol. Requiring Repair Other-See comments
- Mechanical ck. Meter Zeroed Background Subtract Input Sens. Linearity
- F/S Resp. ck. Reset ck. Window Operation Geotropism
- Audio ck. Alarm Setting ck. Batt. ck. (Min. Volt) 2.2 VDC
- Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 650 V Input Sens. 26 mV Det. Oper. n/a V at n/a mV Threshold Dial Ratio n/a = n/a mV

HV Readout (2 points) Ref./Inst. 5 / 510 V Ref./Inst. 10 / 997 V

COMMENTS:

Cs-137 \approx 1 μ Ci check source SN 292 reads \approx 400 μ R/hr @ 500 position with label side of check source placed on front dimple of can at surface level.

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

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
5000	4000 μ R/hr	NIA	4000
5000	1000 μ R/hr		1000
500	400 μ R/hr = 79000 cpm		400
500	100 μ R/hr		100
250	200 μ R/hr = 40000 cpm		200
250	100 μ R/hr		100
50	7900 cpm		40
50	1980 cpm		10
25	4000 cpm		20
25	1000 cpm		5

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

50, 25 Range(s) Calibrated Electronically

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

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

- Reference Instruments and/or Sources: 059 280 720 734 781 1131 1616 1696 5105 5717CO 5719CO
- 60646 70897 73410 E551 E552 G112 M565 S-394 S-1054 T-304 T879 T10081 T10082 Y982
- Alpha S/N Beta S/N Other
- m 500 S/N 289155 Oscilloscope S/N Multimeter S/N 14670125

Calibrated By: Manuela Aguilar Date 3-Apr-13
Reviewed By: Diana Ahrens Date 5 Apr 13

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



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR

19

SERIAL#

276748
2168

Owner: CHP CONSULTANTS

DATE: 09/07/12 LOCATION: Griffin Inst
 TECH: Joanne Glenn DATE LAST CAL EXPIRES: 02/06/13
 REASON FOR CALIBRATION: Due for Calibration

NIST TRACEABLE EQUIPMENT AND SOURCES USED DURING CALIBRATION

PULSER MODEL: 600-2 PULSER SERIAL: 284951 PULSER CAL DUE: 12/28/12
 SOURCE NUMBER: 10250 ISOTOPE: Cs137 ASSAY DATE: 08/30/07
 Fast/Slow Switch working properly Audio Response Geotropism AF HV AL HV 650 V
 Input Sensitivity: 29 mV mV TEMP 75.3 F BARO PRESS: 29.32" HUMIDITY: 58%

A.F. Data	A.F. % ERROR	A.I. Data	A.I. % ERROR
-----------	--------------	-----------	--------------

5000 Scale			3.9	2.5%	*Pulsed Scale
5000 Scale			2.5	0.0%	
5000 Scale			1.0	0.0%	
500 Scale*			400	0.0%	
500 Scale*			250	0.0%	
500 Scale*			100	0.0%	
250 Scale*			200	0.0%	
250 Scale*			125	0.0%	
250 Scale*			50	0.0%	
50 Scale*			40	0.0%	
50 Scale*			25	0.0%	
50 Scale*			10	0.0%	
25 Scale*			20	0.0%	
25 Scale*			12.5	0.0%	
25 Scale*			5	0.0%	

CPM/uR/Hr 174

Is the As Found Data Within 20% of the Set Point?:

Yes No, See Remarks

REMARKS: No previous cal data.

Does Instrument Meet Final Acceptance Criteria?: Yes No

Calibration Sticker Attached?: Yes No

Date Instrument is Due For Next Calibration: 09/07/13

Performed/Reviewed by:

Joanne Glenn

Date: 9/7/2012

Entered by: *[Signature]* Initials

Calibrations performed to ANSI N323A-1997 standards.



CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.

10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER TERRANEAR PMC, LLC

ORDER NO. 20221678/391383

Mfg. Ludlum Measurements, Inc. Model 2360 Serial No. 287657
Mfg. Ludlum Measurements, Inc. Model 43-93 Serial No. PR323034
Cal. Date 7-May-13 Cal Due Date 7-May-14 Cal. Interval 1 Year Meterface 202-855

Check mark Applies to applicable instr. and/or detector IAW mfg. spec. T. 77 °F RH 29 % Alt 703.8 mm Hg

- New Instrument Instrument Received Within Toler. +-10% 10-20% Out of Tol. Requiring Repair Other-See comments
- Mechanical ck. Meter Zeroed Background Subtract Input Sens. Linearity
 F/S Resp. ck. Reset ck. Window Operation Geotropism
 Audio ck. Alarm Setting ck. Batt. ck. (Min. Volt) 2.2 VDC RS-232 Port OK
 Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 700 V

HV Readout (2 points) Ref./Inst. 500 / 504 V Ref./Inst. 1500 / 1490 V

Firmware Version: 39010N24

(EEPROM Settings)

Alpha Threshold: 120mv

User Time: 1.0

Beta Threshold: 3.5mv

Alpha Alarm: 999999

Beta Window: 30mv

Beta Alarm: 999999

Overload Set with Am241 91mdpm

A/B Alarm: 999999

Instrument calibrated with a 39' cable.

Model 2360 Date: 05/07/2013

High voltage set with detector connected

Calibration Date Due: 05/07/2014

COMMENTS:

See Attachment 1 for Efficiencies

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

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
x1000	400kcpm	NA	400
x1000	100kcpm	}	100
x100	40kcpm		400
x100	10kcpm		100
x10	4kcpm		400
x10	1kcpm		100
x1	400kcpm		400
x1	100kcpm		100

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

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm	NA	39941 (0)	NA	NA	NA
40kcpm	}	3994	}	}	}
4kcpm		399			
400cpm		40			
40cpm		4			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCCL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: 059 280 720 734 781 1131 1616 1696 5105 5717CO 5719CO
 80648 70897 73410 E551 E552 G112 M565 S-394 S-1054 T-304 T879 T10081 T10082 Y982

Alpha S/N Pu239#4337 Beta S/N Tc99#635/83.Sr90y90#5030 Other _____

m 500 S/N 235943 Oscilloscope S/N _____ Multimeter S/N 92780438

Calibrated By: Jina Orzco Date 7 May 13

Reviewed By: Jina Orzco Date 8 May 13



Bench Test Data For Detector

Detector 43-93 Serial No. PR323018 Order # 20219349
 Customer TERRANEAR PMC, LLC Alpha Input Sensitivity 120 mV
 Counter 2360 Serial No. 897846 Beta Input Sensitivity 3.5 mV
 Count Time 1Minute Beta Window 30 mV
 Other NA Distance Source to Detector Surface

High Voltage	Background		Isotope <u>Pu239</u> Size <u>30900dpm</u>		Isotope <u>Tc99</u> Size <u>22900dpm</u>		Isotope <u>Sr90y90</u> Size <u>8356dpm</u>	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
650	0	40	5250	353	6	1982	0	1396
675	1	62	6309	288	4	3199	0	1930
-700	1	85	6905	300	3	4175	1	2500
725	2	154	7043	322	5	4942	1	2983
750	1	168	7227	359	8	5715	0	3290
<i>NA</i>								
<u>AT 700V</u>								
<u>2360 opp</u>								
<u>Wt tag</u>								
	<u>Efficiency</u>		<u>K Pu239 = 0.223</u>					
			<u>B Sr90 = 0.299</u>					
			<u>B Tc99 = 0.192</u>					

- Gas Proportional detector count rate decreased $\leq 10\%$ after 15 hour static test using 39" cable.
 Gas proportional detector count rate decreased $\leq 10\%$ after 5 hour static test using 39" cable and alpha/beta counter.

Signature Zina Orayo Date 5 Apr. 13

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



• NO CERTIFICATION
REQUIRED

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 2 π beta emission rate was measured with a 2 π 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.

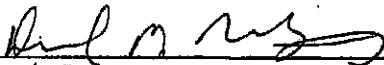
ISOTOPE:	Tc-99
2 π EMISSION RATE (β /sec):	4.964 E3
RELATIVE EXPANDED UNCERTAINTY (k=2):	5.0%
HALF-LIFE:	2.111 E5 years
CALIBRATION DATE:	October 4, 2004 12:00 EST

Diameter of active area: 43 mm.

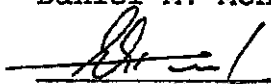
CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

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 :	05/07/13	Team No. :	JEG/BGC
	Site Name :	Sievers-Sandberg USARC	Location	Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldgs 434, 464 and 475
Location / Area : Bldgs 434, 464 and 475 (Survey Unit 1)

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	4.6	744.4	N/A	26.6	193.3
Ludlum 19	276748	N/A	09/07/12	N/A	N/A	N/A	N/A	6.0	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
		24.9	461.4

	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	Tritium				
1	0	192	-4.6	-18.5	0	151	-4.6	-173.5	-	-	0.0368 U	0.402 U	-	7.0	7.5
2	2	179	3.8	-67.7	0	177	-4.6	-75.2	1	180	-	-	-	7.0	7.0
3	0	167	-4.6	-113.0	-	-	-	-	-	-	-	-	-	6.0	6.0
4	3	151	8.0	-173.5	-	-	-	-	-	-	-	-	-	5.0	5.0
5	0	167	-4.6	-113.0	-	-	-	-	1	166	-	-	-	5.0	5.0
6	0	148	-4.6	-184.9	-	-	-	-	-	-	-	-	-	5.0	5.5
7	2	164	3.8	-124.4	-	-	-	-	-	-	0.00721 U	0.282 U	-1.76 U	5.5	5.5
8	2	149	3.8	-181.1	-	-	-	-	1	199	-	-	-	5.0	5.0
9	0	169	-4.6	-105.5	-	-	-	-	-	-	-	-	-	9.0	9.0
10	1	134	-0.4	-237.8	-	-	-	-	-	-	-	-	-	6.0	5.5
11	0	180	-4.6	-63.9	-	-	-	-	-	-	-	-	-	5.0	5.5
12	1	124	-0.4	-275.6	-	-	-	-	-	-	-	-	-	4.5	5.0
13	0	150	-4.6	-177.3	0	179	-4.6	-67.7	-	-	0.149 U	0.368 U	1.38 U	6.5	7.0
14	1	173	-0.4	-90.4	-	-	-	-	0	181	-	-	-	6.0	6.0
15	0	187	-4.6	-37.4	0	157	-4.6	-150.9	-	-	-0.0807 U	0.263 U	-0.992 U	8.5	9.0

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
Braden Case

Radiological Survey Record Form
(continuation sheet)

Date : 05/07/13

Team No. : JEG/BGC

Site Name : Sievers-Sandberg USARC

Location Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldgs 434, 464 and 475

Location / Area : Bldgs 434, 464 and 475 (Survey Unit 1)

	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	0	158	-4.6	-147.1	2	183	3.8	-52.6	-	-	0.124 U	-0.0553 U	-	6.0	6.0
17	1	193	-0.4	-14.7	0	162	-4.6	-131.9	-	-	0.271 U	-0.0669 U	-0.676 U	10.0	10.5
18	0	209	-4.6	45.7	2	165	3.8	-120.6	-	-	0.648	0.809 U	-	7.5	7.5
19	1	168	-0.4	-109.3	-	-	-	-	-	-	-	-	-	5.5	6.0
20	2	151	3.8	-173.5	-	-	-	-	-	-	-	-	-	7.5	7.0
21	2	149	3.8	-181.1	0	153	-4.6	-166.0	-	-	0.703	1.34	-24.2 U	4.0	4.0
22	1	161	-0.4	-135.7	-	-	-	-	0	189	-	-	-	4.5	4.5
23	0	192	-4.6	-18.5	-	-	-	-	-	-	-	-	-	4.5	5.0
24	2	182	3.8	-56.3	0	165	-4.6	-120.6	-	-	0.736	1.16	-	3.5	4.0
25	3	163	8.0	-128.2	-	-	-	-	2	172	-	-	-	4.0	4.0
26	1	174	-0.4	-86.6	-	-	-	-	-	-	-	-	-	4.0	4.0
27	2	164	3.8	-124.4	-	-	-	-	-	-	-	-	-	4.5	5.0
28	1	174	-0.4	-86.6	-	-	-	-	4	174	-	-	-	4.0	4.0
29	1	173	-0.4	-90.4	0	162	-4.6	-131.9	-	-	0.735	0.848	3.88 U	4.0	4.0
30	1	163	-0.4	-128.2	1	152	-0.4	-169.8	-	-	0.387 U	0.0273 U	-	4.0	3.5
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
 Braden Case

Radiological Survey Record Form	Date : 05/08/13	Team No. : JEG/BGC
	Site Name : Sievers-Sandberg USARC	Location : Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldgs 171, 173 and 190
 Location / Area : Bldgs 171, 173 and 190 (Survey Unit 2)

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	686.6	N/A	29.7	186.0
Ludlum 19	276748	N/A	09/07/12	N/A	N/A	N/A	N/A	8.2	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
	25.4 446.1

	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	Tritium				
31	2	221	1.7	149.0	1	167	-2.5	-55.2	-	-	-0.038 U	-0.221 U	-	10.0	10.0
32	1	146	-2.5	-134.6	-	-	-	-	4	154	-	-	-	5.0	5.0
33	2	170	1.7	-43.9	-	-	-	-	-	-	-	-	-	10.0	10.0
34	2	157	1.7	-93.0	-	-	-	-	-	-	-	-	-	4.0	4.5
35	1	134	-2.5	-180.0	1	187	-2.5	20.4	-	-	0.715	1.03	-5.42 U	4.0	4.0
36	4	106	10.1	-285.8	0	137	-6.7	-168.6	-	-	-0.0377 U	0.29 U	-	3.0	3.0
37	2	119	1.7	-236.7	-	-	-	-	-	-	-	-	-	3.5	4.0
38	0	163	-6.7	-70.3	1	198	-2.5	62.0	-	-	0.766	1.71	2.15 U	4.5	5.0
39	1	176	-2.5	-21.2	-	-	-	-	-	-	-	-	-	5.0	5.0
40	2	138	1.7	-164.8	1	168	-2.5	-51.4	-	-	0.156 U	0.434 U	-	3.5	4.0
41	0	142	-6.7	-149.7	-	-	-	-	-	-	-	-	-	4.5	4.0
42	1	136	-2.5	-172.4	0	172	-6.7	-36.3	-	-	-0.05 U	0.359 U	-	6.5	6.5
43	0	172	-6.7	-36.3	-	-	-	-	-	-	-	-	-	6.0	6.5
44	1	132	-2.5	-187.5	2	161	1.7	-77.9	-	-	1.07	3.83	-9.58 U	6.5	7.0
45	2	152	1.7	-111.9	-	-	-	-	-	-	-	-	-	7.0	6.5

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
Braden Case

Radiological Survey Record Form
(continuation sheet)

Date : 05/08/13

Team No. : JEG/BGC

Site Name : Sievers-Sandberg USARC

Location Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldgs 171, 173 and 190

Location / Area : Bldgs 171, 173 and 190 (Survey Unit 2)

	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		
46	1	143	-2.5	-145.9	2	200	1.7	69.6	-	-	0.324 U	0.576 U	-	6.0	6.0
47	0	162	-6.7	-74.1	-	-	-	-	-	-	-	-	-	7.5	7.5
48	4	362	10.1	682.0	-	-	-	-	-	-	-	-	-	10.0	10.5
49	2	148	1.7	-127.0	-	-	-	-	2	179	-	-	-	6.5	6.5
50	0	173	-6.7	-32.5	-	-	-	-	3	163	-	-	-	7.0	7.0
51	1	367	-2.5	700.9	-	-	-	-	-	-	-	-	-	11.0	11.5
52	2	173	1.7	-32.5	-	-	-	-	-	-	-	-	-	7.0	7.0
53	0	176	-6.7	-21.2	-	-	-	-	-	-	-	-	-	6.5	6.5
54	2	139	1.7	-161.1	-	-	-	-	-	-	-	-	-	7.0	6.5
55	1	153	-2.5	-108.1	-	-	-	-	2	167	-	-	-	5.5	5.5
56	4	171	10.1	-40.1	-	-	-	-	-	-	-	-	-	8.5	8.0
57	1	179	-2.5	-9.8	1	191	-2.5	35.5	-	-	0.0701 U	0.769	-	6.0	6.0
58	2	228	1.7	175.4	-	-	-	-	4	161	-	-	-	10.5	10.5
59	3	150	5.9	-119.5	1	179	-2.5	-9.8	-	-	0.245 U	0.869 U	-	7.0	7.5
60	2	154	1.7	-104.3	-	-	-	-	-	-	-	-	-	9.5	9.5

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
Braden Case

Radiological Survey Record Form	Date :	05/08/13	Team No. :	JEG/BGC
	Site Name :	Sievers-Sandberg USARC	Location	Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldgs 404 and 413
Location / Area : Bldgs 404 and 413 (Survey Unit 3)

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	8.4	719.8	N/A	31.9	190.3
Ludlum 19	276748	N/A	09/07/12	N/A	N/A	N/A	N/A	7.7	N/A	N/A

Instrument Notes: 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 $\{(1/1min+1/10min)\} * bkg\ cpm\}$
Ludlum 43-93 with Ludlum 2360
Instrument background measurements taken on like survey surfaces (poured concrete surface)

Reg Guide 1.86 Action Level (gcpm/100 cm ²)	
α	β
25.8	454.9

	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		
61	0	146	-8.4	-167.9	1	197	-4.2	25.0	-	-	0.0464 U	0.894	-0.25 U	6.0	6.0
62	2	156	0.0	-130.1	-	-	-	-	1	185	-	-	-	7.0	7.0
63	2	174	0.0	-62.0	-	-	-	-	-	-	-	-	-	8.0	8.0
64	0	168	-8.4	-84.7	-	-	-	-	-	-	-	-	-	9.0	8.5
65	2	442	0.0	951.2	-	-	-	-	-	-	-	-	-	11.0	10.5
66	1	167	-4.2	-88.5	0	191	-8.4	2.3	-	-	-0.24 U	-0.232 U	-	9.5	9.0
67	1	219	-4.2	108.1	-	-	-	-	-	-	-	-	-	11.0	11.5
68	1	174	-4.2	-62.0	0	192	-8.4	6.0	-	-	0.259 U	0.892	-	8.0	8.5
69	0	450	-8.4	981.5	1	187	-4.2	-12.9	-	-	0.311 U	0.86	-	10.5	10.5
70	3	176	4.2	-54.4	-	-	-	-	-	-	-	-	-	9.0	9.0
71	1	186	-4.2	-16.6	-	-	-	-	-	-	-	-	-	9.0	9.5
72	2	187	0.0	-12.9	1	189	-4.2	-5.3	-	-	0.347 U	1.17	-	6.5	6.0
73	0	201	-8.4	40.1	3	191	4.2	2.3	-	-	0.252 U	3.93	-	6.5	7.0
74	2	207	0.0	62.8	-	-	-	-	-	-	-	-	-	7.5	8.0
75	1	191	-4.2	2.3	-	-	-	-	0	188	-	-	-	11.5	11.0

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
Braden Case

Radiological Survey Record Form
(continuation sheet)

Date : 05/08/13

Team No. : JEG/BGC

Site Name : Sievers-Sandberg USARC

Location Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldgs 404 and 413

Location / Area : Bldgs 404 and 413 (Survey Unit 3)

	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		
76	1	212	-4.2	81.7	-	-	-	-	2	189	-	-	-	7.0	7.5
77	2	175	0.0	-58.2	-	-	-	-	-	-	-	-	-	10.0	10.5
78	4	176	8.4	-54.4	-	-	-	-	-	-	-	-	-	9.0	9.5
79	0	144	-8.4	-175.4	-	-	-	-	-	-	-	-	-	8.0	8.0
80	2	210	0.0	74.1	-	-	-	-	-	-	-	-	-	12.5	13.0
81	2	191	0.0	2.3	-	-	-	-	-	-	-	-	-	7.5	7.5
82	0	216	-8.4	96.8	-	-	-	-	-	-	-	-	-	10.0	10.0
83	0	192	-8.4	6.0	1	186	-4.2	-16.6	-	-	0.172 U	0.2 U	-4.51 U	6.5	7.0
84	2	173	0.0	-65.8	2	183	0.0	-28.0	-	-	0.225 U	0.775	-	7.5	7.5
85	3	182	4.2	-31.8	-	-	-	-	1	186	-	-	-	7.0	7.7
86	2	207	0.0	62.8	1	187	-4.2	-12.9	-	-	0.272 U	0.518 U	7.2 U	10.0	10.5
87	3	235	4.2	168.6	-	-	-	-	2	190	-	-	-	10.5	11.0
88	0	154	-8.4	-137.6	1	182	-4.2	-31.8	-	-	0.0846 U	0.149 U	-	5.0	5.5
89	3	303	4.2	425.7	-	-	-	-	-	-	0.619	2.64	-	10.0	10.5
90	6	236	16.8	172.4	2	196	0.0	21.2	1	184	-	-	-	9.5	10.0
91															
92															
93															
94															
95															
96															
97															

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
Braden Case

Radiological Survey Record Form	Date :	05/09/13	Team No. :	JEG/BGC
	Site Name :	Sievers-Sandberg USARC	Location	Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldg 273
Location / Area : Bldg 273 (Survey Unit 4)

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	8.0	756.5	N/A	31.4	194.8
Ludlum 19	276748	N/A	09/07/12	N/A	N/A	N/A	N/A	9.5	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
		25.7	464.6

	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	Tritium				
91	2	169	0.4	-117.6	-	-	-	-	1	205	-	-	-	4.5	5.0
92	1	123	-3.8	-291.5	2	184	0.4	-60.9	-	-	0.682	2.15	-1.77 U	4.5	5.0
93	0	137	-8.0	-238.6	1	212	-3.8	45.0	-	-	0.0103 U	0.649 U	-59.2 U	4.5	5.0
94	0	131	-8.0	-261.2	-	-	-	-	-	-	-	-	-	5.0	5.0
95	0	119	-8.0	-306.6	2	212	0.4	45.0	-	-	0.796	1.88	-	5.0	5.0
96	0	179	-8.0	-79.8	-	-	-	-	2	193	-	-	-	6.0	6.0
97	2	197	0.4	-11.7	-	-	-	-	-	-	-	-	-	6.0	6.0
98	1	166	-3.8	-128.9	-	-	-	-	-	-	-	-	-	7.5	7.5
99	2	157	0.4	-162.9	1	200	-3.8	-0.4	-	-	0.66	0.935	2.12 U	5.0	5.0
100	1	142	-3.8	-219.7	1	223	-3.8	86.6	-	-	0.523	0.934	-	5.0	5.0
101	0	134	-8.0	-249.9	0	188	-8.0	-45.7	-	-	0.4 U	1.16	-	5.0	5.5
102	1	148	-3.8	-197.0	0	204	-8.0	14.7	-	-	0.494	0.59	2.78 U	6.0	5.5
103	1	147	-3.8	-200.8	-	-	-	-	-	-	-	-	-	5.0	5.0
104	0	179	-8.0	-79.8	1	208	-3.8	29.9	-	-	0.224 U	0.0293 U	9.13 U	5.5	5.5
105	2	188	0.4	-45.7	-	-	-	-	-	-	-	-	-	8.5	9.0

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
Braden Case

Radiological Survey Record Form
(continuation sheet)

Date : 05/09/13

Team No. : JEG/BGC

Site Name : Sievers-Sandberg USARC

Location : Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldg 273

Location / Area : Bldg 273 (Survey Unit 4)

	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		
106	0	224	-8.0	90.4	-	-	-	-	2	180	-	-	-	12.5	13.0
107	2	179	0.4	-79.8	-	-	-	-	-	-	-	-	-	8.0	8.0
108	1	418	-3.8	823.8	-	-	-	-	-	-	-	-	-	18.0	18.0
109	2	169	0.4	-117.6	-	-	-	-	3	189	-	-	-	10.0	10.5
110	2	180	0.4	-76.0	-	-	-	-	-	-	-	-	-	9.0	8.5
111	0	178	-8.0	-83.6	0	207	-8.0	26.1	-	-	0.579	0.781	-	8.0	8.0
112	0	130	-8.0	-265.0	-	-	-	-	-	-	-	-	-	8.0	8.0
113	0	197	-8.0	-11.7	-	-	-	-	1	198	-	-	-	12.0	12.0
114	2	198	0.4	-7.9	-	-	-	-	-	-	-	-	-	10.5	11.0
115	0	186	-8.0	-53.3	-	-	-	-	-	-	-	-	-	8.5	9.0
116	3	382	4.6	687.7	-	-	-	-	-	-	-	-	-	14.0	14.5
117	2	462	0.4	990.2	-	-	-	-	-	-	-	-	-	16.5	16.5
118	1	424	-3.8	846.5	-	-	-	-	-	-	-	-	-	14.5	14.5
119	0	186	-8.0	-53.3	2	212	0.4	45.0	-	-	0.644	1.9	-0.31 U	7.5	8.0
120	1	195	-3.8	-19.3	-	-	-	-	2	213	-	-	-	8.5	8.5

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
 Braden Case

Radiological Survey Record Form	Date : 05/09/13	Team No. : JEG/BGC
	Site Name : Sievers-Sandberg USARC	Location : Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldg 274 and 285
 Location / Area : Bldg 274 and 285 (Survey Unit 5)

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	7.1	649.5	N/A	30.3	181.2
Ludlum 19	276748	N/A	09/07/12	N/A	N/A	N/A	N/A	8.0	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
	25.5 436.3

	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	Tritium				
121	0	133	-7.1	-146.7	2	182	1.3	38.6	-	-	0.281 U	0.197 U	-	5.0	5.0
122	0	143	-7.1	-108.9	-	-	-	-	-	-	-	-	-	4.0	4.0
123	1	138	-2.9	-127.8	-	-	-	-	3	148	-	-	-	6.0	6.0
124	1	172	-2.9	0.8	-	-	-	-	-	-	-	-	-	4.5	4.5
125	3	124	5.5	-180.7	1	172	-2.9	0.8	-	-	0.459 U	0.591	-1.09 U	5.0	5.5
126	0	176	-7.1	15.9	0	161	-7.1	-40.8	-	-	0.257 U	0.386 U	-	5.0	5.0
127	1	357	-2.9	700.2	-	-	-	-	-	-	-	-	-	8.5	9.0
128	5	391	13.9	828.7	0	154	-7.1	-67.3	-	-	0.771	0.472 U	-	12.0	11.5
129	3	141	5.5	-116.4	1	161	-2.9	-40.8	-	-	0.0476 U	0.374 U	-	5.0	5.0
130	1	162	-2.9	-37.1	-	-	-	-	-	-	-	-	-	6.5	7.0
131	0	181	-7.1	34.8	-	-	-	-	1	180	-	-	-	7.0	7.0
132	0	167	-7.1	-18.1	-	-	-	-	-	-	-	-	-	6.5	7.0
133	1	180	-2.9	31.0	-	-	-	-	-	-	-	-	-	7.0	6.5
134	5	425	13.9	957.3	1	153	-2.9	-71.1	-	-	0.17 U	-0.124 U	-	11.5	11.5
135	0	415	-7.1	919.5	1	153	-2.9	-71.1	-	-	0.664	0.96	-1.04 U	10.0	9.5

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
Braden Case

Radiological Survey Record Form
(continuation sheet)

Date : 05/09/13

Team No. : JEG/BGC

Site Name : Sievers-Sandberg USARC

Location Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldg 274 and 285

Location / Area : Bldg 274 and 285 (Survey Unit 5)

	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		
136	2	196	1.3	91.5	-	-	-	-	-	-	-	-	-	8.0	8.5
137	0	432	-7.1	983.7	-	-	-	-	3	158	-	-	-	9.5	9.5
138	0	171	-7.1	-3.0	-	-	-	-	1	180	-	-	-	8.0	8.0
139	0	161	-7.1	-40.8	-	-	-	-	-	-	-	-	-	6.5	7.0
140	1	212	-2.9	152.0	0	152	-7.1	-74.9	-	-	0.0611 U	1.02 U	-	7.5	7.5
141	0	161	-7.1	-40.8	-	-	-	-	-	-	-	-	-	7.5	7.5
142	0	180	-7.1	31.0	-	-	-	-	-	-	-	-	-	7.0	7.0
143	0	149	-7.1	-86.2	-	-	-	-	1	171	-	-	-	7.0	7.0
144	4	164	9.7	-29.5	-	-	-	-	-	-	-	-	-	7.0	7.0
145	4	436	9.7	998.9	-	-	-	-	-	-	-	-	-	5.5	6.0
146	0	402	-7.1	870.3	2	174	1.3	8.3	-	-	0.508	0.68 U	-1.06 U	10.0	10.0
147	2	175	1.3	12.1	0	173	-7.1	4.5	-	-	0.0445 U	0.354 U	-	6.5	6.5
148	5	168	13.9	-14.4	-	-	-	-	1	177	-	-	-	5.0	5.5
149	3	184	5.5	46.1	-	-	-	-	-	-	-	-	-	7.5	7.5
150	0	204	-7.1	121.7	2	183	1.3	42.3	-	-	0.275 U	-0.0709 U	-	6.5	6.5

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
Braden Case

Radiological Survey Record Form	Date : 05/21/13	Team No. : JEG/BGC
	Site Name : Sievers-Sandberg USARC	Location : Pedricktown, NJ (NJ013)

Survey Description : Direct, wet and dry wipe, micorR, and large area wipe surveys to provide determine the radiological condition of Bldg 273 Basement and 404 Vault
 Location / Area : Bldg 273 Basement and 404 Vault (Survey Unit 3 and 4)

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	PR323018	100	04/05/13	0.224	0.327	8.9	430.9	N/A	33.9	133.5
Ludlum 19	296424	N/A	04/03/13	N/A	N/A	N/A	N/A	7.8	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 $\{(1/1min+1/10min)^{-1} * bkg\ cpm\}$ Instrument background measurements taken on like survey surfaces (poured concrete surface)	Reg Guide 1.86 Action Level (gcpm/100 cm ²) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>α</th> <th>β</th> </tr> <tr> <td style="background-color: yellow;">24.4</td> <td style="background-color: yellow;">467.9</td> </tr> </table>	α	β	24.4	467.9
α	β				
24.4	467.9				

	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	Tritium				
151	1	100	-4.5	-125.1	0	162	-8.9	64.5	-	-	5.44	8.82	0 U	5.0	5.5
152	2	113	0.0	-85.3	0	150	-8.9	27.8	-	-	4.59	7.07	0.913 U	5.5	5.5
153	1	162	-4.5	64.5	0	155	-8.9	43.1	-	-	0.159 U	0.134 U	-15.1 U	9.0	9.0
154	3	315	4.5	532.4	1	150	-4.5	27.8	-	-	0.439	0.682 U	-	14.0	14.5
155	7	293	22.3	465.1	2	143	0.0	6.4	-	-	0.65	1.93	-	10.5	10.5
156	3	305	4.5	501.8	-	-	-	-	3	177	-	-	-	14.0	14.0

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
Braden Case

APPENDIX F
SAMPLE DESCRIPTION LOG

SAMPLE LOCATION DESCRIPTION LOG

Survey Location: Bldgs 434, 464 and 475, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey unit 1

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 floor unless otherwise noted.)
1	Bldg 475	Wipe, Direct	Sievers-Sandberg USARC_Sample 1AB	4'N 4'W	Restroom
2	Bldg 475	LAW, Direct	-	8'N 2'W	Restroom
3	Bldg 464	Direct	-	12'N 2'W	Office (linoleum)
4	Bldg 464	Direct	-	11'N 2'W	Office (painted)
5	Bldg 464	LAW, Direct	-	3'N 24'W	Office (linoleum)
6	Bldg 464	Direct	-	10'N 5'W	Office (linoleum)
7	Bldg 464	Wipe, Direct	Sievers-Sandberg USARC_Sample 7ABT	2'N 8'W	NBC
8	Bldg 464	LAW, Direct	-	7'N 2'W	Entryway (linoleum)
9	Bldg 464	Direct	-	17'N 3'W	Office (linoleum)
10	Bldg 464	Direct	-	3'N 10'W	Office (linoleum)
11	Bldg 464	Direct	-	5'N 12'W	Office
12	Bldg 464	Direct	-	12'N 3'W	Office (linoleum)
13	Bldg 464	Wipe, Direct	Sievers-Sandberg USARC_Sample 10ABT	6'S 28'W	Cage
14	Bldg 464	LAW, Direct	-	16'N 14'W	Thrift
15	Bldg 464	Wipe, Direct	Sievers-Sandberg USARC_Sample 15ABT	33'N 6'W	Cage (linoleum)
16	Bldg 464	Wipe, Direct	Sievers-Sandberg USARC_Sample 16AB	18'N 4'W	Cage (linoleum)
17	Bldg 464	Wipe, Direct	Sievers-Sandberg USARC_Sample 17ABT	42'N 7'W	Cage (linoleum)
18	Bldg 464	Wipe, Direct	Sievers-Sandberg USARC_Sample 18AB	20'N 2'W	Cage (linoleum)
19	Bldg 464	Direct	-	3'N 7'W	Restroom (linoleum)
20	Bldg 464	Direct	-	6'N 7'W	Restroom (linoleum)
21	Bldg 434	Wipe, Direct	Sievers-Sandberg USARC_Sample 21ABT	187'N 50'W	Bay cage
22	Bldg 434	LAW, Direct	-	173'N 4'W	Bay cage
23	Bldg 434	Direct	-	136'N 60'W	Bay cage
24	Bldg 434	Wipe, Direct	Sievers-Sandberg USARC_Sample 24AB	134'N 13'W	Bay cage
25	Bldg 434	LAW, Direct	-	96'N 58'W	Bay cage
26	Bldg 434	Direct	-	95'N 7'W	Bay cage
27	Bldg 434	Direct	-	57'N 60'W	Bay cage
28	Bldg 434	LAW, Direct	-	55'N 9'W	Bay cage
29	Bldg 434	Wipe, Direct	Sievers-Sandberg USARC_Sample 29ABT	20'N 5'W	Bay cage
30	Bldg 434	Wipe, Direct	Sievers-Sandberg USARC_Sample 30AB	23'N 13'W	Bay cage

SAMPLE LOCATION DESCRIPTION LOG

Survey Location: Bldgs 171, 173 and 190, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 2

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 floor unless otherwise noted.)
31	Bldg 190	Wipe, Direct	Sievers-Sandberg USARC_Sample 31ABT	2'N 4'W	Guard shack
32	Bldg 171	LAW, Direct	-	3'N 17'W	Office
33	Bldg 171	Direct	-	3'N 7'W	Office
34	Bldg 171	Direct	-	2'N 8'W	Telecom
35	Bldg 171	Wipe, Direct	Sievers-Sandberg USARC_Sample 35ABT	2'N 5'W	Vault
36	Bldg 171	Wipe, Direct	Sievers-Sandberg USARC_Sample 36AB	10'N 2'W	Vault
37	Bldg 171	Direct	-	3'N 6'W	Cage door
38	Bldg 171	Wipe, Direct	Sievers-Sandberg USARC_Sample 38ABT	6'N 3'W	Cage door
39	Bldg 171	Direct	-	6'N 5'W	B15A Storage
40	Bldg 171	Wipe, Direct	Sievers-Sandberg USARC_Sample 40AB	9'N 13'W	Office
41	Bldg 171	Direct	-	4'N 5'W	Rm B15B
42	Bldg 171	Wipe, Direct	Sievers-Sandberg USARC_Sample 42AB	3'N 2'W	Rm B17
43	Bldg 171	Direct	-	2'N 23'W	Rm B17 cage
44	Bldg 171	Wipe, Direct	Sievers-Sandberg USARC_Sample 44ABT	1'N 1'W	Rm B17 cage closet
45	Bldg 171	Direct	-	16'N 2'W	Rm B16
46	Bldg 171	Wipe, Direct	Sievers-Sandberg USARC_Sample 46AB	21'N 17'W	Rm 107 (linoleum)
47	Bldg 171	Direct	-	2'N 6'W	Rm 102 (linoleum)
48	Bldg 171	Direct	-	5'N 3'W	Restroom (tile)
49	Bldg 171	LAW, Direct	-	34'N 3'W	Rm 103 (linoleum)
50	Bldg 171	LAW, Direct	-	32'N 17'W	Rm 208 (linoleum)
51	Bldg 171	Direct	-	16'N 4'W	Restroom (tile)
52	Bldg 173	Direct	-	6'N 2'W	Restroom (linoleum)
53	Bldg 173	Direct	-	2'N 1'W	Janitor closet (linoleum)
54	Bldg 173	Direct	-	3'N 2'W	Restroom (linoleum)
55	Bldg 173	LAW, Direct	-	7'N 17'W	Entryway (linoleum)
56	Bldg 173	Direct	-	9'N 2'W	Office (linoleum)
57	Bldg 173	Wipe, Direct	Sievers-Sandberg USARC_Sample 57AB	3'N 7'W	Storage (linoleum)
58	Bldg 173	LAW, Direct	-	6'N 3'W	Dining Rm (linoleum)
59	Bldg 173	Wipe, Direct	Sievers-Sandberg USARC_Sample 59AB	2'N 4'W	Storage (linoleum)
60	Bldg 173	Direct	-	4'N 4'W	Restroom (linoleum)

0

SAMPLE LOCATION DESCRIPTION LOG

Survey Location: Bldgs 404 and 413, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 3

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 floor unless otherwise noted.)
61	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 61ABT	17°N 0°W	Rm 406 Outside Vault (linoleum)
62	Bldg 404	LAW, Direct	-	3°N 48°W	Entryway (linoleum)
63	Bldg 404	Direct	-	4°N 10°W	Rm 405 (linoleum)
64	Bldg 404	Direct	-	8°N 3°W	Rm 405A (linoleum)
65	Bldg 404	Direct	-	10°N 4°W	Restroom (tile)
66	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 66AB	3°N 4°W	Janitor closet (linoleum)
67	Bldg 404	Direct	-	2°N 4°W	Closet
68	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 68AB	7°N 4°W	Rm 407
69	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 69AB	4°N 3°W	Restroom (tile)
70	Bldg 404	Direct	-	6°N 13°W	Rm 411 (linoleum)
71	Bldg 404	Direct	-	9°N 11°W	Locker room (linoleum)
72	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 72AB	16°N 31°W	Cage
73	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 73AB	8°N 18°W	Cage stain
74	Bldg 404	Direct	-	12°N 10°W	Cage
75	Bldg 404	LAW, Direct	-	33°N 18°W	Bay cage
76	Bldg 404	LAW, Direct	-	4°N 30°W	Cage
77	Bldg 404	Direct	-	66°N 2°W	Bay
78	Bldg 404	Direct	-	2°N 4°W	Rm 13
79	Bldg 404	Direct	-	4°N 5°W	Under stairs cage
80	Bldg 404	Direct	-	5°N 2°W	Restroom
81	Bldg 404	Direct	-	5°N 45°W	Bay
82	Bldg 404	Direct	-	38°N 4°W	Bay
83	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 83ABT	4°N 4°W	Cage
84	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 84AB	6°N 13°W	Bay cage
85	Bldg 404	LAW, Direct	-	7°N 13°W	Bay cage
86	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 86ABT	13°N 3°W	Bay cage stain
87	Bldg 404	LAW, Direct	-	35°N 20°W	Bay
88	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 88AB	4°N 4°W	Bay
89	Bldg 413	Wipe, Direct	Sievers-Sandberg USARC_Sample 89AB	4°N 4°W	Hazmat
90	Bldg 413	LAW, Direct	-	8°N 3°W	Hazmat

0

SAMPLE LOCATION DESCRIPTION LOG

Survey Location: Bldg 273, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 4

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 floor unless otherwise noted.)
91	Bldg 273	LAW, Direct	-	5'N 7'W	NBC
92	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 92ABT	25'N 9'W	NBC (linoleum)
93	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 93ABT	3'N 17'W	NBC cage
94	Bldg 273	Direct	-	6'N 10'W	NBC cage (linoleum)
95	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 95AB	5'N 7'W	NBC cage (linoleum)
96	Bldg 273	Direct	-	35'N 1'W	NBC cage
97	Bldg 273	LAW, Direct	-	5'N 19'W	Storage cage
98	Bldg 273	Direct	-	3'N 2'W	Telecom
99	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 99ABT	3'N 3'W	Vault cage
100	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 100AB	18'N 4'W	Vault cage
101	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 101AB	21'N 7'W	Vault cage
102	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 102ABT	33'N 3'W	Vault cage
103	Bldg 273	Direct	-	32'N 21'W	Vault cage
104	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 104ABT	32'N 32'W	Vault cage
105	Bldg 273	Direct	-	28'N 7'W	Janitor closet
106	Bldg 273	LAW, Direct	-	2'N 10'W	Office (linoleum)
107	Bldg 273	Direct	-	8'N 4'W	Office (linoleum)
108	Bldg 273	Direct	-	12'N 2'W	Restroom (tile)
109	Bldg 273	LAW, Direct	-	25'N 11'W	Hallway (linoleum)
110	Bldg 273	Direct	-	3'N 2'W	Rm 100 (linoleum)
111	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 111AB	N 1'W	Rm 102 cage (linoleum) stain
112	Bldg 273	Direct	-	3'N 8'W	Rm 104 (linoleum)
113	Bldg 273	LAW, Direct	-	22'N 3'W	Rm 105 (linoleum)
114	Bldg 273	Direct	-	9'N 3'W	Rm 106 (linoleum)
115	Bldg 273	Direct	-	5'N 16'W	Rm 108 (linoleum)
116	Bldg 273	Direct	-	10'N 7'W	Restroom (tile)
117	Bldg 273	Direct	-	11'N 2'W	Restroom (tile)
118	Bldg 273	Direct	-	5'N 6'W	Restroom (tile)
119	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 119ABT	7'N 2'W	NBC mask hanger (linoleum)
120	Bldg 273	LAW, Direct	-	3'N 5'W	Rm 201 (linoleum)

SAMPLE LOCATION DESCRIPTION LOG

Survey Location: Bldg 274 and 285, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 5

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 floor unless otherwise noted.)
121	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 121AB	4'N 25'W	Breakroom (linoleum)
122	Bldg 274	Direct	-	27'N 10'W	Breakroom (linoleum)
123	Bldg 274	LAW, Direct	-	3'N 13'W	Entryway (linoleum)
124	Bldg 274	Direct	-	3'N 5'W	Vault
125	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 125ABT	7'N 3'W	Vault cage
126	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 126AB	1'N 10'W	Office
127	Bldg 274	Direct	-	3'N 3'W	Restroom (tile)
128	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 128AB	4'N 5'W	Restroom (tile)
129	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 129AB	4'N 2'W	Office
130	Bldg 274	Direct	-	1'N 6'W	Office (linoleum)
131	Bldg 274	LAW, Direct	-	3'N 4'E	Hallway (linoleum)
132	Bldg 274	Direct	-	3'N 6'W	Office (linoleum)
133	Bldg 274	Direct	-	6'N 4'W	Office (linoleum)
134	Bldg 274	Direct	15, 16 gamma 4 484, 7 458	10'N 4'W	Restroom (tile)
135	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 135ABT	7'N 3'W	Lab (tile)
136	Bldg 274	Direct	-	3'N 2'W	Rm 6 (linoleum)
137	Bldg 274	LAW, Direct	-	9'N 1'W	Lab (tile)
138	Bldg 274	LAW, Direct	-	1'N 4'W	Entryway (linoleum)
139	Bldg 274	Direct	-	3'N 14'W	Office (linoleum)
140	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 140AB	3'N 6'W	A/C (linoleum)
141	Bldg 274	Direct	-	2'N 7'W	Office (linoleum)
142	Bldg 274	Direct	-	7'N 6'W	Office (linoleum)
143	Bldg 274	LAW, Direct	-	2'N 4'W	Hallway (linoleum)
144	Bldg 274	Direct	-	8'N 2'W	Office (linoleum)
145	Bldg 274	Direct	-	10'N 3'W	Restroom (tile)
146	Bldg 274	Wipe, Direct	Sievers-Sandberg USARC_Sample 146ABT	8'N 3'W	Lab (tile)
147	Bldg 285	Wipe, Direct	Sievers-Sandberg USARC_Sample 147AB	4'N 17'W	Garage
148	Bldg 285	LAW, Direct	-	15'N 15'W	Garage
149	Bldg 285	Direct	-	17'N 2'W	Garage
150	Bldg 285	Wipe, Direct	Sievers-Sandberg USARC_Sample 150AB	4'N 2'W	Garage

SAMPLE LOCATION DESCRIPTION LOG

Survey Location: Bldg 273 Basement and 404 Vault, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Unit 3 and 4

No.	Survey Location	Data Type <small>(Large Area Wipe (LAW), Wipe Test (100 cm²)(Wipe) Direct)</small>	Lab Sample ID	Sample Location <small>(Starting Point is SE Corner)</small>	Description of Location <small>(Samples collected on concrete floor unless otherwise noted.)</small>
151	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 151ABT	1'N 1'W	Vault (linoleum)
152	Bldg 404	Wipe, Direct	Sievers-Sandberg USARC_Sample 152ABT	3'N 1'W	Vault (linoleum)
153	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 153ABT	1'N 5'W	Storage NBC
154	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 154AB	4'N 8'W	Storage (tile)
155	Bldg 273	Wipe, Direct	Sievers-Sandberg USARC_Sample 155AB	14'N 7'W	Storage (tile)
156	Bldg 273	LAW, Direct	-	3'N 10'W	Kitchen (tile)

APPENDIX G
SURVEY SKETCH

Radiological Survey Record - Survey Locations

Location : Bldgs 434, 464 and 475, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Sketch

Note: Coordinates on Sample Description

Scale: Not to Scale

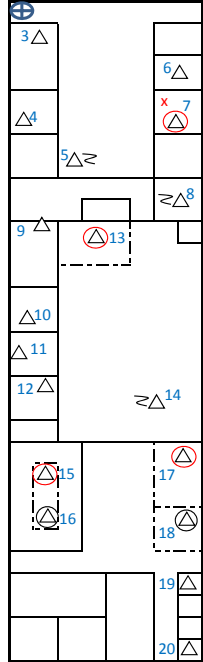
Log use the SE corner of each room.

Date : 5/7/13
Team : JEG/BGC

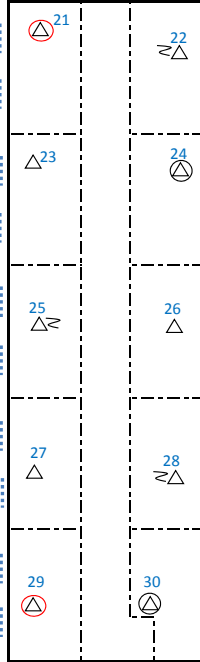
Building 475



Building 464



Building 434



Key:	
≧	Large Area Wipe (LAW)
○	Wipe Test (100 cm ²) (alpha and beta)
○	Wipe Test (100 cm ²) (alpha, beta and tritium)
△	Direct Reading (1 min)
⊕	Background Survey Location
R	Rest Room
13	Survey data number
.....	Roll up Door
-----	Cage Area
x	Potential Former NBC Storage Area

Survey Unit 1

Radiological Survey Record - Survey Locations

Location : Bldgs 171, 173 and 190, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

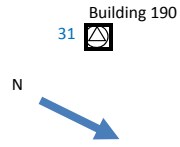
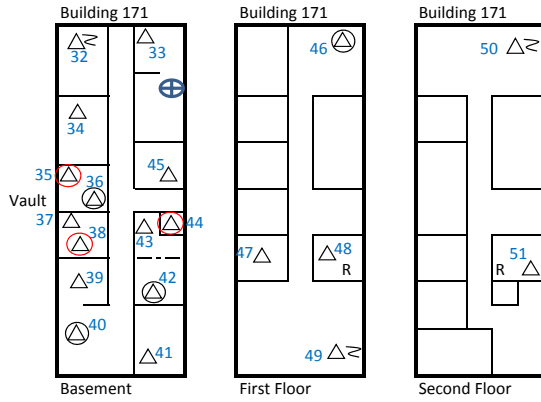
Date : 5/8/13

Team : JEG/BGC

Survey Sketch

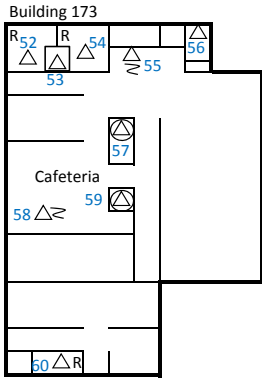
Scale: Not to Scale

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



Key:

- \approx Large Area Wipe (LAW)
- \bigcirc Wipe Test (100 cm²) (alpha and beta)
- \bigcirc Wipe Test (100 cm²) (alpha, beta and tritium)
- \triangle Direct Reading (1 min)
- \oplus Background Survey Location
- R Rest Room
- 13 Survey data number
- Cage Area



Survey Unit 2

Radiological Survey Record - Survey Locations

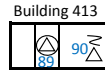
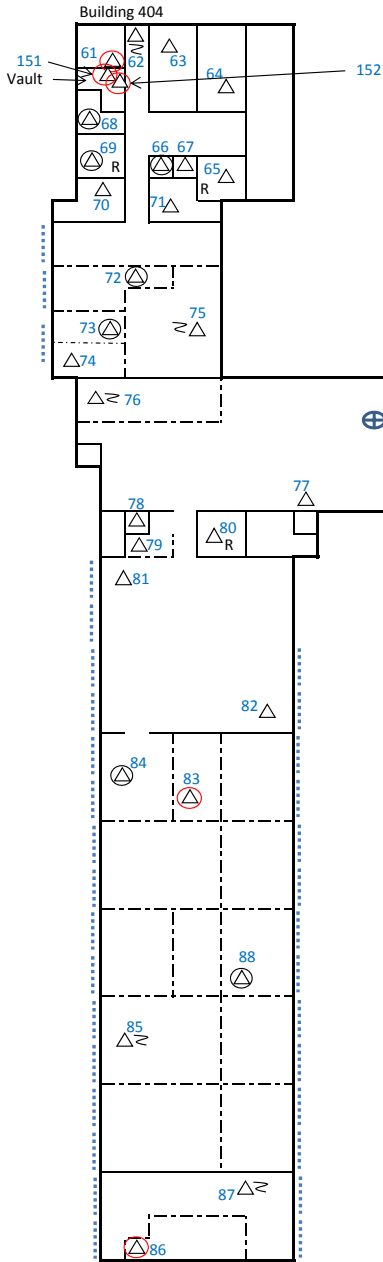
Location : Bldgs 404 and 413, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Sketch

Scale: Not to Scale

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

Date : 5/8/13
Team : JEG/BGC



Key:

- ≧ Large Area Wipe (LAW)
- Wipe Test (100 cm²) (alpha and beta)
- Wipe Test (100 cm²) (alpha, beta and tritium)
- △ Direct Reading (1 min)
- ⊕ Background Survey Location
- R Rest Room
- 13 Survey data number
- Roll up Door
- - - - - Cage Area

Survey Unit 3

Radiological Survey Record - Survey Locations

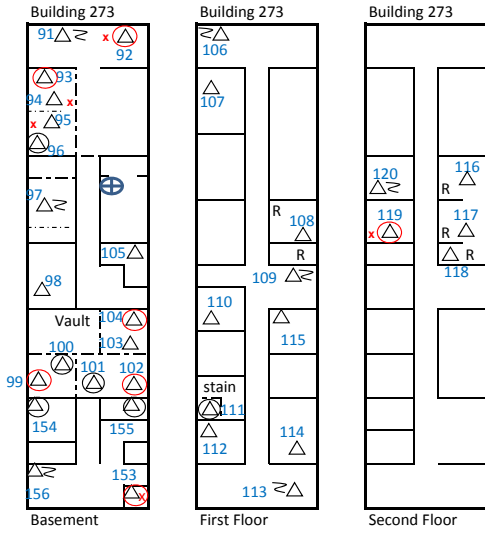
Location : Bldg 273, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

Survey Sketch

Scale: Not to Scale

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

Date : 5/9/13
Team : JEG/BGC



Key:

- ≧ Large Area Wipe (LAW)
- Wipe Test (100 cm²) (alpha and beta)
- Wipe Test (100 cm²) (alpha, beta and tritium)
- △ Direct Reading (1 min)
- ⊕ Background Survey Location
- R Rest Room
- 13 Survey data number
- Cage Area
- x Potential Former NBC Storage Area

Survey Unit 4

Radiological Survey Record - Survey Locations

Location : Bldg 274 and 285, Sievers-Sandberg USARC, Pedricktown, NJ (NJ013)

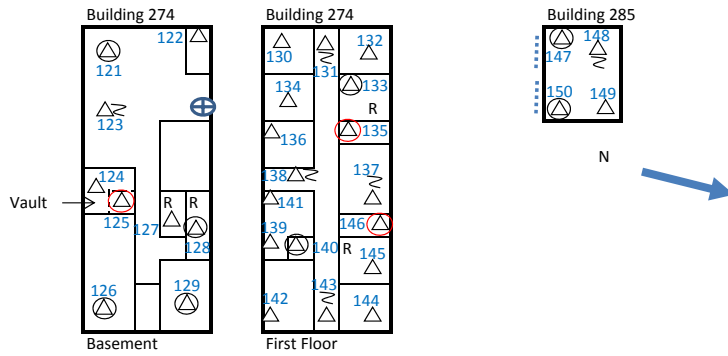
Date : 5/9/13

Survey Sketch

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

Scale: Not to Scale

Team : JEG/BGC



Key:	
	Large Area Wipe (LAW)
	Wipe Test (100 cm ²) (alpha and beta)
	Wipe Test (100 cm ²) (alpha, beta and tritium)
	Direct Reading (1 min)
	Background Survey Location
	Rest Room
	Survey data number
	Roll up Door
	Cage Area

Survey Unit 5

APPENDIX H
HIGH RESULTS NARRATIVE

HIGH RESULTS NARRATIVE

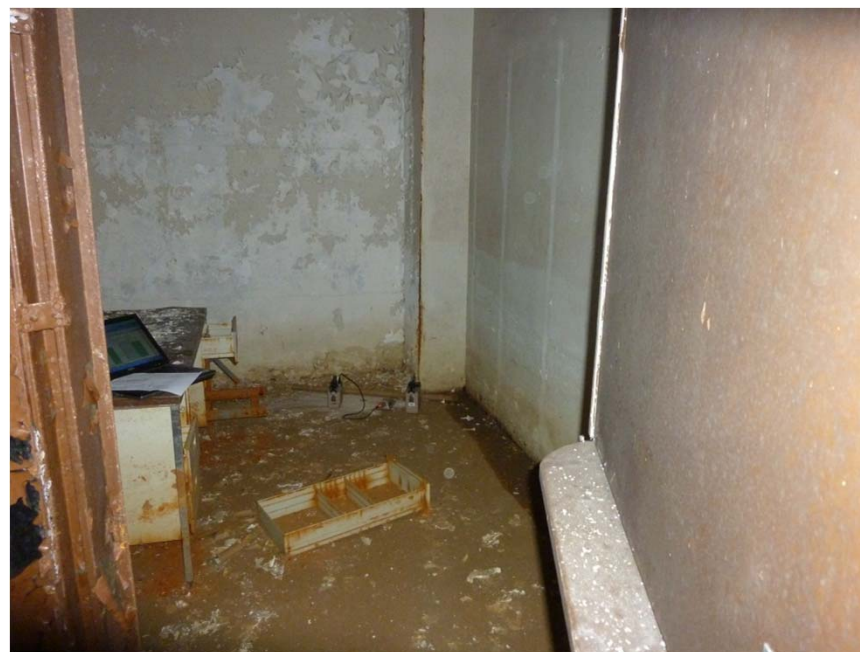
Site : Sievers Sandberg USARC, Pedricktown, NJ (NJ013)

Sample Location	Remarks
	There were no results that exceeded site assessment criteria.

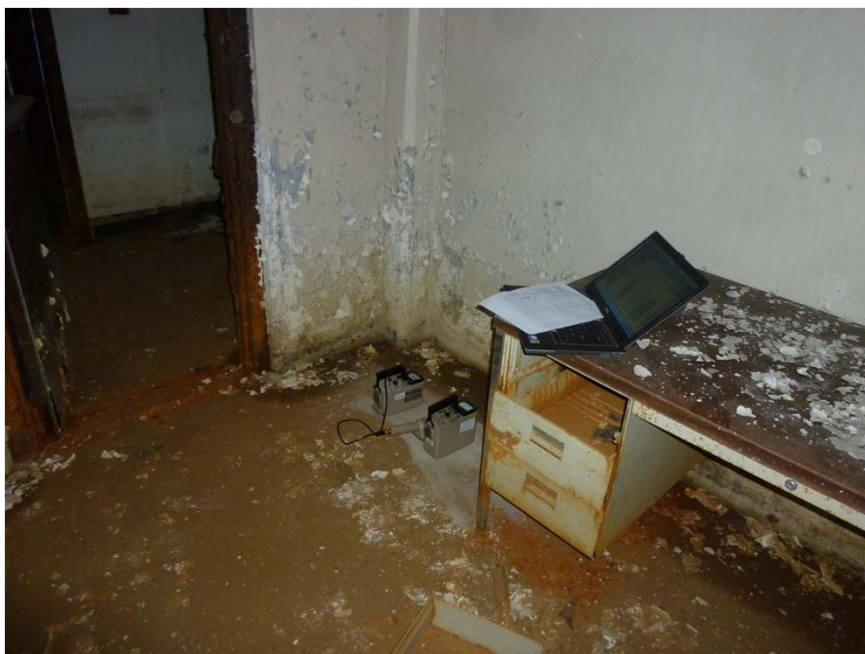
APPENDIX I
SITE PHOTOS



Sievers-Sandberg USARC_Bldg 171 173 and 190_rear view



Sievers-Sandberg USARC_Bldg 171_Sample 35ABT



Sievers-Sandberg USARC_Bldg 171_Sample 36AB



Sievers-Sandberg USARC_Bldg 171_Sample 38ABT



Sievers-Sandberg USARC_Bldg 273 274 and 285_Front



Sievers-Sandberg USARC_Bldg 273_Sample 92ABT



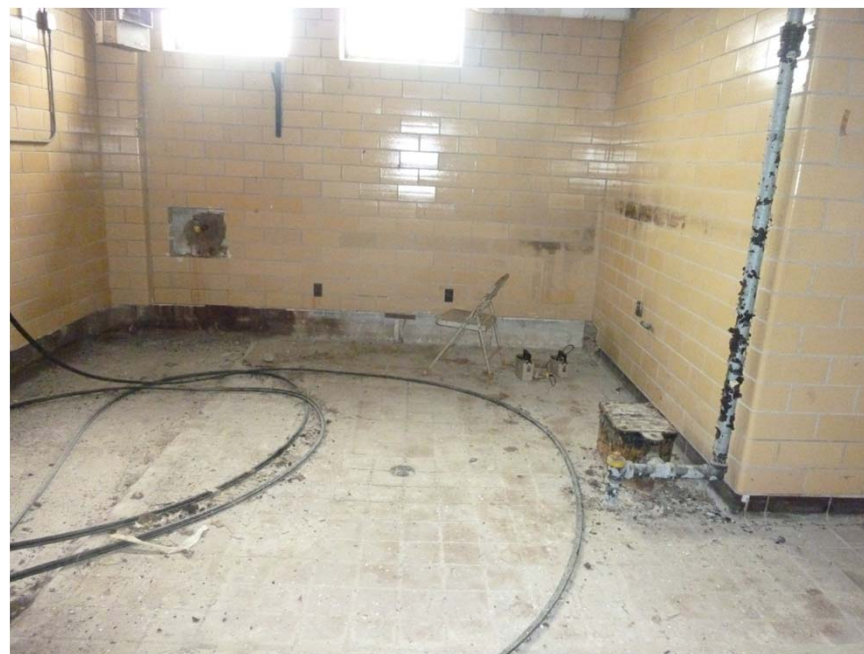
Sievers-Sandberg USARC_Bldg 273_Sample 99ABT



Sievers-Sandberg USARC_Bldg 273_Sample 119ABT



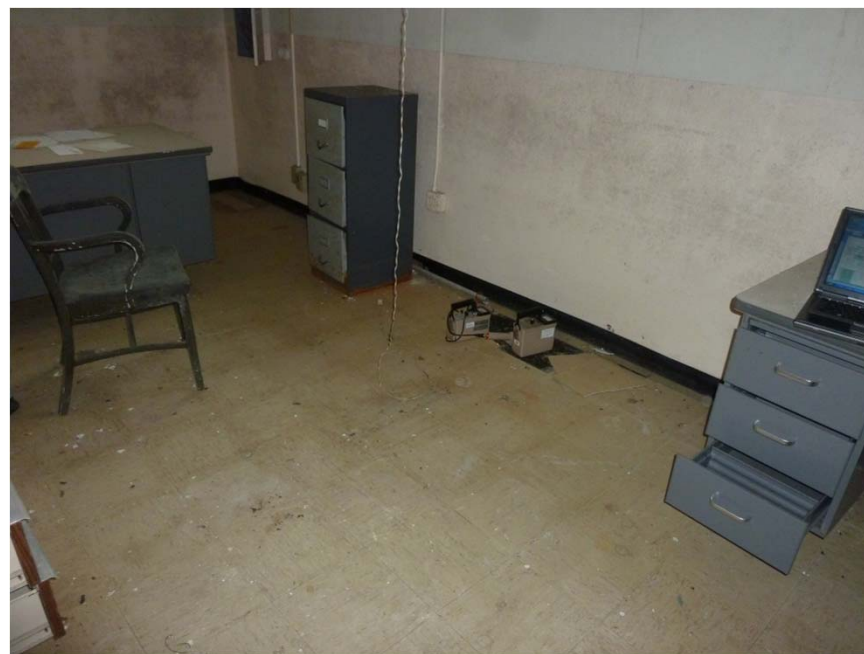
Sievers-Sandberg USARC_Bldg 273_Sample 153ABT



Sievers-Sandberg USARC_Bldg 273_Sample 156



Sievers-Sandberg USARC_Bldg 274_Sample 121AB



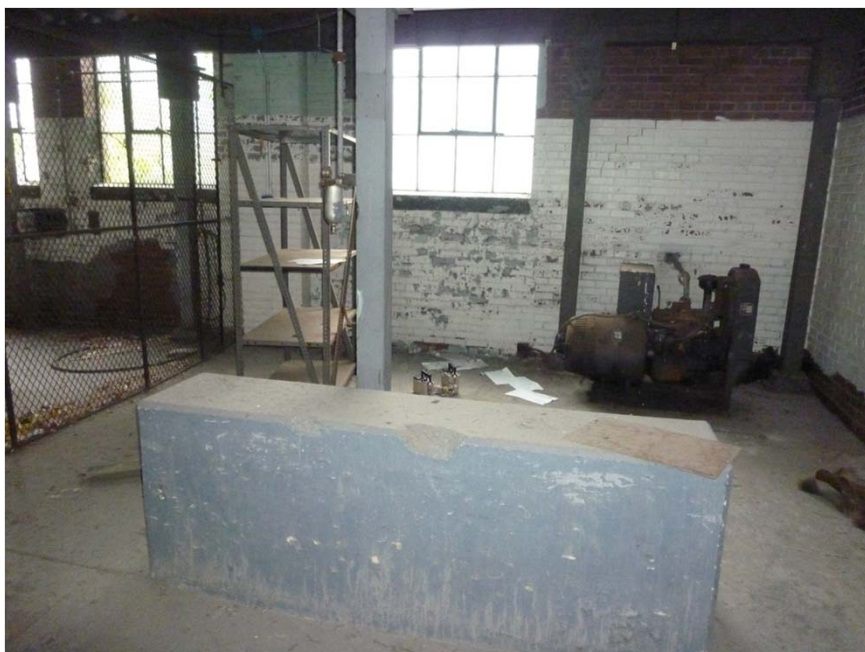
Sievers-Sandberg USARC_Bldg 274_Sample 126AB



Sievers-Sandberg USARC_Bldg 274_Sample 146ABT



Sievers-Sandberg USARC_Bldg 404 and 413_rear



Sievers-Sandberg USARC_Bldg 404_Sample 76



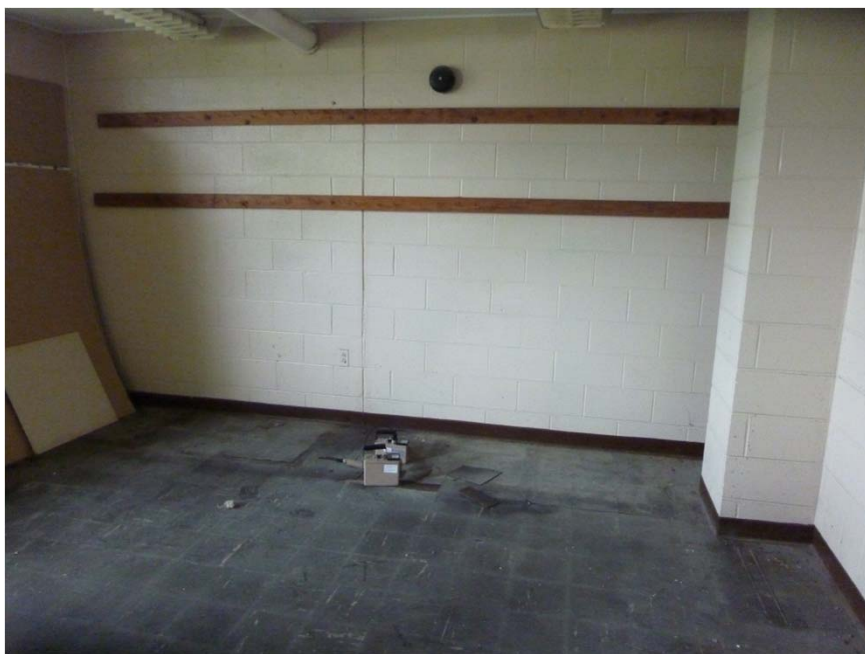
Sievers-Sandberg USARC_Bldg 413_Sample 89AB



Sievers-Sandberg USARC_Bldg 434 464 and 475_Front



Sievers-Sandberg USARC_Bldg 434_Sample 21ABT



Sievers-Sandberg USARC_Bldg 464_Sample 7ABT



Sievers-Sandberg USARC_Bldg 464_Sample 17ABT

APPENDIX J
ANALYTICAL RESULTS



May 16, 2013

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

Re: TerranearPMC, LLC (Project No. 46142) Sievers-Sandberg USARC (NJ013)
Work Order: 325554

Dear Daniel Caputo:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 10, 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. 4505.

Sincerely,

Heather Shaffer
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: 325554 GEL Work Order: 325554

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** 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, Heather Shaffer.

Reviewed by _____

Heather Shaffer

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 7T Project: TPMC00504
Sample ID: 325554001 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:45
Receive Date: 10-MAY-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	-1.76	23.8	100	dpm/Filter		BYS1	05/11/13	1235	1301113	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 13T Project: TPMC00504
Sample ID: 325554002 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:40
Receive Date: 10-MAY-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	1.38	13.8	100	dpm/Filter		BYS1	05/11/13	1252	1301113	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 15T Project: TPMC00504
Sample ID: 325554003 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:48
Receive Date: 10-MAY-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	-0.992	13.4	100	dpm/Filter		BYS1	05/11/13	1308	1301113	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 17T Project: TPMC00504
Sample ID: 325554004 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:52
Receive Date: 10-MAY-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	-0.676	14.0	100	dpm/Filter		BYS1	05/11/13	1325	1301113	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
 Address : 222 Valley Creek Blvd.
 Suite 210
 Exton, Pennsylvania 19341
 Contact: Daniel F. Caputo
 Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 21T Project: TPMC00504
 Sample ID: 325554005 Client ID: TPMC005
 Matrix: Swipe
 Collect Date: 07-MAY-13 14:59
 Receive Date: 10-MAY-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	-24.2	61.7	100	dpm/Filter		BYS1	05/11/13	1341	1301113	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 29T Project: TPMC00504
Sample ID: 325554006 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 15:15
Receive Date: 10-MAY-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	3.88	26.2	100	dpm/Filter		BYS1	05/11/13	1357	1301113	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 1AB Project: TPMC00504
Sample ID: 325554007 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:25
Receive Date: 10-MAY-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	0.0368	0.499	0.500	dpm/Filter		AF1	05/14/13	1059	1301107	1
Beta	U	0.402	0.578	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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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 7AB Project: TPMC00504
Sample ID: 325554008 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:45
Receive Date: 10-MAY-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	0.00721	0.486	0.500	dpm/Filter		AF1	05/11/13	1656	1301107	1
Beta	U	0.282	0.582	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 13AB Project: TPMC00504
Sample ID: 325554009 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:40
Receive Date: 10-MAY-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	0.149	0.463	0.500	dpm/Filter		AF1	05/14/13	2018	1301107	1
Beta	U	0.368	0.815	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 15AB Project: TPMC00504
Sample ID: 325554010 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:48
Receive Date: 10-MAY-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	-0.0807	0.499	0.500	dpm/Filter		AF1	05/11/13	1656	1301107	1
Beta	U	0.263	0.439	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 16AB Project: TPMC00504
Sample ID: 325554011 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:50
Receive Date: 10-MAY-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	0.124	0.484	0.500	dpm/Filter		AF1	05/11/13	1656	1301107	1
Beta	U	-0.0553	0.695	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 17AB Project: TPMC00504
Sample ID: 325554012 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:52
Receive Date: 10-MAY-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	0.271	0.488	0.500	dpm/Filter		AF1	05/11/13	1657	1301107	1
Beta	U	-0.0669	0.837	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 18AB Project: TPMC00504
Sample ID: 325554013 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:54
Receive Date: 10-MAY-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		0.648	0.498	0.500	dpm/Filter		AF1	05/11/13	1657	1301107	1
Beta	U	0.809	0.890	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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Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 21AB Project: TPMC00504
Sample ID: 325554014 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 14:59
Receive Date: 10-MAY-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		0.703	0.481	0.500	dpm/Filter		AF1	05/11/13	1657	1301107	1
Beta		1.34	0.675	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 24AB Project: TPMC00504
Sample ID: 325554015 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 15:06
Receive Date: 10-MAY-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		0.736	0.494	0.500	dpm/Filter		AF1	05/11/13	1657	1301107	1
Beta		1.16	0.944	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 29AB Project: TPMC00504
Sample ID: 325554016 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 15:15
Receive Date: 10-MAY-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		0.735	0.499	0.500	dpm/Filter		AF1	05/11/13	1658	1301107	1
Beta		0.848	0.606	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 30AB Project: TPMC00504
Sample ID: 325554017 Client ID: TPMC005
Matrix: Swipe
Collect Date: 07-MAY-13 15:18
Receive Date: 10-MAY-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	0.387	0.468	0.500	dpm/Filter		AF1	05/11/13	1658	1301107	1
Beta	U	0.0273	0.655	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 35T Project: TPMC00504
Sample ID: 325554018 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:10
Receive Date: 10-MAY-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	-5.42	27.6	100	dpm/Filter		BYS1	05/11/13	1414	1301113	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 38T Project: TPMC00504
Sample ID: 325554019 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:14
Receive Date: 10-MAY-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	2.15	29.0	100	dpm/Filter		BYS1	05/11/13	1430	1301113	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 44T Project: TPMC00504
Sample ID: 325554020 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:30
Receive Date: 10-MAY-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	-9.58	32.2	100	dpm/Filter		BYS1	05/13/13	1427	1301113	1

The following Analytical Methods were performed:

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

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Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 61T Project: TPMC00504
Sample ID: 325554021 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:00
Receive Date: 10-MAY-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	-0.25	11.2	100	dpm/Filter		BYS1	05/11/13	1503	1301113	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 83T Project: TPMC00504
Sample ID: 325554022 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:54
Receive Date: 10-MAY-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	-4.51	23.0	100	dpm/Filter		BYS1	05/11/13	1519	1301113	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 86T Project: TPMC00504
Sample ID: 325554023 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 10:17
Receive Date: 10-MAY-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	7.20	20.7	100	dpm/Filter		BYS1	05/11/13	1536	1301113	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 31AB Project: TPMC00504
Sample ID: 325554024 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:00
Receive Date: 10-MAY-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	-0.038	0.492	0.500	dpm/Filter		AF1	05/11/13	1658	1301107	1
Beta	U	-0.221	1.07	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 35AB Project: TPMC00504
Sample ID: 325554025 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:10
Receive Date: 10-MAY-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		0.715	0.469	0.500	dpm/Filter		AF1	05/11/13	1658	1301107	1
Beta		1.03	0.761	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 36AB Project: TPMC00504
Sample ID: 325554026 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:12
Receive Date: 10-MAY-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	-0.0377	0.499	0.500	dpm/Filter		AF1	05/11/13	1659	1301107	1
Beta	U	0.290	0.560	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 38AB Project: TPMC00504
Sample ID: 325554027 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:14
Receive Date: 10-MAY-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		0.766	0.484	0.500	dpm/Filter		AF1	05/11/13	1659	1301107	1
Beta		1.71	0.543	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 40AB Project: TPMC00504
Sample ID: 325554028 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:18
Receive Date: 10-MAY-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	0.156	0.473	0.500	dpm/Filter		AF1	05/11/13	1659	1301107	1
Beta	U	0.434	0.466	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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Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 42AB Project: TPMC00504
Sample ID: 325554029 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:22
Receive Date: 10-MAY-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	-0.05	0.495	0.500	dpm/Filter		AF1	05/11/13	1659	1301107	1
Beta	U	0.359	0.538	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 44AB Project: TPMC00504
Sample ID: 325554030 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:30
Receive Date: 10-MAY-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		1.07	0.479	0.500	dpm/Filter		AF1	05/11/13	1700	1301107	1
Beta		3.83	0.559	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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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 46AB Project: TPMC00504
Sample ID: 325554031 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:35
Receive Date: 10-MAY-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	0.324	0.486	0.500	dpm/Filter		AF1	05/11/13	1700	1301107	1
Beta	U	0.576	0.779	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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Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 57AB Project: TPMC00504
Sample ID: 325554032 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:50
Receive Date: 10-MAY-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	0.0701	0.482	0.500	dpm/Filter		AF1	05/11/13	1700	1301107	1
Beta		0.769	0.655	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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Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 59AB Project: TPMC00504
Sample ID: 325554033 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 13:55
Receive Date: 10-MAY-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	0.245	0.483	0.500	dpm/Filter		AF1	05/11/13	1705	1301108	1
Beta	U	0.869	0.942	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 61AB Project: TPMC00504
Sample ID: 325554034 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:00
Receive Date: 10-MAY-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	0.0464	0.481	0.500	dpm/Filter		AF1	05/11/13	1705	1301108	1
Beta		0.894	0.881	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 66AB Project: TPMC00504
Sample ID: 325554035 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:14
Receive Date: 10-MAY-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	-0.24	0.496	0.500	dpm/Filter		AF1	05/11/13	1705	1301108	1
Beta	U	-0.232	0.694	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 68AB Project: TPMC00504
Sample ID: 325554036 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 00:17
Receive Date: 10-MAY-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	0.259	0.499	0.500	dpm/Filter		AF1	05/12/13	1625	1301108	1
Beta		0.892	0.696	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 69AB Project: TPMC00504
Sample ID: 325554037 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:20
Receive Date: 10-MAY-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	0.311	0.472	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta		0.860	0.596	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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Company : TerranearPMC, LLC
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 72AB Project: TPMC00504
Sample ID: 325554038 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:29
Receive Date: 10-MAY-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	0.347	0.477	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta		1.17	0.587	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 73AB Project: TPMC00504
Sample ID: 325554039 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:33
Receive Date: 10-MAY-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	0.252	0.465	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta		3.93	0.712	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 83AB Project: TPMC00504
Sample ID: 325554040 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 09:54
Receive Date: 10-MAY-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	0.172	0.491	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta	U	0.200	0.458	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 84AB Project: TPMC00504
Sample ID: 325554041 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 10:13
Receive Date: 10-MAY-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	0.225	0.484	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta		0.775	0.700	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 86AB Project: TPMC00504
Sample ID: 325554042 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 10:17
Receive Date: 10-MAY-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	0.272	0.488	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta	U	0.518	0.761	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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Address : 222 Valley Creek Blvd.
Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 88AB Project: TPMC00504
Sample ID: 325554043 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 10:31
Receive Date: 10-MAY-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	0.0846	0.487	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta	U	0.149	0.789	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 89AB Project: TPMC00504
Sample ID: 325554044 Client ID: TPMC005
Matrix: Swipe
Collect Date: 08-MAY-13 10:42
Receive Date: 10-MAY-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		0.619	0.480	0.500	dpm/Filter		AF1	05/12/13	1626	1301108	1
Beta		2.64	0.830	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 125T Project: TPMC00504
Sample ID: 325554045 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 08:59
Receive Date: 10-MAY-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	-1.09	48.9	100	dpm/Filter		BYS1	05/11/13	1552	1301113	1

The following Analytical Methods were performed:

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

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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 135T Project: TPMC00504
Sample ID: 325554046 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:20
Receive Date: 10-MAY-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	-1.04	21.6	100	dpm/Filter		BYS1	05/11/13	1608	1301113	1

The following Analytical Methods were performed:

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

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Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 146T Project: TPMC00504
Sample ID: 325554047 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:45
Receive Date: 10-MAY-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	-1.06	14.4	100	dpm/Filter		BYS1	05/11/13	1625	1301113	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 92T Project: TPMC00504
Sample ID: 325554048 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:10
Receive Date: 10-MAY-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	-1.77	22.8	100	dpm/Filter		BYS1	05/11/13	1747	1301114	1

The following Analytical Methods were performed:

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

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Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 93T Project: TPMC00504
Sample ID: 325554049 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:12
Receive Date: 10-MAY-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	-59.2	63.7	100	dpm/Filter		BYS1	05/13/13	1756	1301114	1

The following Analytical Methods were performed:

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

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Address : 222 Valley Creek Blvd.
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Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 92AB Project: TPMC00504
Sample ID: 325554050 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:10
Receive Date: 10-MAY-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		0.682	0.489	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta		2.15	0.724	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 93AB Project: TPMC00504
Sample ID: 325554051 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:12
Receive Date: 10-MAY-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	0.0103	0.482	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta	U	0.649	1.00	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 95AB Project: TPMC00504
Sample ID: 325554052 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:20
Receive Date: 10-MAY-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		0.796	0.498	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta		1.88	0.694	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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Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 99AB Project: TPMC00504
Sample ID: 325554053 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:30
Receive Date: 10-MAY-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		0.660	0.494	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta		0.935	0.646	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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Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 100AB Project: TPMC00504
Sample ID: 325554054 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:32
Receive Date: 10-MAY-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		0.523	0.471	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta		0.934	0.633	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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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 101AB Project: TPMC00504
Sample ID: 325554055 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:34
Receive Date: 10-MAY-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	0.400	0.476	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta		1.16	1.04	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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Report Date: May 16, 2013

Company : TerranearPMC, LLC
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 102AB Project: TPMC00504
Sample ID: 325554056 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:38
Receive Date: 10-MAY-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		0.494	0.474	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta		0.590	0.547	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 104AB Project: TPMC00504
Sample ID: 325554057 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:45
Receive Date: 10-MAY-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	0.224	0.481	0.500	dpm/Filter		AF1	05/12/13	1627	1301108	1
Beta	U	0.0293	0.511	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 111AB Project: TPMC00504
Sample ID: 325554058 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 13:00
Receive Date: 10-MAY-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		0.579	0.499	0.500	dpm/Filter		AF1	05/12/13	2152	1301109	1
Beta		0.781	0.696	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 119AB Project: TPMC00504
Sample ID: 325554059 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 13:40
Receive Date: 10-MAY-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		0.644	0.484	0.500	dpm/Filter		AF1	05/12/13	2153	1301109	1
Beta		1.90	0.700	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 121AB Project: TPMC00504
Sample ID: 325554060 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 08:50
Receive Date: 10-MAY-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	0.281	0.490	0.500	dpm/Filter		AF1	05/12/13	2201	1301109	1
Beta	U	0.197	0.550	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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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 125AB Project: TPMC00504
Sample ID: 325554061 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 08:59
Receive Date: 10-MAY-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	0.459	0.474	0.500	dpm/Filter		AF1	05/12/13	2211	1301109	1
Beta		0.591	0.547	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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Certificate of Analysis

Report Date: May 16, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 126AB Project: TPMC00504
Sample ID: 325554062 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:02
Receive Date: 10-MAY-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	0.257	0.471	0.500	dpm/Filter		AF1	05/14/13	1032	1301109	1
Beta	U	0.386	0.892	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 128AB Project: TPMC00504
Sample ID: 325554063 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:08
Receive Date: 10-MAY-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		0.771	0.353	0.500	dpm/Filter		AF1	05/14/13	1032	1301109	1
Beta	U	0.472	0.761	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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Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 129AB Project: TPMC00504
Sample ID: 325554064 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:10
Receive Date: 10-MAY-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	0.0476	0.484	0.500	dpm/Filter		AF1	05/14/13	1034	1301109	1
Beta	U	0.374	0.799	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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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 134AB Project: TPMC00504
Sample ID: 325554065 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:12
Receive Date: 10-MAY-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	0.170	0.300	0.500	dpm/Filter		AF1	05/14/13	1034	1301109	1
Beta	U	-0.124	0.871	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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Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 140AB Project: TPMC00504
Sample ID: 325554066 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:35
Receive Date: 10-MAY-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	0.0611	0.404	0.500	dpm/Filter		AF1	05/14/13	1048	1301109	1
Beta	U	1.02	1.08	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 146AB Project: TPMC00504
Sample ID: 325554067 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:45
Receive Date: 10-MAY-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		0.508	0.456	0.500	dpm/Filter		AF1	05/14/13	1048	1301109	1
Beta	U	0.680	0.976	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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Certificate of Analysis

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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 147AB Project: TPMC00504
Sample ID: 325554068 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:55
Receive Date: 10-MAY-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	0.0445	0.490	0.500	dpm/Filter		AF1	05/14/13	1048	1301109	1
Beta	U	0.354	0.550	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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Certificate of Analysis

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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 150AB Project: TPMC00504
Sample ID: 325554069 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 10:00
Receive Date: 10-MAY-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	0.275	0.450	0.500	dpm/Filter		AF1	05/14/13	1049	1301109	1
Beta	U	-0.0709	0.834	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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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 135AB Project: TPMC00504
Sample ID: 325554070 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 09:20
Receive Date: 10-MAY-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		0.664	0.567	0.500	dpm/Filter		AF1	05/13/13	0837	1301109	1
Beta		0.960	0.798	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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 Contact: Daniel F. Caputo
 Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID:	Sievers-Sandberg USARC 99T	Project:	TPMC00504
Sample ID:	325554071	Client ID:	TPMC005
Matrix:	Swipe		
Collect Date:	09-MAY-13 12:30		
Receive Date:	10-MAY-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	2.12	27.3	100	dpm/Filter		BYS1	05/11/13	1819	1301114	1

The following Analytical Methods were performed:

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

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Certificate of Analysis

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Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 102T Project: TPMC00504
Sample ID: 325554072 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:38
Receive Date: 10-MAY-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	2.78	35.9	100	dpm/Filter		BYS1	05/11/13	1836	1301114	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 104T Project: TPMC00504
Sample ID: 325554073 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 12:45
Receive Date: 10-MAY-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	9.13	27.1	100	dpm/Filter		BYS1	05/11/13	1852	1301114	1

The following Analytical Methods were performed:

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

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Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 119T Project: TPMC00504
Sample ID: 325554074 Client ID: TPMC005
Matrix: Swipe
Collect Date: 09-MAY-13 13:40
Receive Date: 10-MAY-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	-0.31	13.4	100	dpm/Filter		BYS1	05/11/13	1908	1301114	1

The following Analytical Methods were performed:

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

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QC Summary

Report Date: May 16, 2013
Page 1 of 2

TerranearPMC, LLC
222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania

Contact: Daniel F. Caputo

Workorder: 325554

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch		1301107									
QC1202874317	325554007	DUP									
Alpha	U	0.0368	U	0.331	dpm/Filter	0.00		N/A	AF1	05/14/13	20:18
Beta	U	0.402	U	0.0216	dpm/Filter	0.00		N/A			
QC1202874316	MB										
Alpha			U	0.142	dpm/Filter					05/11/13	17:00
Beta			U	-0.278	dpm/Filter						
Batch		1301108									
QC1202874319	325554033	DUP									
Alpha	U	0.245	U	0.388	dpm/Filter	0.00		N/A	AF1	05/12/13	20:36
Beta	U	0.869		0.688	dpm/Filter	23.2		(0% - 100%)			
QC1202874318	MB										
Alpha			U	0.236	dpm/Filter					05/12/13	16:45
Beta			U	-0.10	dpm/Filter						
Batch		1301109									
QC1202874321	325554058	DUP									
Alpha		0.579	U	0.122	dpm/Filter	130*		(0% - 100%)	AF1	05/13/13	10:14
Beta		0.781	U	0.0211	dpm/Filter	189*		(0% - 100%)			
QC1202874320	MB										
Alpha			U	0.0486	dpm/Filter					05/13/13	10:04
Beta			U	0.538	dpm/Filter						
Rad Liquid Scintillation											
Batch		1301113									
QC1202874332	LCS										
Tritium	217			217	dpm/Filter		100	(75%-125%)	BYS1	05/11/13	16:57
QC1202874333	LCSD										
Tritium	217			202	dpm/Filter	7.05	93.2	(0%-20%)		05/11/13	17:14
QC1202874331	MB										
Tritium			U	0.671	dpm/Filter					05/11/13	16:41
Batch		1301114									
QC1202874339	LCS										
Tritium	217			236	dpm/Filter		109	(75%-125%)	BYS1	05/11/13	20:30
QC1202874340	LCSD										
Tritium	217			225	dpm/Filter	4.79	104	(0%-20%)		05/11/13	20:47
QC1202874338	MB										
Tritium			U	4.45	dpm/Filter					05/11/13	20:14

Notes:

The Qualifiers in this report are defined as follows:

** Analyte is a Tracer compound

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QC Summary

Workorder: 325554

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<	Result is less than value reported										
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
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	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
NI	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
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										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	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.

DATA EXCEPTION REPORT

Mo.Day Yr. 16-MAY-13	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: LSC	Test / Method: GL-RAD-A-002	Matrix Type: Filter	Client Code: TPMC
Batch ID: 1301114	Sample Numbers: See below		

Potentially affected work order(s)(SDG): 325554,325564

Application Issues:

Result is more negative than the three sigma TPU

**Specification and Requirements
Exception Description:**

DER Disposition:

1. Sample 325554049(Sievers-Sandberg USARC 93T) has a negative activity 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:

Lyndsey Pace 16-MAY-13

Data Validator/Group Leader:

Jennifer Landingham 16-MAY-13

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

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (1)	Field Filtered (2)	Sample Matrix (4)	Should this sample be considered:		Total number of containers	Sample Analysis Requested (5) (Fill in the number of containers for each test)	<-- Preservative Type (6)	Comments Note: extra sample is required for sample specific QC
						Radioactive	TSCA Regulated				
Siemens-Sandberg USARC 7T, 13T, 15T, 17T, 21T, 24T	5-7-13		N	NA	P			6			* refer to
Siemens-Sandberg USARC 11AB, 13AB, 15AB, 16AB, 17AB	5-7-13		N	NA	P			6			Sample labels
Siemens-Sandberg USARC 18AB, 21AB, 24AB, 30AB	5-7-13		N	NA	P			5			for time collected
Siemens-Sandberg USARC 35T, 38T, 44T, 61T, 83T, 86T	5-8-13		N	NA	P			6			
Siemens-Sandberg USARC 31AB, 35AB, 36AB, 38AB, 40AB	5-8-13		N	NA	P			5			
Siemens-Sandberg USARC 42AB, 44AB, 46AB, 57AB, 59AB	5-8-13		N	NA	P			7			
Siemens-Sandberg USARC 61AB, 66AB, 69AB, 73AB	5-8-13		N	NA	P			6			
Siemens-Sandberg USARC 83AB, 84AB, 86AB, 88AB, 89AB	5-8-13		N	NA	P			5			

TAT Requested: Normal: 7 Rush: _____ Specify: _____ (Subject to Surcharges) Fax Results: Yes / No
 Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4
 Sample Collection Time Zone: Eastern Pacific Central Mountain
 Remarks: Are there any known hazards applicable to these samples? If so, please list the hazards
Sampling to verify existing conditions

Chain of Custody Signatures		
Relinquished By (Signed)	Date	Time
<u>Joe Sheen</u>	<u>5-9-13</u>	<u>3:25</u>
<u>[Signature]</u>	<u>5-9-13</u>	<u>051013 @ 0905</u>

GEL PM: Heather Shaffer
 Method of Shipment: FeDEX Date Shipped: 5-9-13
 Airbill #: 875726524971
 Airbill #:

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=Faecal, 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
 For Lab Receiving Use Only
 Cystech Seal Intact? YES NO
 Cooler Temp: 20 C
 WHITE = LABORATORY
 YELLOW = FILE
 PINK = CLIENT

Page: _____ of _____
 Project #: 46142-08
 GEL Quote #: _____
 COC Number (1): 242
 PO Number: _____
 Client Name: Tennessee PMC
 Project/Site Name: Silver-Sandberg USARC (11013)
 Address: _____
 Collected by: Heather Send Results To: K. Shoff
 GEL Work Order Number: 3205504 Phone #: 215 586-1092 Fax #: _____

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

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (1)	Field Filtered (2)	Sample Matrix (4)	Should this sample be considered:		Total number of containers	Sample Analysis Requested (5) (Fill in the number of containers for each test)	Preservative Type (6)	Comments
						Radioactive	TSCA Regulated				
Silver-Sandberg USARC 125T, 135T, 146T, 92T, 93T, 5-9-13	5-9-13		N	NA	P			5			* refers to Sample labels for time collected
Silver-Sandberg USARC 92AB, 93AB, 95AB, 99AB, 100AB, 101AB	5-9-13		N	NA	P			6			
Silver-Sandberg USARC 102AB, 104AB, 111AB, 119AB	5-9-13		N	NA	P			4			
Silver-Sandberg USARC 121AB, 125AB, 126AB, 128AB, 129AB	5-9-13		N	NA	P			5			
Silver-Sandberg USARC 134AB, 140AB, 146AB, 147AB, 150AB, 151AB	5-9-13		N	NA	P			6			
Silver-Sandberg USARC 99T, 102T, 104T, 119T	5-9-13		N	NA	P			4			

TAT Requested: Normal: 7 Rush: _____ Specify: _____ (Subject to Surcharge) Fax Results: Yes / No
 Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4
 Sample Collection Time Zone: Eastern Pacific Central Mountain
 Remarks: Are there any known hazards applicable to these samples? If so, please list the hazards
Sampling to verify existing conditions

Chain of Custody Signatures		Sample Shipping and Delivery Details	
Relinquished By (Signed)	Date	Time	Date
<u>Heather</u>	<u>5-9-13</u>	<u>5:25</u>	<u>5-9-13</u>
<u>Heather Shoff</u>	<u>5-9-13</u>	<u>051013 0905</u>	<u>5-9-13</u>
			<u>4971</u>

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=Faecal, 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
 For Lab Receiving Use Only
 Custody Seal Intact? YES NO
 Cooler Temp: 20 C



325554

Client: TPMC		SDG/AR/COC/Work Order: Sievers-Sandberg USARC (MS013)	
Received By: H. Taylor		Date Received: 051013	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice <input checked="" type="checkbox"/> None Other (describe) *all temperatures are recorded in Celsius 20
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: 61524646 Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: no time on chain
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected: received a friction and Gross A/B for ID TT 1445 <i>Sievers Sandberg</i>
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 8757 2652 4971

Comments (Use Continuation Form if needed):

Client: TPMC Received By: HT Date Received: 5-10-13 SDG/AR/COC/Work Order: 325554

Sievers Sandberry			
7T 1445	1AB 1425	83 AB 0954	73AB 09B3
13 1440	7	84 1013	73
15 1452 1448	13 1440	86 1017	
17 1452	15 1448	88 1031	135AB 0920
21 1459	16 1450	89 1042	
29 1515	17 1452	92 1210	
35 1310	18 15 1454	93 1212	
38 1314	21 1451	95 1220	
44 1330	24 1506	99 1230	
61 0900	29 1515	100 1232	
83 0954	30 1518	101 1234	
86 1017	31 1300	102 1238	
125 0859	35 1310	104 1245	
135 0920	36 1312	111 1300	
146 0945	38 1314	119 1340	
92 1210	40 1318	121 0850	
93 1212	42 1322	125 0859	
99 1230	44 1330	126 0902	
102 1238	46 1335	128 0908	
104 1245	57 1350	129 0910	
119 1340	59 1355	134 0912	
	61 0900	140 0935	
CARROLL	66 0914	146 0945	
13T 1141	68 017	147 0955	
15 1149	69 0920	150 1000	
19 1159	72 0929		
9AB 1135	15AB 1149	114	CARROLL
11AB 1138	16 1151	21 AB 1203	4AB 1130
13AB 1141	17 1153	25 1215	
14AB 1146	19 1159	NA	

PM (or PMA) review: Initials DS Date 5/10/13 Page 2 of 2

Re: TPMC samples received today 5/10/13

Subject: Re: TPMC samples received today 5/10/13
From: Joe<jgreen@terraneartpmc.com>
Date: 5/10/2013 1:16 PM
To: "Heather Shaffer"<Heather.Shaffer@gel.com>, kshroff@Terraneartpmc.com
CC: "team.shaffer"<team.shaffer@gel.com>

The swipe should be 7AB for GAB and tritium bottle should be 7T

Thanks

Joe

Sent from my Verizon Wireless Droid

-----Original message-----

From: Heather Shaffer <Heather.Shaffer@gel.com>
To: kshroff@Terraneartpmc.com, JGreen@Terraneartpmc.com
Cc: "team.shaffer" <team.shaffer@gel.com>
Sent: Fri, May 10, 2013 16:42:42 GMT+00:00
Subject: Re: TPMC samples received today 5/10/13

We did not receive a GAB filter for **7AB**. I believe that the GAB filter labeled as **7T** should really be **7AB**. Thank you.

On 5/10/2013 12:23 PM, Heather Shaffer wrote:

Good afternoon,

We received samples today and I have one discrepancy. For Sievers Sandberg ID 7T (collection time 14:45) we received a tritium container and a GAB. Please confirm if only tritium should be run on this sample or if GAB is also required.

Thank you,
Heather

--
Heather Shaffer
Project Manager
GEL Laboratories, LLC
2040 Savage Road
Charleston, SC (USA) 29407
Direct: 843.769.7386
Main: 843.556.8171 xt 4505
Fax: 843.766.1178
E-mail: heather.shaffer@gel.com Web: www.gel.com

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List of current GEL Certifications as of 16 May 2013

State	Certification
Alaska	UST-110
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	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790



May 28, 2013

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

Re: TerranearPMC, LLC (Project No. 46142) Sievers-Sandberg USARC (NJ013)
Work Order: 326162

Dear Daniel Caputo:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 22, 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. 4505.

Sincerely,

Heather Shaffer
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: 326162 GEL Work Order: 326162

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** 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, Heather Shaffer.

Reviewed by _____

Heather Shaffer

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 28, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 151T Project: TPMC00504
Sample ID: 326162001 Client ID: TPMC005
Matrix: Swipe
Collect Date: 21-MAY-13 09:33
Receive Date: 22-MAY-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	0.00	14.2	100	dpm/Filter		BYS1	05/23/13	2043	1303590	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 28, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 153T Project: TPMC00504
Sample ID: 326162003 Client ID: TPMC005
Matrix: Swipe
Collect Date: 21-MAY-13 10:22
Receive Date: 22-MAY-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	-15.1	68.1	100	dpm/Filter		BYS1	05/23/13	2116	1303590	1

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 28, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 151AB Project: TPMC00504
Sample ID: 326162004 Client ID: TPMC005
Matrix: Swipe
Collect Date: 21-MAY-13 09:33
Receive Date: 22-MAY-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		5.44	0.429	0.500	dpm/Filter		JXR1	05/23/13	1317	1303535	1
Beta		8.82	1.14	2.00	dpm/Filter						

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: May 28, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 152AB Project: TPMC00504
Sample ID: 326162005 Client ID: TPMC005
Matrix: Swipe
Collect Date: 21-MAY-13 09:35
Receive Date: 22-MAY-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		4.59	0.455	0.500	dpm/Filter		JXR1	05/23/13	1317	1303535	1
Beta		7.07	1.13	2.00	dpm/Filter						

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 28, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 153AB Project: TPMC00504
Sample ID: 326162006 Client ID: TPMC005
Matrix: Swipe
Collect Date: 21-MAY-13 10:28
Receive Date: 22-MAY-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	0.159	0.477	0.500	dpm/Filter		JXR1	05/23/13	1317	1303535	1
Beta	U	0.134	0.965	2.00	dpm/Filter						

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 28, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 154AB Project: TPMC00504
Sample ID: 326162007 Client ID: TPMC005
Matrix: Swipe
Collect Date: 21-MAY-13 10:32
Receive Date: 22-MAY-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		0.439	0.390	0.500	dpm/Filter		JXR1	05/23/13	1343	1303535	1
Beta	U	0.682	0.802	2.00	dpm/Filter						

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 28, 2013

Company : TerranearPMC, LLC
Address : 222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania 19341
Contact: Daniel F. Caputo
Project: TerranearPMC, LLC (Project No. 46142)Sievers-Sandberg USARC (NJ013)

Client Sample ID: Sievers-Sandberg USARC 155AB Project: TPMC00504
Sample ID: 326162008 Client ID: TPMC005
Matrix: Swipe
Collect Date: 21-MAY-13 10:35
Receive Date: 22-MAY-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		0.650	0.493	0.500	dpm/Filter		JXR1	05/23/13	1316	1303535	1
Beta		1.93	0.991	2.00	dpm/Filter						

The following Analytical Methods were performed:

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

GEL LABORATORIES LLC

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

QC Summary

Report Date: May 28, 2013
Page 1 of 2

TerranearPMC, LLC
222 Valley Creek Blvd.
Suite 210
Exton, Pennsylvania

Contact: Daniel F. Caputo

Workorder: 326162

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	1303535										
QC1202880498	326162004	DUP									
Alpha		5.44		4.75	dpm/Filter	13.5		(0%-20%)	JXR1	05/23/13	15:03
Beta		8.82		8.71	dpm/Filter	1.24		(0%-20%)			
QC1202880497	MB										
Alpha			U	-0.0218	dpm/Filter					05/23/13	13:43
Beta			U	0.0221	dpm/Filter						
Rad Liquid Scintillation											
Batch	1303590										
QC1202880620	LCS										
Tritium	216			227	dpm/Filter		105	(75%-125%)	BYS1	05/23/13	21:49
QC1202880621	LCSD										
Tritium	216			180	dpm/Filter	23.4*	83	(0%-20%)		05/23/13	22:05
QC1202880619	MB										
Tritium			U	0.00	dpm/Filter					05/23/13	21:32

Notes:

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- 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 REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.

GEL LABORATORIES LLC

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QC Summary

Workorder: 326162

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
N1											
NI											
ND											
NJ											
Q											
R											
U											
UI											
UJ											
UL											
X											
Y											
^											
h											

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.

There are no "Data Exception Reports" associated with this analytical report.

206168

GEL Chain of Custody and Analytical Request

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

Page: 46 of 42
 Project #: 46142-08
 GEL Quote #: 1
 COC Number (1):
 PO Number:

GEL Work Order Number:

Client Name: **Tenneco PML**
 Phone #: **215 596-1092**

Project/Site Name: **Sivewright USARC (N-13)**

Address: **for these**

Collected by: **for these**

Send Results To: **for these**

Sample ID	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (1)	Field Filtered (2)	Sample Matrix (3)
Sivewright USARC 151T, 152T, 153T	5-21-13		N	NA	P
Sivewright USARC 151AB, 152AB, 153AB	5-21-13		N	NA	P
Sivewright USARC 154AB, 155AB	5-21-13		N	NA	P

* For composites - indicate start and stop date/time

Sample Analysis Requested (5) (Fill in the number of containers for each test)	Should this sample be considered:		Total number of containers	Comments Note: extra sample is required for sample specific QC
	Radioactive	TSCA Regulated		
			3	* refer to sample label for Time collected
			3	
			2	

Sample Collection Time Zone	Sample Analysis Requested (5) (Fill in the number of containers for each test)		
	Eastern	Central	Mountain
Eastern	3	3	2
Central			
Mountain			

TAT Requested: Normal: **7** Rush: Specify: (Subject to Surchage) Fax Results: Yes / 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 spiking conditions

Chain of Custody Signatures		
Relinquished By (Signed)	Date	Time
for these	5-21-13	1:35 PM
P. Kent	5-22-13	09:35

GEL PM: **Henden Staffer**
 Method of Shipment: **Express** Date Shipped: **5-21-13**
 Airbill #: **8005 4737 9451**
 Airbill #:

Sample Shipping and Delivery Details	
For Lab Receiving Use Only	
Custody Seal Intact?	YES NO
Coolest Temp:	19 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, SI=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

Client: TPMC		SDG/AR/COC/Work Order: 326162
Received By: P. Went		Date Received: 052213
Suspected Hazard Information	Yes	No
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>

*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

Maximum Net Counts Observed* (Observed Counts - Area Background Counts): **0 CPM**

If yes, Were swipes taken of sample containers < action levels?

If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.

Hazard Class Shipped: UN#:

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe) 19c
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* PA	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice <u>None</u> Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): 61524649
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?			<input checked="" type="checkbox"/>	Sample ID's affected: NO TIME ON CHAIN
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?		<input checked="" type="checkbox"/>		CLIENTS
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: FedEx Air <u> </u> FedEx Ground UPS Field Services Courier Other 8005 4737 9451

Comments (Use Continuation Form if needed):



Client: TPMC Received By: P. Dent Date Received: 5-22-13 SDG/AR/COC/Work Order: 326162

ID	DATE	TIME
151 A.B	5-21-13	09:33
152 "	5-21-13	09:35
153 "	5-21-13	10:28
154 "	5-21-13	10:32
155 ^	5-21-13	10:35
151 T	5-21-13	09:33
152 T	5-21-13	09:35
153 T	5-21-13	10:22

PM (or PMA) review: Initials HA Date 052313 Page 2 of 1

List of current GEL Certifications as of 28 May 2013

State	Certification
Alaska	UST-110
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	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790