



RTI Laboratories, Inc.

Client Ref.: Fort Monmonth 1207075

Pace-Pittsburgh Project No. 3072155

Pace Analysis Services, Inc.-Pittsburgh

1638 Roseytown Road

Suites 2, 3, & 4

Greensburg, PA 15601

Phone Number: 724-850-5600 Fax Number: 724-850-5601

Table of Contents 3072155

| Page Number | Section |
|--------------------|--|
| 1 | Pace Analysis Services, Inc Report Cover Page |
| 3 | Project Narrative |
| 5 | Analysis Results |
| 33 | Qualifier Flags |
| 34 | Chain of Custody |
| 40 | Sample Receipt Form |
| 42 | Low Energy Beta Data Analysis - 1 |
| 86 | Low Energy Beta Data Analysis - 2 |
| 117 | Low Energy Beta Data Analysis - 3 |
| 155 | Low Energy Beta Data Analysis - 4 |
| 194 | Low Energy Beta Data Analysis - 5 |
| 236 | Low Energy Beta Data Calibration Documentation |
| 249 | Standards |

Case Narrative for Pace Analytical Job Number 3072155

8/1/2012

Eight Hundred and twenty three (823) low-energy beta contamination swipe samples were received in good condition at Pace Analytical on 06/25/12. One hundred (100) of the samples received were logged for radiochemical analyses under Pace Analytical Project number 3072155 with corresponding samples IDs of 3072155001 through 3072155100. This project narrative is for the analysis of all samples for Low-Energy-Beta (LEB) content by Liquid Scintillation Counting (LSC).

Samples were analyzed as specified in the generic Scope of Work (SOW) for Analytical Chemistry Laboratory Services for Environmental Samples USACE, Baltimore District.

All work was performed under the Purchase Order (PO) agreement number 12E-183 by and between Pace Analytical Services, Inc. and RTI Laboratories, Inc.

Low-Energy-Beta (LEB) analysis by Liquid Scintillation Counting (LSC)

The SOW for this project specified that the samples were to be analyzed utilizing detector window settings sufficient to include contributions from H-3, Ni-63, and C-14. Of these radionuclides, H-3 is the weakest beta emitter and C-14 is the strongest beta emitter, with Ni-63 having the most moderate beta energy of the three listed radionuclides. The system employed for sample counting has a higher response (efficiency) with higher beta particle energies. For this project, Pace calibrated all instruments utilized using NIST-traceable quantities of Ni-63, the most moderate beta-emitter listed by the client. Instrument window settings were chosen so as to measure contributions from all of the listed radionuclides of interest for the client.

The samples received were individual LEB smear samples that were collected by the client and placed into glass scintillation vials containing 5.0 mL of ASTM Type II water. The sample vials containing water and the filter swipes were provide to the client by Pace in order to maintain product consistency between samples, laboratory calibration sources, and laboratory blanks and spikes.

To each sample, as received, Pace added 15 mL of Ultima Gold LLT (Low-Level-Tritium) cocktail and individual samples were shaken until the filter swipes dissolved and a uniform sample/cocktail mixture was obtained. The prepared samples were counted on a LSC which was calibrated with NIST-traceable quantities of Ni-63. Samples were counted for a duration sufficient to achieve the project-specified detection limit of 10 dpm/filter for an energy window setting of 1 – 160 keV.

Batch quality control analyses performed for each set of 20 samples consisted of one batch method blank (MB), one Laboratory Control Sample (LCS), and one LCS Duplicate (LCSD). The LCS and LCSD samples used were “static” sources that were prepared by Pace prior to the onset of analyses and consisted of a blank filter of the same lot as those used for sample analysis directly spiked with a quantity of Ni-63.

Case Narrative for Pace Analytical Job Number 3072155

Following analysis of many samples, it was discovered that incorrect LCS and LCSD sources were counted with sample batches. In the attached data package, any logbook or instrument printouts with recordings of LCSs and LCSDs without an accompanying five digit batch ID should be considered to be extraneous information that does not relate to this project.

Upon discovery of the issue related to counting of incorrect LCSs and LCSDs, the laboratory counted the required spike samples and all QC information has been provided.

Numerous samples and QC samples exhibited “quenching” with a corresponding instrument quench value (TSIE) that was outside of the range of the calibration curve generated. Quenching is the effect of unknown sample components which when combined with liquid scintillation cocktails may cause a suppression of the light measured by the liquid scintillation counter. For liquid scintillation analysis, compensation for quenching is made by preparing a calibration curve that relates the instrument quench values (TSIEs) to the instrument response (efficiency).

For all samples in this project with noted TSIE values outside of the calibration range, the observed sample quench was **less** than the least-quenched source utilized for calibration. The resulting calibration curves for this project were second order polynomials that showed extremely good correlation between TSIEs and system efficiency. For this reason, the calibration curves were extrapolated to determine the sample-specific efficiency for all samples, including those outside of the calibration range. It is estimated that curve extrapolation could not contribute greater than 1% difference in the results provided.


No further anomalous events were noted during the preparation or analysis of the samples for Low-Energy-Beta by Liquid Scintillation Counting. Unless indicated otherwise, all data quality objectives and quality control acceptance criteria were satisfied.

General Comments

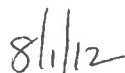
Please note that analytical results, as well as the CSU (Combined Standard Uncertainty – a.k.a. TPU) are reported at the 1.96 sigma level for all sample analyses.

No further anomalous events were noted during the preparation or analysis of the samples referenced in this project narrative.

Unless noted otherwise, all data quality objectives and quality control acceptance criteria were satisfied.



Radiochemistry Manager or Designate



Date

July 31, 2012

Mr. Chino Ortiz
RTI Laboratories, Inc.
31628 Glendale Street
Livonia, MI 48150


RE: Project: Fort Monmouth 1207075
Pace Project No.: 3072155

Dear Mr. Ortiz:

Enclosed are the analytical results for sample(s) received by the laboratory on June 25, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carin Ferris

carin.ferris@pacelabs.com
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

CERTIFICATIONS

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4 Greensburg, PA 15601
ACCLASS DOD-ELAP Accreditation #: ADE-1544
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California/TNI Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH 0694
Delaware Certification
Florida/TNI Certification #: E87683
Guam/PADEP Certification
Hawaii/PADEP Certification
Idaho Certification
Illinois/PADEP Certification
Indiana/PADEP Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana/TNI Certification #: LA080002
Louisiana/TNI Certification #: 4086
Maine Certification #: PA0091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification
Missouri Certification #: 235
Montana Certification #: Cert 0082
Nevada Certification
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188
Utah/TNI Certification #: ANTE
Virgin Island/PADEP Certification
Virginia Certification #: 00112
Virginia VELAP (Cert # 460198)
Washington Certification #: C868
West Virginia Certification #: 143
Wisconsin/PADEP Certification
Wyoming Certification #: 8TMS-Q

REPORT OF LABORATORY ANALYSIS

Page 2 of 29

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

SAMPLE SUMMARY

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|------------|-----------|--------|----------------|----------------|
| 3072155001 | SU-15-1 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155002 | SU-15-2 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155003 | SU-15-3 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155004 | SU-15-3D | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155005 | SU-15-4 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155006 | SU-15-5 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155007 | SU-15-6 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155008 | SU-15-7 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155009 | SU-15-8 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155010 | SU-15-9 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155011 | SU-15-10 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155012 | SU-15-11 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155013 | SU-15-12 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155014 | SU-15-13 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155015 | SU-15-14 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155016 | SU-15-15 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155017 | SU-15-16 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155018 | SU-15-17 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155019 | SU-15-18 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155020 | SU-15-19 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155021 | SU-15-20 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155022 | SU-15-21 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155023 | SU-15-22 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155024 | SU-15-23 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155025 | SU-15-24 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155026 | SU-15-25 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155027 | SU-15-26 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155028 | SU-15-27 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155029 | SU-15-28 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155030 | SU-15-29 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155031 | SU-15-30 | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155032 | SU-15-30D | Wipe | 06/20/12 00:01 | 06/25/12 10:15 |
| 3072155033 | SU-06-1 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155034 | SU-06-2 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155035 | SU-06-2D | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155036 | SU-06-3 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155037 | SU-06-4 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |

REPORT OF LABORATORY ANALYSIS

Page 3 of 29

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

SAMPLE SUMMARY

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|------------|-----------|--------|----------------|----------------|
| 3072155038 | SU-06-5 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155039 | SU-06-6 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155040 | SU-06-7 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155041 | SU-06-8 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155042 | SU-06-9 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155043 | SU-06-9D | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155044 | SU-06-10 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155045 | SU-06-11 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155046 | SU-06-12 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155047 | SU-06-13 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155048 | SU-06-14 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155049 | SU-06-15 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155050 | SU-06-16 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155051 | SU-06-17 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155052 | SU-06-18 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155053 | SU-06-19 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155054 | SU-06-20 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155055 | SU-06-20D | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155056 | SU-06-21 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155057 | SU-06-22 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155058 | SU-06-23 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155059 | SU-06-24 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155060 | SU-06-25 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155061 | SU-06-26 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155062 | SU-06-27 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155063 | SU-06-28 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155064 | SU-06-29 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155065 | SU-06-30 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155066 | SU-06-31 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155067 | SU-06-32 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155068 | SU-07-1 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155069 | SU-07-2 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155070 | SU-07-3 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155071 | SU-07-4 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155072 | SU-07-5 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155073 | SU-07-6 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155074 | SU-07-7 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |

REPORT OF LABORATORY ANALYSIS

Page 4 of 29

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

SAMPLE SUMMARY

Project: Fort Monmonth 1207075

Pace Project No.: 3072155

| Lab ID | Sample ID | Matrix | Date Collected | Date Received |
|------------|-----------|--------|----------------|----------------|
| 3072155075 | SU-07-8 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155076 | SU-07-9 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155077 | SU-07-10 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155078 | SU-07-11 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155079 | SU-07-12 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155080 | SU-07-13 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155081 | SU-07-14 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155082 | SU-07-15 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155083 | SU-07-16 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155084 | SU-07-17 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155085 | SU-07-18 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155086 | SU-07-19 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155087 | SU-07-20 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155088 | SU-07-21 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155089 | SU-07-22 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155090 | SU-07-23 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155091 | SU-07-23D | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155092 | SU-07-24 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155093 | SU-07-25 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155094 | SU-07-26 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155095 | SU-07-27 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155096 | SU-07-28 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155097 | SU-07-29 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155098 | SU-07-30 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155099 | SU-07-31 | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |
| 3072155100 | SU-07-31D | Wipe | 06/11/12 00:01 | 06/25/12 10:15 |

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|------------|-----------|------------|----------|-------------------|------------|
| 3072155001 | SU-15-1 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155002 | SU-15-2 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155003 | SU-15-3 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155004 | SU-15-3D | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155005 | SU-15-4 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155006 | SU-15-5 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155007 | SU-15-6 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155008 | SU-15-7 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155009 | SU-15-8 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155010 | SU-15-9 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155011 | SU-15-10 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155012 | SU-15-11 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155013 | SU-15-12 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155014 | SU-15-13 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155015 | SU-15-14 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155016 | SU-15-15 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155017 | SU-15-16 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155018 | SU-15-17 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155019 | SU-15-18 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155020 | SU-15-19 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155021 | SU-15-20 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155022 | SU-15-21 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155023 | SU-15-22 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155024 | SU-15-23 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155025 | SU-15-24 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155026 | SU-15-25 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155027 | SU-15-26 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155028 | SU-15-27 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155029 | SU-15-28 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155030 | SU-15-29 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155031 | SU-15-30 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155032 | SU-15-30D | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155033 | SU-06-1 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155034 | SU-06-2 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155035 | SU-06-2D | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155036 | SU-06-3 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155037 | SU-06-4 | EPA 906.0M | RMK | 1 | PASI-PA |

REPORT OF LABORATORY ANALYSIS

Page 6 of 29

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|------------|-----------|------------|----------|-------------------|------------|
| 3072155038 | SU-06-5 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155039 | SU-06-6 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155040 | SU-06-7 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155041 | SU-06-8 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155042 | SU-06-9 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155043 | SU-06-9D | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155044 | SU-06-10 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155045 | SU-06-11 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155046 | SU-06-12 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155047 | SU-06-13 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155048 | SU-06-14 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155049 | SU-06-15 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155050 | SU-06-16 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155051 | SU-06-17 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155052 | SU-06-18 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155053 | SU-06-19 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155054 | SU-06-20 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155055 | SU-06-20D | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155056 | SU-06-21 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155057 | SU-06-22 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155058 | SU-06-23 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155059 | SU-06-24 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155060 | SU-06-25 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155061 | SU-06-26 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155062 | SU-06-27 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155063 | SU-06-28 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155064 | SU-06-29 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155065 | SU-06-30 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155066 | SU-06-31 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155067 | SU-06-32 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155068 | SU-07-1 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155069 | SU-07-2 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155070 | SU-07-3 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155071 | SU-07-4 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155072 | SU-07-5 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155073 | SU-07-6 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155074 | SU-07-7 | EPA 906.0M | RMK | 1 | PASI-PA |

REPORT OF LABORATORY ANALYSIS

Page 7 of 29

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Lab ID | Sample ID | Method | Analysts | Analytes Reported | Laboratory |
|------------|-----------|------------|----------|-------------------|------------|
| 3072155075 | SU-07-8 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155076 | SU-07-9 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155077 | SU-07-10 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155078 | SU-07-11 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155079 | SU-07-12 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155080 | SU-07-13 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155081 | SU-07-14 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155082 | SU-07-15 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155083 | SU-07-16 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155084 | SU-07-17 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155085 | SU-07-18 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155086 | SU-07-19 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155087 | SU-07-20 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155088 | SU-07-21 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155089 | SU-07-22 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155090 | SU-07-23 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155091 | SU-07-23D | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155092 | SU-07-24 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155093 | SU-07-25 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155094 | SU-07-26 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155095 | SU-07-27 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155096 | SU-07-28 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155097 | SU-07-29 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155098 | SU-07-30 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155099 | SU-07-31 | EPA 906.0M | RMK | 1 | PASI-PA |
| 3072155100 | SU-07-31D | EPA 906.0M | RMK | 1 | PASI-PA |

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-15-1 | | Lab ID: 3072155001 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.54J ± 2.96 (5.42) | dpm/sample | 07/17/12 00:23 | | |

| Sample: SU-15-2 | | Lab ID: 3072155002 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.99J ± 3.05 (5.51) | dpm/sample | 07/17/12 00:39 | | |

| Sample: SU-15-3 | | Lab ID: 3072155003 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 6.24 ± 3.24 (5.41) | dpm/sample | 07/17/12 00:55 | | |

| Sample: SU-15-3D | | Lab ID: 3072155004 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.39J ± 2.93 (5.39) | dpm/sample | 07/17/12 01:11 | | |

| Sample: SU-15-4 | | Lab ID: 3072155005 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 2.37J ± 2.84 (5.41) | dpm/sample | 07/17/12 01:27 | | |

| Sample: SU-15-5 | | Lab ID: 3072155006 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.39J ± 2.94 (5.40) | dpm/sample | 07/17/12 01:44 | | |

| Sample: SU-15-6 | | Lab ID: 3072155007 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 2.40J ± 2.87 (5.46) | dpm/sample | 07/17/12 02:00 | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-15-7 | | Lab ID: 3072155008 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.92U ± 2.89 (5.60) | dpm/sample | 07/17/12 02:16 | | | |

| Sample: SU-15-8 | | Lab ID: 3072155009 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|-----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | -1.77U ± 4.11 (10.0) | dpm/sample | 07/30/12 13:02 | | | |

| Sample: SU-15-9 | | Lab ID: 3072155010 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.18J ± 3.03 (5.43) | dpm/sample | 07/17/12 02:32 | | | |

| Sample: SU-15-10 | | Lab ID: 3072155011 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.02J ± 2.91 (5.42) | dpm/sample | 07/17/12 02:48 | | | |

| Sample: SU-15-11 | | Lab ID: 3072155012 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 2.62J ± 2.86 (5.40) | dpm/sample | 07/17/12 03:04 | | | |

| Sample: SU-15-12 | | Lab ID: 3072155013 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.31J ± 2.96 (5.47) | dpm/sample | 07/17/12 03:20 | | | |

| Sample: SU-15-13 | | Lab ID: 3072155014 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.68J ± 3.07 (5.40) | dpm/sample | 07/17/12 03:37 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-15-14 | | Lab ID: 3072155015 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.91J ± 2.99 (5.39) | dpm/sample | 07/18/12 12:18 | | | |

| Sample: SU-15-15 | | Lab ID: 3072155016 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.32U ± 4.41 (9.81) | dpm/sample | 07/30/12 13:10 | | | |

| Sample: SU-15-16 | | Lab ID: 3072155017 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.01J ± 2.90 (5.41) | dpm/sample | 07/17/12 03:53 | | | |

| Sample: SU-15-17 | | Lab ID: 3072155018 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 2.50J ± 2.85 (5.39) | dpm/sample | 07/17/12 04:09 | | | |

| Sample: SU-15-18 | | Lab ID: 3072155019 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.44 ± 3.14 (5.39) | dpm/sample | 07/17/12 04:25 | | | |

| Sample: SU-15-19 | | Lab ID: 3072155020 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.47 ± 3.16 (5.42) | dpm/sample | 07/18/12 12:29 | | | |

| Sample: SU-15-20 | | Lab ID: 3072155021 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.85 ± 3.20 (5.41) | dpm/sample | 07/17/12 04:41 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-15-21 | | Lab ID: 3072155022 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 2.62J ± 2.86 (5.39) | dpm/sample | 07/17/12 04:57 | | | |

| Sample: SU-15-22 | | Lab ID: 3072155023 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.61 ± 3.27 (5.40) | dpm/sample | 07/17/12 05:13 | | | |

| Sample: SU-15-23 | | Lab ID: 3072155024 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.74U ± 2.78 (5.40) | dpm/sample | 07/17/12 05:29 | | | |

| Sample: SU-15-24 | | Lab ID: 3072155025 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.16J ± 3.02 (5.40) | dpm/sample | 07/17/12 06:33 | | | |

| Sample: SU-15-25 | | Lab ID: 3072155026 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 2.24J ± 2.83 (5.41) | dpm/sample | 07/17/12 06:49 | | | |

| Sample: SU-15-26 | | Lab ID: 3072155027 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.91J ± 2.99 (5.40) | dpm/sample | 07/17/12 07:05 | | | |

| Sample: SU-15-27 | | Lab ID: 3072155028 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.86U ± 2.81 (5.44) | dpm/sample | 07/17/12 07:21 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-15-28 | | Lab ID: 3072155029 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.14 ± 3.24 (5.45) | dpm/sample | 07/17/12 07:37 | | | |

| Sample: SU-15-29 | | Lab ID: 3072155030 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.60U ± 2.76 (5.40) | dpm/sample | 07/17/12 07:53 | | | |

| Sample: SU-15-30 | | Lab ID: 3072155031 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.14J ± 2.91 (5.40) | dpm/sample | 07/17/12 08:10 | | | |

| Sample: SU-15-30D | | Lab ID: 3072155032 | Collected: 06/20/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|--------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.73U ± 2.78 (5.40) | dpm/sample | 07/17/12 08:26 | | | |

| Sample: SU-06-1 | | Lab ID: 3072155033 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.85U ± 2.79 (5.40) | dpm/sample | 07/17/12 08:42 | | | |

| Sample: SU-06-2 | | Lab ID: 3072155034 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.36 ± 3.24 (5.40) | dpm/sample | 07/17/12 08:58 | | | |

| Sample: SU-06-2D | | Lab ID: 3072155035 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.78J ± 2.98 (5.40) | dpm/sample | 07/17/12 09:14 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-06-3 | | Lab ID: 3072155036 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.53J ± 2.95 (5.40) | dpm/sample | 07/17/12 09:30 | | |

| Sample: SU-06-4 | | Lab ID: 3072155037 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 4.05J ± 3.01 (5.40) | dpm/sample | 07/17/12 09:46 | | |

| Sample: SU-06-5 | | Lab ID: 3072155038 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 4.55J ± 3.06 (5.41) | dpm/sample | 07/17/12 10:02 | | |

| Sample: SU-06-6 | | Lab ID: 3072155039 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 4.31J ± 3.04 (5.42) | dpm/sample | 07/17/12 10:18 | | |

| Sample: SU-06-7 | | Lab ID: 3072155040 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|-----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 0.578U ± 2.66 (5.40) | dpm/sample | 07/17/12 10:34 | | |

| Sample: SU-06-8 | | Lab ID: 3072155041 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.00J ± 3.38 (6.71) | dpm/sample | 07/17/12 10:51 | | |

| Sample: SU-06-9 | | Lab ID: 3072155042 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.12J ± 3.51 (6.97) | dpm/sample | 07/17/12 11:07 | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-06-9D | | Lab ID: 3072155043 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 2.00U ± 3.27 (6.75) | dpm/sample | 07/17/12 11:23 | | |

| Sample: SU-06-10 | | Lab ID: 3072155044 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 5.90J ± 3.84 (6.94) | dpm/sample | 07/17/12 11:39 | | |

| Sample: SU-06-11 | | Lab ID: 3072155045 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 4.82J ± 3.69 (6.91) | dpm/sample | 07/17/12 21:49 | | |

| Sample: SU-06-12 | | Lab ID: 3072155046 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 6.41J ± 3.79 (6.71) | dpm/sample | 07/17/12 14:16 | | |

| Sample: SU-06-13 | | Lab ID: 3072155047 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 5.60J ± 3.78 (6.89) | dpm/sample | 07/17/12 14:27 | | |

| Sample: SU-06-14 | | Lab ID: 3072155048 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.72J ± 3.47 (6.71) | dpm/sample | 07/17/12 14:38 | | |

| Sample: SU-06-15 | | Lab ID: 3072155049 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 1.41U ± 3.18 (6.71) | dpm/sample | 07/17/12 14:49 | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-06-16 | | Lab ID: 3072155050 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|---------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 7.00 ± 3.87 (6.71) | dpm/sample | 07/17/12 15:00 | | | |

| Sample: SU-06-17 | | Lab ID: 3072155051 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.63J ± 3.83 (6.73) | dpm/sample | 07/17/12 15:11 | | | |

| Sample: SU-06-18 | | Lab ID: 3072155052 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.63J ± 3.83 (6.74) | dpm/sample | 07/17/12 15:22 | | | |

| Sample: SU-06-19 | | Lab ID: 3072155053 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.60U ± 3.22 (6.73) | dpm/sample | 07/17/12 15:33 | | | |

| Sample: SU-06-20 | | Lab ID: 3072155054 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.46J ± 3.82 (6.75) | dpm/sample | 07/17/12 15:44 | | | |

| Sample: SU-06-20D | | Lab ID: 3072155055 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|--------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.45J ± 3.68 (6.71) | dpm/sample | 07/17/12 15:56 | | | |

| Sample: SU-06-21 | | Lab ID: 3072155056 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 2.57J ± 3.34 (6.73) | dpm/sample | 07/17/12 16:07 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-06-22 | | Lab ID: 3072155057 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.15J ± 3.40 (6.73) | dpm/sample | 07/17/12 16:18 | | | |

| Sample: SU-06-23 | | Lab ID: 3072155058 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.89J ± 3.62 (6.74) | dpm/sample | 07/17/12 16:29 | | | |

| Sample: SU-06-24 | | Lab ID: 3072155059 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.23J ± 3.78 (6.72) | dpm/sample | 07/17/12 16:40 | | | |

| Sample: SU-06-25 | | Lab ID: 3072155060 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.36J ± 3.44 (6.75) | dpm/sample | 07/18/12 12:40 | | | |

| Sample: SU-06-26 | | Lab ID: 3072155061 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.57J ± 3.48 (6.79) | dpm/sample | 07/17/12 16:51 | | | |

| Sample: SU-06-27 | | Lab ID: 3072155062 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|------------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | -0.135U ± 2.99 (6.71) | dpm/sample | 07/17/12 17:02 | | | |

| Sample: SU-06-28 | | Lab ID: 3072155063 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.72J ± 3.47 (6.71) | dpm/sample | 07/17/12 17:13 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-06-29 | | Lab ID: 3072155064 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.23J ± 3.49 (6.89) | dpm/sample | 07/17/12 17:24 | | |

| Sample: SU-06-30 | | Lab ID: 3072155065 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.92J ± 3.50 (6.72) | dpm/sample | 07/17/12 17:35 | | |

| Sample: SU-06-31 | | Lab ID: 3072155066 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 3.72J ± 3.47 (6.71) | dpm/sample | 07/18/12 12:51 | | |

| Sample: SU-06-32 | | Lab ID: 3072155067 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 4.01J ± 3.57 (6.87) | dpm/sample | 07/17/12 18:08 | | |

| Sample: SU-07-1 | | Lab ID: 3072155068 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 4.97J ± 3.68 (6.85) | dpm/sample | 07/17/12 18:19 | | |

| Sample: SU-07-2 | | Lab ID: 3072155069 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 5.26J ± 3.65 (6.71) | dpm/sample | 07/17/12 18:30 | | |

| Sample: SU-07-3 | | Lab ID: 3072155070 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 5.94J ± 3.79 (6.82) | dpm/sample | 07/17/12 18:41 | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

| Sample: SU-07-4 | | Lab ID: 3072155071 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.36J ± 3.59 (6.81) | dpm/sample | 07/17/12 18:53 | | | |

| Sample: SU-07-5 | | Lab ID: 3072155072 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.14J ± 3.40 (6.72) | dpm/sample | 07/17/12 19:04 | | | |

| Sample: SU-07-6 | | Lab ID: 3072155073 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.49J ± 3.56 (6.71) | dpm/sample | 07/17/12 19:15 | | | |

| Sample: SU-07-7 | | Lab ID: 3072155074 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.91J ± 3.49 (6.71) | dpm/sample | 07/17/12 19:26 | | | |

| Sample: SU-07-8 | | Lab ID: 3072155075 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.22J ± 3.77 (6.71) | dpm/sample | 07/17/12 19:37 | | | |

| Sample: SU-07-9 | | Lab ID: 3072155076 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.48J ± 3.70 (6.75) | dpm/sample | 07/17/12 19:48 | | | |

| Sample: SU-07-10 | | Lab ID: 3072155077 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.73J ± 3.47 (6.73) | dpm/sample | 07/17/12 19:59 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

| Sample: SU-07-11 | | Lab ID: 3072155078 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.88J ± 3.61 (6.71) | dpm/sample | 07/17/12 20:10 | | | |

| Sample: SU-07-12 | | Lab ID: 3072155079 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.72J ± 3.47 (6.71) | dpm/sample | 07/17/12 20:21 | | | |

| Sample: SU-07-13 | | Lab ID: 3072155080 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 2.07U ± 3.39 (6.98) | dpm/sample | 07/17/12 20:32 | | | |

| Sample: SU-07-14 | | Lab ID: 3072155081 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.88J ± 3.61 (6.72) | dpm/sample | 07/17/12 20:43 | | | |

| Sample: SU-07-15 | | Lab ID: 3072155082 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 2.96J ± 3.39 (6.74) | dpm/sample | 07/17/12 20:54 | | | |

| Sample: SU-07-16 | | Lab ID: 3072155083 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.47J ± 3.56 (6.98) | dpm/sample | 07/17/12 21:05 | | | |

| Sample: SU-07-17 | | Lab ID: 3072155084 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.35J ± 3.85 (6.84) | dpm/sample | 07/17/12 21:16 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

| Sample: SU-07-18 | | Lab ID: 3072155085 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.88J ± 3.61 (6.71) | dpm/sample | 07/17/12 21:27 | | | |

| Sample: SU-07-19 | | Lab ID: 3072155086 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.16J ± 3.42 (6.75) | dpm/sample | 07/18/12 13:02 | | | |

| Sample: SU-07-20 | | Lab ID: 3072155087 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.20J ± 3.86 (6.90) | dpm/sample | 07/17/12 21:38 | | | |

| Sample: SU-07-21 | | Lab ID: 3072155088 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.43J ± 3.80 (6.72) | dpm/sample | 07/17/12 23:56 | | | |

| Sample: SU-07-22 | | Lab ID: 3072155089 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 1.22U ± 3.18 (6.75) | dpm/sample | 07/18/12 00:07 | | | |

| Sample: SU-07-23 | | Lab ID: 3072155090 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.52J ± 3.72 (6.79) | dpm/sample | 07/18/12 00:18 | | | |

| Sample: SU-07-23D | | Lab ID: 3072155091 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|--------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.49J ± 3.70 (7.01) | dpm/sample | 07/18/12 00:29 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

| Sample: SU-07-24 | | Lab ID: 3072155092 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.11J ± 3.52 (6.71) | dpm/sample | 07/18/12 00:40 | | | |

| Sample: SU-07-25 | | Lab ID: 3072155093 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.46J ± 3.68 (6.72) | dpm/sample | 07/18/12 00:51 | | | |

| Sample: SU-07-26 | | Lab ID: 3072155094 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 3.72J ± 3.47 (6.71) | dpm/sample | 07/18/12 13:13 | | | |

| Sample: SU-07-27 | | Lab ID: 3072155095 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.68J ± 3.59 (6.71) | dpm/sample | 07/18/12 01:02 | | | |

| Sample: SU-07-28 | | Lab ID: 3072155096 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 5.46J ± 3.68 (6.72) | dpm/sample | 07/18/12 01:13 | | | |

| Sample: SU-07-29 | | Lab ID: 3072155097 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 6.24J ± 3.78 (6.72) | dpm/sample | 07/18/12 01:24 | | | |

| Sample: SU-07-30 | | Lab ID: 3072155098 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | | |
|-------------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|--|
| PWS: | | Site ID: | Sample Type: | | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual | |
| LSC Low Energy Beta | EPA 906.0M | 4.12J ± 3.53 (6.73) | dpm/sample | 07/18/12 01:35 | | | |

ANALYTICAL RESULTS

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

| Sample: SU-07-31 | | Lab ID: 3072155099 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 4.10J ± 3.51 (6.71) | dpm/sample | 07/18/12 01:46 | | |

| Sample: SU-07-31D | | Lab ID: 3072155100 | Collected: 06/11/12 00:01 | Received: 06/25/12 10:15 | Matrix: Wipe | |
|---------------------|------------|----------------------------|---------------------------|--------------------------|--------------|------|
| PWS: | | Site ID: | Sample Type: | | | |
| Parameters | Method | Act ± Unc (MDC) | Units | Analyzed | CAS No. | Qual |
| LSC Low Energy Beta | EPA 906.0M | 5.02J ± 3.72 (6.92) | dpm/sample | 07/18/12 13:24 | | |

QUALITY CONTROL DATA

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

QC Batch: RADC/12476 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072155001, 3072155002, 3072155003, 3072155004, 3072155005, 3072155006, 3072155007, 3072155008,
3072155009, 3072155010, 3072155011, 3072155012, 3072155013, 3072155014, 3072155015, 3072155016,
3072155017, 3072155018, 3072155019, 3072155020

METHOD BLANK: 459058 Matrix: Impact Plate
Associated Lab Samples: 3072155001, 3072155002, 3072155003, 3072155004, 3072155005, 3072155006, 3072155007, 3072155008,
3072155009, 3072155010, 3072155011, 3072155012, 3072155013, 3072155014, 3072155015, 3072155016,
3072155017, 3072155018, 3072155019, 3072155020

| Parameter | Act ± Unc (MDC) | Units | Analyzed | Qualifiers |
|---------------------|---------------------|------------|----------------|------------|
| LSC Low Energy Beta | 4.71J ± 3.17 (5.59) | dpm/sample | 07/17/12 00:07 | |

QUALITY CONTROL DATA

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

QC Batch: RADC/12477 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072155021, 3072155022, 3072155023, 3072155024, 3072155025, 3072155026, 3072155027, 3072155028, 3072155029, 3072155030, 3072155031, 3072155032, 3072155033, 3072155034, 3072155035, 3072155036, 3072155037, 3072155038, 3072155039, 3072155040

METHOD BLANK: 459061 Matrix: Impact Plate
Associated Lab Samples: 3072155021, 3072155022, 3072155023, 3072155024, 3072155025, 3072155026, 3072155027, 3072155028, 3072155029, 3072155030, 3072155031, 3072155032, 3072155033, 3072155034, 3072155035, 3072155036, 3072155037, 3072155038, 3072155039, 3072155040

| Parameter | Act ± Unc (MDC) | Units | Analyzed | Qualifiers |
|---------------------|---------------------|------------|----------------|------------|
| LSC Low Energy Beta | 3.97J ± 3.13 (5.68) | dpm/sample | 07/17/12 06:17 | |

QUALITY CONTROL DATA

Project: Fort Monmouth 1207075
Pace Project No.: 3072155

| | | | |
|-------------------------|--|-----------------------|---------------------------|
| QC Batch: | RADC/12478 | Analysis Method: | EPA 906.0M |
| QC Batch Method: | EPA 906.0M | Analysis Description: | 906.0 LSC Low Energy Beta |
| Associated Lab Samples: | 3072155041, 3072155042, 3072155043, 3072155044, 3072155045, 3072155046, 3072155047, 3072155048, 3072155049, 3072155050, 3072155051, 3072155052, 3072155053, 3072155054, 3072155055, 3072155056, 3072155057, 3072155058, 3072155059, 3072155060 | | |

| | | | |
|-------------------------|--|---------|--------------|
| METHOD BLANK: | 459062 | Matrix: | Impact Plate |
| Associated Lab Samples: | 3072155041, 3072155042, 3072155043, 3072155044, 3072155045, 3072155046, 3072155047, 3072155048, 3072155049, 3072155050, 3072155051, 3072155052, 3072155053, 3072155054, 3072155055, 3072155056, 3072155057, 3072155058, 3072155059, 3072155060 | | |

| Parameter | Act ± Unc (MDC) | Units | Analyzed | Qualifiers |
|---------------------|---------------------|------------|----------------|------------|
| LSC Low Energy Beta | 1.46U ± 3.31 (6.98) | dpm/sample | 07/17/12 22:34 | |

QUALITY CONTROL DATA

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

QC Batch: RADC/12479

Analysis Method: EPA 906.0M

QC Batch Method: EPA 906.0M

Analysis Description: 906.0 LSC Low Energy Beta

Associated Lab Samples: 3072155061, 3072155062, 3072155063, 3072155064, 3072155065, 3072155066, 3072155067, 3072155068, 3072155069, 3072155070, 3072155071, 3072155072, 3072155073, 3072155074, 3072155075, 3072155076, 3072155077, 3072155078, 3072155079, 3072155080

METHOD BLANK: 459064

Matrix: Impact Plate

Associated Lab Samples: 3072155061, 3072155062, 3072155063, 3072155064, 3072155065, 3072155066, 3072155067, 3072155068, 3072155069, 3072155070, 3072155071, 3072155072, 3072155073, 3072155074, 3072155075, 3072155076, 3072155077, 3072155078, 3072155079, 3072155080

| Parameter | Act ± Unc (MDC) | Units | Analyzed | Qualifiers |
|---------------------|---------------------|------------|----------------|------------|
| LSC Low Energy Beta | 6.68J ± 3.95 (6.99) | dpm/sample | 07/18/12 02:20 | |

QUALITY CONTROL DATA

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

QC Batch: RADC/12480

Analysis Method: EPA 906.0M

QC Batch Method: EPA 906.0M

Analysis Description: 906.0 LSC Low Energy Beta

Associated Lab Samples: 3072155081, 3072155082, 3072155083, 3072155084, 3072155085, 3072155086, 3072155087, 3072155088, 3072155089, 3072155090, 3072155091, 3072155092, 3072155093, 3072155094, 3072155095, 3072155096, 3072155097, 3072155098, 3072155099, 3072155100

METHOD BLANK: 459065

Matrix: Impact Plate

Associated Lab Samples: 3072155081, 3072155082, 3072155083, 3072155084, 3072155085, 3072155086, 3072155087, 3072155088, 3072155089, 3072155090, 3072155091, 3072155092, 3072155093, 3072155094, 3072155095, 3072155096, 3072155097, 3072155098, 3072155099, 3072155100

| Parameter | Act ± Unc (MDC) | Units | Analyzed | Qualifiers |
|---------------------|---------------------|------------|----------------|------------|
| LSC Low Energy Beta | 4.60J ± 3.60 (6.76) | dpm/sample | 07/30/12 13:34 | |

QUALIFIERS

Project: Fort Monmouth 1207075

Pace Project No.: 3072155

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

Project Number: 3072155

**Chain of Custody
And
Sample Receiving Conditions Upon Receipt
Form**

Box 1 of 2

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.



| | | | | | |
|--|--|--|--|---|--|
| Section A Required Client Information: Company: US Army Corps of Engineers Address: 10 South Howard Street Baltimore, MD Email To: david.j.watters@usace.army.mil Phone: 443-253-0916 Requested Due Date/TAT: ASAP | | Section B Required Project Information: Report To: David Watters Copy To: Alan Warminski Purchase Order No.: Project Name: Fort Monmouth Rad Survey Project Number: | | Section C Invoice Information: Attention: Address: Pace Quote Reference: Pace Project Manager: Carlin Ferris Pace Profile #: | |
| Regulatory Agency: <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER | | Site Location: _____ STATE: NJ | | Page: 1 of 36 | |

| ITEM # | Valid Matrix Codes MATRIX CODE DRINKING WATER: DW WASTE WATER: WW PRODUCT: P SOIL/SOLID: SL OIL: OL WIPE: WIP AIR: AR OTHER: OT TISSUE: TS | COLLECTED | | SAMPLE TYPE (G-GRAB C-COMP) | MATRIX CODE (see yield codes to left) | # OF CONTAINERS | Preservatives Unpreserved H ₂ SO ₄ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other | Analysis Test Y/N | Gross Low Energy Beta Analysis N | Requested Analysis Filtered (Y/N) | Residual Chlorine (Y/N) |
|--------|--|-----------------|--------------------|-----------------------------|---------------------------------------|-----------------|---|----------------------|-------------------------------------|-----------------------------------|-------------------------|
| | | COMPOSITE START | COMPOSITE END/GRAB | | | | | | | | |
| 0 | B-1-25 lab blank | WP | G | NA | NA | NA | NA | X | | | |
| 1 | SU-15-1 | WP | G | NA | 6/20/12 | NA | NA | X | | | 001 |
| 2 | SU-15-2 | WP | G | NA | 6/20/12 | NA | NA | X | | | 002 |
| 3 | SU-15-3 | WP | G | NA | 6/20/12 | NA | NA | X | | | 003 |
| 4 | SU-15-3D | WP | G | NA | 6/20/12 | NA | NA | X | | | 004 |
| 5 | SU-15-4 | WP | G | NA | 6/20/12 | NA | NA | X | | | 005 |
| 6 | SU-15-5 | WP | G | NA | 6/20/12 | NA | NA | X | | | 006 |
| 7 | SU-15-6 | WP | G | NA | 6/20/12 | NA | NA | X | | | 007 |
| 8 | SU-15-7 | WP | G | NA | 6/20/12 | NA | NA | X | | | 008 |
| 9 | SU-15-8 | WP | G | NA | 6/20/12 | NA | NA | X | | | 009 |
| 10 | SU-15-9 | WP | G | NA | 6/20/12 | NA | NA | X | | | 010 |
| 11 | SU-15-10 | WP | G | NA | 6/20/12 | NA | NA | X | | | 011 |
| 12 | SU-15-11 | WP | G | NA | 6/20/12 | NA | NA | X | | | 012 |
| 13 | SU-15-12 | WP | G | NA | 6/20/12 | NA | NA | X | | | 013 |
| 14 | SU-15-13 | WP | G | NA | 6/20/12 | NA | NA | X | | | 014 |
| 15 | SU-15-14 | WP | G | NA | 6/20/12 | NA | NA | X | | | 015 |
| 16 | SU-15-15 | WP | G | NA | 6/20/12 | NA | NA | X | | | 016 |
| 17 | SU-15-16 | WP | G | NA | 6/20/12 | NA | NA | X | | | 017 |
| 18 | SU-15-17 | WP | G | NA | 6/20/12 | NA | NA | X | | | 018 |
| 19 | SU-15-18 | WP | G | NA | 6/20/12 | NA | NA | X | | | 019 |
| 20 | SU-15-19 | WP | G | NA | 6/20/12 | NA | NA | X | | | 020 |
| 21 | SU-15-20 | WP | G | NA | 6/20/12 | NA | NA | X | | | 021 |

8872185
30722185
Pace Project No./Lab I.D.

APX Pac 6/25/12 1015



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 38

| | | | | | |
|--|--|---|--|--|--|
| Section A Required Client Information: | | Section B Required Project Information: | | Section C Invoice Information: | |
| Company: US Army Corps of Engineers | | Report To: David Watters | | Attention: | |
| Address: 10 South Howard Street | | Copy To: Alan Warminski | | REGULATORY AGENCY | |
| Ballimore, MD | | Purchase Order No.: | | <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/> NRG | |
| Email To: david.j.watters@usace.army.mil | | Project Name: Fort Monmouth Rad Survey | | Site Location | |
| Phone: 443-253-0916 Fax: none | | Project Number: | | STATE: NJ | |
| Requested Due Date/TAT: ASAP | | Matrix Code (see valid codes to left) | | Requested Analysis Filtered (Y/N) | |

| ITEM # | Valid Matrix Codes MATRIX CODE DRINKING WATER WATER WASTE WATER PRODUCT SOLID OIL WIP AIR OTHER TISSUE | SAMPLE TYPE (G-GRAB C-COMP) | COLLECTED | | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Preservatives Unpreserved H ₂ SO ₄ HCl NaOH Na ₂ S ₂ O ₈ Methanol Other | Analysis Test | Gross Low Energy Beta Analysis | Residual Chlorine (Y/N) | Pace Project No./ Lab I.D. |
|--------|---|-----------------------------|-----------------|--------------------|---------------------------|-----------------|---|---------------|--------------------------------|-------------------------|----------------------------|
| | | | COMPOSITE START | COMPOSITE END/GRAB | | | | | | | |
| 22 | SU-15-21 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 022 |
| 23 | SU-15-22 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 023 |
| 24 | SU-15-23 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 024 |
| 25 | SU-15-24 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 025 |
| 26 | SU-15-25 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 026 |
| 27 | SU-15-26 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 027 |
| 28 | SU-15-27 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 028 |
| 29 | SU-15-28 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 029 |
| 30 | SU-15-29 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 030 |
| 31 | SU-15-30 | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 031 |
| 32 | SU-15-30D | WP G | NA | NA | 06/20/12 | NA | 1 | X | | | 032 |
| 33 | SU-06-1 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 033 |
| 34 | SU-06-2 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 034 |
| 35 | SU-06-2D | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 035 |
| 36 | SU-06-3 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 036 |
| 37 | SU-06-4 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 037 |
| 38 | SU-06-5 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 038 |
| 39 | SU-06-6 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 039 |
| 40 | SU-06-7 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 040 |
| 41 | SU-06-8 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 041 |
| 42 | SU-06-9 | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 042 |
| 43 | SU-06-9D | WP G | NA | NA | 06/11/12 | NA | 1 | X | | | 043 |

Handwritten signature 6/25/12 1015



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: **4** of **38**

| | | | | | |
|---|--|--|--|--|--|
| Section A Required Client Information: Company: US Army Corps of Engineers Address: 10 South Howard Street Baltimore, MD Email To: david.j.watters@usace.army.mil Phone: 443-263-0916 Fax: none Requested Due Date/TAT: ASAP | | Section B Required Project Information: Report To: David Watters Copy To: Alan Warminski Purchase Order No.: Project Name: Fort Monmouth Rad Survey Project Number: | | Section C Invoice Information: Attention: Address: Pace Quote Reference: Pace Project Manager: Carin Ferris Pace Profile #: | |
| REGULATORY AGENCY <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/> NRC | | Site Location STATE: NJ | | | |

| # | ITEM | Section D Required Client Information | Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW PRODUCT P SOIL/SOLID S OIL OL WIFE WP AIR AIR OTHER OT TISSUE TS | MATRIX CODE (see valid codes to left) | SAMPLE TYPE (G=GRAB C=COMP) | COLLECTED | | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other | Analysis Test ↑ Y/N | Gross Low Energy Beta Analysis N | Requested Analysis, Filtered (Y/N) | Residual Chlorine (Y/N) | Pace Project No./ Lab I.D. |
|----|------|--|--|--|-----------------------------|------------------------------|---------------------------------|---------------------------|-----------------|---|------------------------|-------------------------------------|------------------------------------|-------------------------|----------------------------|
| | | | | | | COMPOSITE START DATE TIME | COMPOSITE END/GRAB DATE TIME | | | | | | | | |
| 66 | | | | SU-06-31 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 066 |
| 67 | | | | SU-06-32 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 067 |
| 68 | | | | SU-07-1 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 068 |
| 69 | | | | SU-07-2 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 069 |
| 70 | | | | SU-07-3 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 070 |
| 71 | | | | SU-07-4 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 071 |
| 72 | | | | SU-07-5 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 072 |
| 73 | | | | SU-07-6 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 073 |
| 74 | | | | SU-07-7 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 074 |
| 75 | | | | SU-07-8 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 075 |
| 76 | | | | SU-07-9 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 076 |
| 77 | | | | SU-07-10 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 077 |
| 78 | | | | SU-07-11 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 078 |
| 79 | | | | SU-07-12 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 079 |
| 80 | | | | SU-07-13 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 080 |
| 81 | | | | SU-07-14 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 081 |
| 82 | | | | SU-07-15 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 082 |
| 83 | | | | SU-07-16 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 083 |
| 84 | | | | SU-07-17 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 084 |
| 85 | | | | SU-07-18 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 085 |
| 86 | | | | SU-07-19 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 086 |
| 87 | | | | SU-07-20 | WP G | NA NA | 06/11/12 | NA | 1 | X | | | | | 087 |

Handwritten signature and date: 6/25/12 10:15



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: **5** of **38**

Section A

Required Client Information: Company: **US Army Corps of Engineers**

Report To: **David Watters**

Copy To: **Alan Warminski**

Address: **10 South Howard Street**

Baltimore, MD

Email To: **david.j.watters@usace.army.mil**

Phone: **443-253-0916** Fax: none

Requested Due Date/TAT: **A94P**

Section B

Invoice Information: Attention:

Address: **Fort Monmouth Rad Survey**

Pace Quote Reference: **Carin Ferris**

Pace Project Manager:

Pace Profile #:

Section C

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER

NRC

Site Location STATE: **NU**

| ITEM # | Section D Required Client Information | Valid Matrix Codes MATRIX CODE DRINKING WATER WASTE WATER PRODUCT LIQUID SOLID WIP AIR OTHER TISSUE | COLLECTED | | SAMPLE TYPE (G=GRAB C=COMP) | MATRIX CODE (see valid codes to left) | # OF CONTAINERS | Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other | Analysis Test ↑ | Gross Low Energy Beta Analysis | Residual Chlorine (Y/N) | Pace Project No./Lab I.D. |
|--------|--|---|------------------------------|---------------------------------|-----------------------------|--|-----------------|---|--------------------|--------------------------------|-------------------------|---------------------------|
| | | | COMPOSITE START DATE TIME | COMPOSITE END/GRAB DATE TIME | | | | | | | | |
| 88 | SU-07-21 | WP | G | NA | NA | NA | 1 | X | | | 088X | |
| 89 | SU-07-22 | WP | G | NA | NA | NA | 1 | X | | | 089 | |
| 90 | SU-07-23 | WP | G | NA | NA | NA | 1 | X | | | 090 | |
| 91 | SU-07-23D | WP | G | NA | NA | NA | 1 | X | | | 091 | |
| 92 | SU-07-24 | WP | G | NA | NA | NA | 1 | X | | | 092 | |
| 93 | SU-07-25 | WP | G | NA | NA | NA | 1 | X | | | 093 | |
| 94 | SU-07-26 | WP | G | NA | NA | NA | 1 | X | | | 094 | |
| 95 | SU-07-27 | WP | G | NA | NA | NA | 1 | X | | | 095 | |
| 96 | SU-07-28 | WP | G | NA | NA | NA | 1 | X | | | 096 | |
| 97 | SU-07-29 | WP | G | NA | NA | NA | 1 | X | | | 097 | |
| 98 | SU-07-30 | WP | G | NA | NA | NA | 1 | X | | | 098 | |
| 99 | SU-07-31 | WP | G | NA | NA | NA | 1 | X | | | 099 | |
| 100 | SU-07-31D | WP | G | NA | NA | NA | 1 | X | | | 100 | |
| 101 | SU-07-32 | WP | G | NA | NA | NA | 1 | X | | | | |
| 102 | SU-07-33 | WP | G | NA | NA | NA | 1 | X | | | | |
| 103 | SU-07-34 | WP | G | NA | NA | NA | 1 | X | | | | |
| 104 | SU-07-35 | WP | G | NA | NA | NA | 1 | X | | | | |
| 105 | SU-07-35D | WP | G | NA | NA | NA | 1 | X | | | | |
| 106 | SU-07-36 | WP | G | NA | NA | NA | 1 | X | | | | |
| 107 | SU-07-37 | WP | G | NA | NA | NA | 1 | X | | | | |
| 108 | SU-07-38 | WP | G | NA | NA | NA | 1 | X | | | | |
| 109 | SU-07-39 | WP | G | NA | NA | NA | 1 | X | | | | |

David Pace 6/25/12 1015



Sample Condition Upon Receipt

Client Name: RTI

Project # 3572155

Courier: [X] Fed Ex [] UPS [] USPS [] Client [] Commercial [] Pace Other

Tracking #: 875928653784

Custody Seal on Cooler/Box Present: [] yes [X] no Seals intact: [] yes [] no

Optional Proj. Due Date: Proj. Name:

Packing Material: [X] Bubble Wrap [] Bubble Bags [] None [X] Other cardboard

Thermometer Used 5 6 7

Type of Ice: Wet Blue [X] None [] Samples on ice, cooling process has begun

Cooler Temperature NA

Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: VFL 6/25/11

Temp should be above freezing to 6°C

Comments:

Table with 16 rows of checklist items (Chain of Custody Present, Chain of Custody Filled Out, etc.) and checkboxes for Yes, No, N/A.

Client Notification/ Resolution:

Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Carmo Seno

Date: 6/27/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)



Project Number: 3522155

Client Name: RTI

| Item No. | Matrix Code | Glass Jar (120 / 250 / 500 / 1L) | Soil kit (2 SB, 1M, soil jar) | Chemistry (250 / 500 / 1L) | Organics (1L) | Nutrient (250 / 500) | Phenolics (250 ml) | TOC (40 ml / 250 ml) | TOX (250 ml) | Total Metals | Dissolved Metals preserved Y | O & G (1L) | TPH (1L) | VOA (40 ml 30 ml) | Cyanide (250 ml) | Sulfide (500 ml) | Bacteria (120 ml) | Wipes / swipe/ smear/ filter | Rachem Nalgene (125 / 250 / 500 / 1L) | Rachem Nalgene (1/2 gal. / 1 gal.) | Cubtainer (500 ml / 4L) | Ziploc | Other | Other |
|----------|-------------|----------------------------------|-------------------------------|----------------------------|---------------|----------------------|--------------------|----------------------|--------------|--------------|------------------------------|------------|----------|-------------------|------------------|------------------|-------------------|------------------------------|---------------------------------------|------------------------------------|-------------------------|--------|-------|-------|
| 100 | MP | | | | | | | | | | | | | | | | | | | | | | | |
| 101 | MP | | | | | | | | | | | | | | | | | | | | | | | |

Low Energy Beta Sample Analysis Data

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

1 459058-BLANK for HBN 91047 [RADC/1247

Type BLANK Matrix Impact Plate Collected % Moisture
 Client QCACCOUNT WO Work ID

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 00:07 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796047 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 00:07 Dilution
 Method EPA 906.0M Col ID Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796047 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|
| Rad Chemistry | OK | | | | |
| LSC Low Energy Beta | OK | 4.71J ± 3.17 (5.59) | dpm/sa 4.71J ± 3.17 (5.59) | | dpm/sa |

2 3072155001-SU-15-1

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 00:23 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789856 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 00:23 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789856 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.54J ± 2.96 (5.42) | dpm/sa 3.54J ± 2.96 (5.42) | | dpm/sa | | |

3 3072155002-SU-15-2

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

3 3072155002-SU-15-2

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 00:39 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789857 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 00:39 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789857 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.99J ± 3.05 (5.51) | dpm/sa 3.99J ± 3.05 (5.51) | | dpm/sa | | |

4 3072155003-SU-15-3

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 00:55 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789858 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 00:55 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789858 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.24 ± 3.24 (5.41) | dpm/sa 6.24 ± 3.24 (5.41) | | dpm/sa | | |

5 3072155004-SU-15-3D

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

5 3072155004-SU-15-3D

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 01:11 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789859 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 01:11 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789859 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.39J ± 2.93 (5.39) | dpm/sa 3.39J ± 2.93 (5.39) | | dpm/sa | | |

6 3072155005-SU-15-4

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 01:27 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789860 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 01:27 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789860 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.37J ± 2.84 (5.41) | dpm/sa 2.37J ± 2.84 (5.41) | | dpm/sa | | |

7 3072155006-SU-15-5

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

7 3072155006-SU-15-5

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 01:44 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789861 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 01:44 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789861 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Req. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.39J ± 2.94 (5.40) | dpm/sa 3.39J ± 2.94 (5.40) | | dpm/sa | | |

8 3072155007-SU-15-6

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 02:00 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789862 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 02:00 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789862 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Req. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.40J ± 2.87 (5.46) | dpm/sa 2.40J ± 2.87 (5.46) | | dpm/sa | | |

9 3072155008-SU-15-7

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

9 3072155008-SU-15-7

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 02:16 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789863 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 02:16 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789863 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.92U ± 2.89 (5.60) | dpm/sa 1.92U ± 2.89 (5.60) | | | dpm/sa | |

10 3072155009-SU-15-8

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/30/2012 13:02 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789864 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/30/2012 13:02 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789864 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|----------------------------|--------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | -1.77U ± 4.11 (10.0) | dpm/sa -1.77U ± 4.11 (10.0) | | | dpm/sa | |

11 3072155010-SU-15-9

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

11 3072155010-SU-15-9

Prep Information

Procedure 9060 I LEB **Batch** RADC/12476 **Prep Date** 7/17/2012 02:32 **Dilution**
Method EPA 906.0M **HBN** 91047 **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789865 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 02:32 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789865 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.18J ± 3.03 (5.43) | dpm/sa 4.18J ± 3.03 (5.43) | | dpm/sa | | |

12 3072155011-SU-15-10

Type PS **Matrix** Wipe **Collected** 6/20/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12476 **Prep Date** 7/17/2012 02:48 **Dilution**
Method EPA 906.0M **HBN** 91047 **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789866 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 02:48 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789866 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.02J ± 2.91 (5.42) | dpm/sa 3.02J ± 2.91 (5.42) | | dpm/sa | | |

13 3072155012-SU-15-11

Type PS **Matrix** Wipe **Collected** 6/20/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

13 3072155012-SU-15-11

Prep Information

Procedure 9060 I LEB **Batch** RADC/12476 **Prep Date** 7/17/2012 03:04 **Dilution**
Method EPA 906.0M **HBN** 91047 **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789867 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 03:04 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789867 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Req. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.62J ± 2.86 (5.40) | dpm/sa 2.62J ± 2.86 (5.40) | | dpm/sa | | |

14 3072155013-SU-15-12

Type PS **Matrix** Wipe **Collected** 6/20/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12476 **Prep Date** 7/17/2012 03:20 **Dilution**
Method EPA 906.0M **HBN** 91047 **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789868 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 03:20 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789868 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Req. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.31J ± 2.96 (5.47) | dpm/sa 3.31J ± 2.96 (5.47) | | dpm/sa | | |

15 3072155014-SU-15-13

Type PS **Matrix** Wipe **Collected** 6/20/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

15 3072155014-SU-15-13

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 03:37 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789869 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 03:37 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789869 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.68J ± 3.07 (5.40) | dpm/sa 4.68J ± 3.07 (5.40) | | | dpm/sa | |

16 3072155015-SU-15-14

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/18/2012 12:18 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789870 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/18/2012 12:18 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789870 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.91J ± 2.99 (5.39) | dpm/sa 3.91J ± 2.99 (5.39) | | | dpm/sa | |

17 3072155016-SU-15-15

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

17 3072155016-SU-15-15

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/30/2012 13:10 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789871 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/30/2012 13:10 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789871 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.32U ± 4.41 (9.81) | dpm/sa 1.32U ± 4.41 (9.81) | | | dpm/sa | |

18 3072155017-SU-15-16

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 03:53 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789872 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 03:53 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789872 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.01J ± 2.90 (5.41) | dpm/sa 3.01J ± 2.90 (5.41) | | | dpm/sa | |

19 3072155018-SU-15-17

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 HBN 91047
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

19 3072155018-SU-15-17

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 04:09 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789873 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 04:09 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789873 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.50J ± 2.85 (5.39) | dpm/sa 2.50J ± 2.85 (5.39) | | dpm/sa | | |

20 3072155019-SU-15-18

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

Prep Information

Procedure 9060 I LEB Batch RADC/12476 Prep Date 7/17/2012 04:25 Dilution
 Method EPA 906.0M HBN 91047 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789874 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 04:25 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789874 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.44 ± 3.14 (5.39) | dpm/sa 5.44 ± 3.14 (5.39) | | dpm/sa | | |

21 3072155020-SU-15-19

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12476 **HBN** 91047
Rule 9060 | LEB **Status** RE
Create Date 6/28/2012 **Analyst** RMK

21 3072155020-SU-15-19

Prep Information

| | | | |
|-----------------------------|-------------------------|-----------------------------------|--------------------|
| Procedure 9060 LEB | Batch RADC/12476 | Prep Date 7/18/2012 12:29 | Dilution |
| Method EPA 906.0M | HBN 91047 | Hold Date 12/17/2012 23:59 | Analyst RMK |
| Schedule 2789875 | Instru NONE | | CC OK F |
| Initial Volume 1 mL Default | 1 mL | | |
| Final Volume, 1 mL Default | 1 mL | | |

Analytical Information

| | | | |
|-----------------------------|--------------------|-----------------------------------|--------------------|
| Procedure 9060 LEB | Instru NONE | Run Date 7/18/2012 12:29 | Dilution |
| Method EPA 906.0M | Col ID | Hold Date 12/17/2012 23:59 | Analyst RMK |
| Schedule 2789875 | File | | CC OK F |

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.47 ± 3.16 (5.42) | dpm/sa 5.47 ± 3.16 (5.42) | | dpm/sa | | |

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Creation Date 06/28/2012 13:43
 Batch ID 12476
 A-code 9060 I LEB 9060W
 Method EPA 906.0M EPA 906.0m

Assigned Analyst RMK
 Earliest Due Date 07/04/2012 07:12
 HBN 91047

| Project | Sample ID | Sample Type | Matrix | Collection Date/Time | Client ID | LEB Activity | LEB Unc. | LEB MDC | Analysis Date/Time |
|---------|------------|-------------|--------|----------------------|-----------|--------------|----------|---------|--------------------|
| | 459058 | BLANK | IP | | QCACCOUNT | 4.71J | 3.17 | 5.59 | 7/17/12 0:07 |
| 3072155 | 3072155001 | PS | WP | 6/20/2012 0:01 | RTI | 3.54J | 2.96 | 5.42 | 7/17/12 0:23 |
| 3072155 | 3072155002 | PS | WP | 6/20/2012 0:01 | RTI | 3.99J | 3.05 | 5.51 | 7/17/12 0:39 |
| 3072155 | 3072155003 | PS | WP | 6/20/2012 0:01 | RTI | 6.24 | 3.24 | 5.41 | 7/17/12 0:55 |
| 3072155 | 3072155004 | PS | WP | 6/20/2012 0:01 | RTI | 3.39J | 2.93 | 5.39 | 7/17/12 1:11 |
| 3072155 | 3072155005 | PS | WP | 6/20/2012 0:01 | RTI | 2.37J | 2.84 | 5.41 | 7/17/12 1:27 |
| 3072155 | 3072155006 | PS | WP | 6/20/2012 0:01 | RTI | 3.39J | 2.94 | 5.40 | 7/17/12 1:44 |
| 3072155 | 3072155007 | PS | WP | 6/20/2012 0:01 | RTI | 2.40J | 2.87 | 5.46 | 7/17/12 2:00 |
| 3072155 | 3072155008 | PS | WP | 6/20/2012 0:01 | RTI | 1.92U | 2.89 | 5.60 | 7/17/12 2:16 |
| 3072155 | 3072155009 | PS | WP | 6/20/2012 0:01 | RTI | | 0.0292 | #NUM! | |
| 3072155 | 3072155010 | PS | WP | 6/20/2012 0:01 | RTI | 4.18J | 3.03 | 5.43 | 7/17/12 2:32 |
| 3072155 | 3072155011 | PS | WP | 6/20/2012 0:01 | RTI | 3.02J | 2.91 | 5.42 | 7/17/12 2:48 |
| 3072155 | 3072155012 | PS | WP | 6/20/2012 0:01 | RTI | 2.62J | 2.86 | 5.40 | 7/17/12 3:04 |
| 3072155 | 3072155013 | PS | WP | 6/20/2012 0:01 | RTI | 3.31J | 2.96 | 5.47 | 7/17/12 3:20 |
| 3072155 | 3072155014 | PS | WP | 6/20/2012 0:01 | RTI | 4.66J | 3.07 | 5.40 | 7/17/12 3:37 |
| 3072155 | 3072155015 | PS | WP | 6/20/2012 0:01 | RTI | 3.91J | 2.99 | 5.39 | 7/18/12 12:18 |
| 3072155 | 3072155016 | PS | WP | 6/20/2012 0:01 | RTI | | 0.0292 | #NUM! | |
| 3072155 | 3072155017 | PS | WP | 6/20/2012 0:01 | RTI | 3.01J | 2.90 | 5.41 | 7/17/12 3:53 |
| 3072155 | 3072155018 | PS | WP | 6/20/2012 0:01 | RTI | 2.50J | 2.85 | 5.39 | 7/17/12 4:09 |
| 3072155 | 3072155019 | PS | WP | 6/20/2012 0:01 | RTI | 5.44 | 3.14 | 5.39 | 7/17/12 4:25 |
| 3072155 | 3072155020 | PS | WP | 6/20/2012 0:01 | RTI | 5.47 | 3.16 | 5.42 | 7/18/12 12:29 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

7/27/12
 27/26/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
 Matrix Smear
 Batch ID 12476
 Prep Start 7/16/2012 12:00
 Prep Finish 7/16/2012
 Act. Rpt Units dpm

Analyst RMK
 PrepSOP1
 PrepSOP2 n/a
 AnalSOP1
 AnalSOP2 n/a
 Aliq. Rpt Units Sample

Bkg CPM 4.77
 Bkg Duration 30.0 min
 Bkg Ref BKG 7/17/2012
 Bkg Ct Date/Time: 7/17/2012 13:09
 Instrument ID: System #3



| Sample | Analysis Volume (Sample) | Ref. Date | Count Duration (min) | Count Start Date/Time | Sample Gross CPM | TSIE # | Activity Report Units | TSIE Within Quench Curve |
|------------|--------------------------|--------------|----------------------|-----------------------|------------------|--------|-----------------------|--------------------------|
| 459058 | 1.0 | 7/17/12 0:07 | 15.0 | 7/17/12 0:07 | 7.13 | 322.3 | dpm/S | High, Evaluate |
| 3072155001 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 0:23 | 6.60 | 287.7 | dpm/S | Pass |
| 3072155002 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 0:39 | 6.80 | 231.5 | dpm/S | Pass |
| 3072155003 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 0:55 | 8.00 | 287.2 | dpm/S | Pass |
| 3072155004 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 1:11 | 6.53 | 271.8 | dpm/S | Pass |
| 3072155005 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 1:27 | 6.00 | 286.2 | dpm/S | Pass |
| 3072155006 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 1:44 | 6.53 | 279.6 | dpm/S | Pass |
| 3072155007 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 2:00 | 6.00 | 300.4 | dpm/S | Pass |
| 3072155008 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 2:16 | 5.73 | 320.2 | dpm/S | High, Evaluate |
| 3072155009 | 1.0 | 6/20/12 0:01 | 15.0 | | | | dpm/S | Low, Reprep |
| 3072155010 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 2:32 | 6.93 | 291.4 | dpm/S | Pass |
| 3072155011 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 2:48 | 6.33 | 251.5 | dpm/S | Pass |
| 3072155012 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 3:04 | 6.13 | 280.2 | dpm/S | Pass |
| 3072155013 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 3:20 | 6.47 | 300.4 | dpm/S | Pass |
| 3072155014 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 3:37 | 7.20 | 279.9 | dpm/S | Pass |
| 3072155015 | 1.0 | 6/20/12 0:01 | 15.0 | 7/18/12 12:18 | 6.80 | 269.2 | dpm/S | Pass |
| 3072155016 | 1.0 | 6/20/12 0:01 | 15.0 | | | | dpm/S | Low, Reprep |
| 3072155017 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 3:53 | 6.33 | 284.3 | dpm/S | Pass |
| 3072155018 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 4:09 | 6.07 | 269.7 | dpm/S | Pass |
| 3072155019 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 4:25 | 7.60 | 265.3 | dpm/S | Pass |
| 3072155020 | 1.0 | 6/20/12 0:01 | 15.0 | 7/18/12 12:29 | 7.60 | 288.5 | dpm/S | Pass |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

7/27/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst: RMK
Date: 7/31/2012
Worklist: 12476
Matrix: Filter

Method: EPA 906.0M
SOP:
MB Sample ID: 459058



| Method Blank Assessment | | | |
|-------------------------|----------|--------|------------|
| Analyte | Activity | MDC | Assessment |
| LSC Low Energy Beta | 4.7090 | 5.9930 | 2.27400 |
| 1.96 Sig Unc. 3.1650 | | | |
| Flag | | | |
| Critical Value | | | |
| Assessment | | | |

| Laboratory Control Sample Assessment | | | |
|---|---------------|---------------|------|
| Analyte | LCS | LCSD | LCSD |
| LSC Low Energy Beta | | | |
| Count Date: | 7/20/12 12:03 | 7/20/12 12:11 | |
| Spike ID.: | 09-009LEB | 09-009LEB | |
| Spike Concentration (DPM/Sample): | 1184.941 | 1184.941 | |
| Volume Used (mL): | 0.100 | 0.100 | |
| Aliquot Volume (L, g, F): | 1.000 | 1.000 | |
| Target Conc. (DPM/Sample, g, F): | 118.494 | 118.494 | |
| 1.96 Sigma Uncertainty (Calculated): | 2.137 | 2.137 | |
| Result (DPM/Sample, g, F): | 110.816 | 108.328 | |
| 1.96 Sigma Unc.: | 17.635 | 17.338 | |
| % Recovery: | 93.52% | 91.42% | |
| Assessment: | Pass | Pass | |
| Upper % Recovery Limits: | 125.00% | 125.00% | |
| Lower % Recovery Limits: | 75.00% | 75.00% | |
| Duplicate Sample Assessment | | | |
| LCS/LCSD Y or N?: | Y | | |
| Analyte: SC Low Energy Beta | | | |
| Sample ID.: | LCS12476 | | |
| Duplicate Sample ID.: | LCSD12476 | | |
| Sample Result (DPM/Sample, g, F): | 110.8160 | | |
| 1.96 Sigma Unc.: | 17.6350 | | |
| Sample Duplicate Result (DPM/Sample, g, F): | 108.3280 | | |
| Duplicate Sample 1.96 Sigma Unc.: | 17.3380 | | |
| Either results below MDC?: | NO | | |
| Relative Percent Difference: | 2.27% | | |
| Assessment: | Pass | | |
| % RPD Limit: | 25.00% | | |

| Sample Matrix Spike Control Assessment | |
|---|------------|
| Analyte: | Assessment |
| Sample Collection Date: | |
| Sample I.D.: | |
| Sample MS I.D.: | |
| Sample MSD I.D.: | |
| Spike I.D.: | |
| MS/MSD Decay Corrected Spike Conc. (DPM/Sample): | |
| Spike Volume Used in MS (mL): | |
| Spike Volume Used in MSD (mL): | |
| MS Aliquot (L, g, F): | |
| MS Target Conc. (DPM/Sample, g, F): | |
| MSD Aliquot (L, g, F): | |
| MSD Target Conc. (DPM/Sample, g, F): | |
| MS Spike uncertainty (calculated): | |
| MSD Spike uncertainty (calculated): | |
| Sample Result: | |
| Sample 1.96 Sigma Unc.: | |
| Sample Matrix Spike Result: | |
| Sample MS 1.96 Sigma Unc.: | |
| Sample Matrix Spike Duplicate Result: | |
| Sample MSD 1.96 Sigma Unc.: | |
| MS % Recovery: | |
| MSD % Recovery: | |
| MS Assessment: | |
| MSD Assessment: | |
| MS/MSD Upper % Recovery Limits: | |
| MS/MSD Lower % Recovery Limits: | |
| Matrix Spike/Matrix Spike Duplicate Sample Assessment | |
| Analyte: | |
| Sample I.D.: | |
| Sample MS I.D.: | |
| Sample MSD I.D.: | |
| Sample Matrix Spike Result: | |
| Sample Matrix Spike 1.96 Sigma Unc.: | |
| Sample Matrix Spike Duplicate Result: | |
| Sample Matrix Spike Duplicate 1.96 Sigma Unc.: | |
| MS/MSD Relative Percent Difference: | |
| MS/MSD RPD Assessment: | |
| % RPD Limit: | |

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

g 2/1/3/12

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



Mass Aliquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | of Critical | CSU (TPU) for Preparation | | 5.39% |
|----------------------------------|----------|-------------|---------------------------|-------------|-------|
| | | | Uncertainty | Uncertainty | |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| Description | relative | of Critical | CSU (TPU) for Yield Correction | | 1.00% |
|-----------------------------|----------|-------------|--------------------------------|-------------|-------|
| | | | Uncertainty | Uncertainty | |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 | |

| Description | Maximum | of Critical | CSU (TPU) for Analysis | | 10.60% |
|----------------------------------|---------|-------------|------------------------|-------------|--------|
| | | | Uncertainty | Uncertainty | |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 | |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| <u>Total Uncertainty</u> | Maximum | of Critical | Uncertainty | Uncertainty |
|--------------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12476



| Calibration Information | | | | |
|---|------------------------------|------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI +15 mL Ultima LLT | 5 mL DI +15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Protocol #: 2

SWIPE_H3_C14

User :

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 2 | 1 | 30.00 | 30 | 2.13 | 5.53 | 4.77 | 300.09 | 7 |

Bkg 071712

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/17/2012 0:22 ✓ | |
| | | Sample Ct Duration (min) | 15.0 ✓ |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 15 ✓ | 7/17/2012 0:07 | 459058 |
| 2 | 31 ✓ | 7/17/2012 0:23 | 3072155001 |
| 3 | 47 ✓ | 7/17/2012 0:39 | 3072155002 |
| 4 | 63 ✓ | 7/17/2012 0:55 | 3072155003 |
| 5 | 79 ✓ | 7/17/2012 1:11 | 3072155004 |
| 6 | 95 ✓ | 7/17/2012 1:27 | 3072155005 |
| 7 | 112 ✓ | 7/17/2012 1:44 | 3072155006 |
| 8 | 128 ✓ | 7/17/2012 2:00 | 3072155007 |
| 9 | 144 ✓ | 7/17/2012 2:16 | 3072155008 |
| 10 | 160 ✓ | 7/17/2012 2:32 | 3072155010 |
| 11 | 176 ✓ | 7/17/2012 2:48 | 3072155011 |
| 12 | 192 ✓ | 7/17/2012 3:04 | 3072155012 |
| 13 | 208 ✓ | 7/17/2012 3:20 | 3072155013 |
| 14 | 225 ✓ | 7/17/2012 3:37 | 3072155014 |
| 15 | 241 ✓ | 7/17/2012 3:53 | 3072155017 |
| 16 | 257 ✓ | 7/17/2012 4:09 | 3072155018 |
| 17 | 273 ✓ | 7/17/2012 4:25 | 3072155019 |
| 18 | 289 ✓ | 7/17/2012 4:41 | 3072155021 |
| 19 | 305 ✓ | 7/17/2012 4:57 | 3072155022 |
| 20 | 321 ✓ | 7/17/2012 5:13 | 3072155023 |
| 21 | 337 ✓ | 7/17/2012 5:29 | 3072155024 |
| 22 | 353 ✓ | 7/17/2012 5:45 | LCS |
| 23 | 369 ✓ | 7/17/2012 6:01 | LCSD |
| 24 | 385 ✓ | 7/17/2012 6:17 | 459061 |
| 25 | 401 ✓ | 7/17/2012 6:33 | 3072155025 |
| 26 | 417 ✓ | 7/17/2012 6:49 | 3072155026 |
| 27 | 433 ✓ | 7/17/2012 7:05 | 3072155027 |
| 28 | 449 ✓ | 7/17/2012 7:21 | 3072155028 |
| 29 | 465 ✓ | 7/17/2012 7:37 | 3072155029 |
| 30 | 481 ✓ | 7/17/2012 7:53 | 3072155030 |
| 31 | 498 ✓ | 7/17/2012 8:10 | 3072155031 |
| 32 | 514 ✓ | 7/17/2012 8:26 | 3072155032 |
| 33 | 530 ✓ | 7/17/2012 8:42 | 3072155033 |
| 34 | 546 ✓ | 7/17/2012 8:58 | 3072155034 |
| 35 | 562 ✓ | 7/17/2012 9:14 | 3072155035 |
| 36 | 578 ✓ | 7/17/2012 9:30 | 3072155036 |
| 37 | 594 ✓ | 7/17/2012 9:46 | 3072155037 |
| 38 | 610 ✓ | 7/17/2012 10:02 | 3072155038 |
| 39 | 626 ✓ | 7/17/2012 10:18 | 3072155039 |
| 40 | 642 ✓ | 7/17/2012 10:34 | 3072155040 |
| 41 | 659 ✓ | 7/17/2012 10:51 | 3072155041 |
| 42 | 675 ✓ | 7/17/2012 11:07 | 3072155042 |
| 43 | 691 ✓ | 7/17/2012 11:23 | 3072155043 |
| 44 | 707 ✓ | 7/17/2012 11:39 | 3072155044 |
| 45 | 722 ✓ | 7/17/2012 11:54 | LCS |
| 46 | 738 ✓ | 7/17/2012 12:10 | LCSD |

Handwritten: 7/31/12

Protocol #:19

SWIPE_H3_C14

User :

Time: 15.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 1 | 15.00 | 15 | 4.13 | 7.27 | 7.13 | 322.27 | 3 |
| 19 | 2 | 15.00 | 31 | 3.87 | 6.87 | 6.60 | 287.68 | 3 |
| 19 | 3 | 15.00 | 47 | 3.73 | 6.87 | 6.80 | 231.53 | 2 |
| 19 | 4 | 15.00 | 63 | 4.67 | 7.93 | 8.00 | 287.20 | 2 |
| 19 | 5 | 15.00 | 79 | 3.07 | 6.67 | 6.53 | 271.83 | 3 |
| 19 | 6 | 15.00 | 95 | 3.07 | 6.07 | 6.00 | 286.15 | 2 |
| 19 | 7 | 15.00 | 112 | 3.80 | 6.67 | 6.53 | 279.56 | 3 |
| 19 | 8 | 15.00 | 128 | 3.40 | 6.07 | 6.00 | 300.39 | 3 |
| 19 | 9 | 15.00 | 144 | 2.93 | 5.87 | 5.73 | 320.15 | 3 |
| 19 | 10 | 15.00 | 160 | 3.87 | 7.00 | 6.93 | 291.35 | 3 |
| 19 | 11 | 15.00 | 176 | 3.00 | 6.47 | 6.33 | 251.48 | 3 |
| 19 | 12 | 15.00 | 192 | 3.27 | 6.27 | 6.13 | 280.24 | 3 |
| 19 | 13 | 15.00 | 208 | 3.47 | 6.53 | 6.47 | 300.44 | 2 |
| 19 | 14 | 15.00 | 225 | 4.27 | 7.20 | 7.20 | 279.89 | 3 |
| 19 | 15 | 15.00 | 241 | 3.33 | 6.40 | 6.33 | 284.34 | 2 |
| 19 | 16 | 15.00 | 257 | 3.07 | 6.27 | 6.07 | 269.68 | 3 |
| 19 | 17 | 15.00 | 273 | 3.80 | 7.60 | 7.60 | 265.33 | 2 |
| 19 | 18 | 15.00 | 289 | 4.07 | 7.80 | 7.80 | 254.00 | 2 |
| 19 | 19 | 15.00 | 305 | 3.33 | 6.20 | 6.13 | 269.40 | 3 |
| 19 | 20 | 15.00 | 321 | 4.93 | 8.20 | 8.20 | 281.60 | 2 |
| 19 | 21 | 15.00 | 337 | 2.73 | 5.67 | 5.67 | 257.25 | 3 |
| 19 | 22 | 14.58 | 353 | 672.98 | 677.71 | 702.88 | 321.86 | 0 |
| 19 | 23 | 14.71 | 369 | 665.74 | 672.06 | 695.85 | 322.33 | 0 |
| 19 | 24 | 15.00 | 385 | 4.67 | 6.93 | 6.73 | 331.04 | 2 |
| 19 | 25 | 15.00 | 401 | 4.47 | 6.93 | 6.93 | 282.14 | 2 |
| 19 | 26 | 15.00 | 417 | 2.87 | 6.07 | 5.93 | 284.20 | 4 |
| 19 | 27 | 15.00 | 433 | 3.73 | 6.87 | 6.80 | 282.17 | 3 |
| 19 | 28 | 15.00 | 449 | 3.07 | 5.93 | 5.73 | 294.14 | 3 |
| 19 | 29 | 15.00 | 465 | 4.47 | 8.13 | 7.93 | 297.13 | 2 |
| 19 | 30 | 15.00 | 481 | 3.87 | 5.80 | 5.60 | 279.02 | 4 |
| 19 | 31 | 15.00 | 498 | 2.73 | 6.53 | 6.40 | 262.99 | 3 |
| 19 | 32 | 15.00 | 514 | 3.13 | 5.80 | 5.67 | 281.66 | 2 |
| 19 | 33 | 15.00 | 530 | 3.07 | 5.67 | 5.73 | 275.08 | 3 |
| 19 | 34 | 15.00 | 546 | 4.27 | 8.13 | 8.07 | 272.44 | 2 |
| 19 | 35 | 15.00 | 562 | 3.73 | 6.60 | 6.73 | 269.66 | 2 |
| 19 | 36 | 15.00 | 578 | 3.00 | 6.60 | 6.60 | 276.94 | 2 |
| 19 | 37 | 15.00 | 594 | 4.07 | 6.93 | 6.87 | 264.90 | 2 |
| 19 | 38 | 15.00 | 610 | 3.60 | 7.20 | 7.13 | 280.41 | 2 |
| 19 | 39 | 15.00 | 626 | 4.20 | 7.00 | 7.00 | 255.59 | 2 |

Protocol #:19

SWIPE_H3_C14

User :

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tsIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 40 | 15.00 | 642 | 2.13 | 5.13 | 5.07 | 273.48 | 3 |
| 19 | 41 | 15.00 | 659 | 3.67 | 6.40 | 6.33 | 268.20 | 3 |
| 19 | 42 | 15.00 | 675 | 3.60 | 6.40 | 6.33 | 320.47 | 2 |
| 19 | 43 | 15.00 | 691 | 2.13 | 5.87 | 5.80 | 290.94 | 3 |
| 19 | 44 | 15.00 | 707 | 4.53 | 7.73 | 7.73 | 318.14 | 2 |
| 19 | 45 | 14.55 | 722 | 674.64 | 680.55 | 705.70 | 327.71 | 0 |
| 19 | 46 | 14.55 | 738 | 673.95 | 680.21 | 704.40 | 318.60 | 0 |

Pace Analytical Services
 Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|-------------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/18/2012 12:28 ✓ |
| | | Sample Ct Duration (min) | 10.0 ✓ |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/18/2012 12:18 | 3072155015 |
| 2 | 21 | 7/18/2012 12:29 | 3072155020 |
| 3 | 32 | 7/18/2012 12:40 | 3072155060 |
| 4 | 43 | 7/18/2012 12:51 | 3072155066 |
| 5 | 54 | 7/18/2012 13:02 | 3072155086 |
| 6 | 65 | 7/18/2012 13:13 | 3072155094 |
| 7 | 76 | 7/18/2012 13:24 | 3072155100 |
| 8 | 87 | 7/18/2012 13:35 | 459065 |

OK
 7/18/12

Protocol #:19

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 1 | 10.00 | 10 | 3.60 | 6.90 | 6.80 | 269.15 | 2 |
| 19 | 2 | 10.00 | 21 | 5.00 | 7.70 | 7.60 | 288.48 | 2 |
| 19 | 3 | 10.00 | 32 | 3.30 | 6.60 | 6.50 | 248.85 | 2 |
| 19 | 4 | 10.00 | 43 | 3.70 | 6.60 | 6.70 | 269.85 | 2 |
| 19 | 5 | 10.00 | 54 | 4.00 | 6.30 | 6.40 | 291.27 | 2 |
| 19 | 6 | 10.00 | 65 | 3.30 | 6.60 | 6.70 | 269.98 | 2 |
| 19 | 7 | 10.00 | 76 | 4.60 | 7.20 | 7.30 | 315.26 | 3 |
| 19 | 8 | 10.00 | 87 | 216.50 | 220.90 | 228.70 | 298.17 | 0 |

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| BKG | G-14 Cal | Sample H3 C14 | 13 | 9 | 7/18/12 1345 | 3 | NA | RMK |
| C-14 20120118-N1 | | | | | | | | |
| N2 | | | | | | | | |
| N3 | | | | | | | | |
| N4 | | | | | | | | |
| N5 | | | | | | | | |
| N6 | | | | | | | | |
| N7 | | | | | | | | |
| N8 | | | | | | | | |
| N9 | | | | | | | | |
| N10 | | | | | | | | |
| BKG | H-3 Cal | | 31 | 10 | 7/18/12 1345 | TD 15 7/18/12 | | |
| H3 20120118-N1 | | | | | | | | |
| N2 | | | | | | | | |
| N3 | | | | | | | | |
| N4 | | | | | | | | |
| N5 | | | | | | | | |
| N6 | | | | | | | | |
| N7 | | | | | | | | |
| N8 | | | | | | | | |
| N9 | | | | | | | | |
| N10 | | | | | | | | |
| 3072155015 | 12476 | Swipe-H3-C14 | 20 | 19 | 7/17/12 2130 | 10 | INA | RMK |
| 020 | | | | | | | | |

Run comments:

Peer Review:

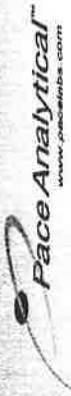
Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| DELAY | NA | | | | 7/16/12 2:35 | 30 | NA | RMLC |
| DELAY | ↓ | | | | 7/16/12 2:35 | 15 | | |
| BKG 071612 | NA | Swipe-H3-C14 | 20 | 19 | 7/16/12 2:35 | | | |
| 3072155001 | 12476 | | | | | | | |
| 002 | | | | | | | | |
| 003 | | | | | | | | |
| 004 | | | | | | | | |
| 005 | | | | | | | | |
| 006 | | | | | | | | |
| 007 | | | | | | | | |
| 008 | | | | | | | | |
| 010 | | | | | | | | |
| 011 | | | | | | | | |
| 012 | | | | | | | | |
| 013 | | | | | | | | |
| 014 | | | 17 | | | | | |
| 017 | | | | | | | | |
| 018 | | | | | | | | |
| 019 | | | | | | | | |
| 021 | 12477 | | | | | | | |
| 022 | | | | | | | | |
| 023 | | | | | | | | |
| 024 | | | | | | | | |
| LCS | NA | | | | | | | |

Run comments:

Peer Review:



Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-----------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| LCS DA 7/16/12 | NA | Swipe-H3-C14 | 17 | 19 | 7/16/12 2135 | 15 | NA | RMK |
| BIG MB (459058) | 12476 | | ↓ | | | | | |
| 3072155025 | 12477 | | 15 | | | | | |
| 026 | | | | | | | | |
| 027 | | | | | | | | |
| 028 | | | | | | | | |
| 029 | | | | | | | | |
| 030 | | | | | | | | |
| 031 | | | | | | | | |
| 032 | | | | | | | | |
| 033 | | | | | | | | |
| 034 | | | | | | | | |
| 035 | | | | | | | | |
| 036 | | | | | | | | |
| 037 | | | | | | | | |
| 038 | | | | | | | | |
| 039 | | | | | | | | |
| 040 | | | | | | | | |
| 041 | 12478 | | | | | | | |
| 042 | | | | | | | | |
| 043 | | | | | | | | |
| 044 | | | | | | | | |
| LCS | NA | | | | | | | |
| LCS | ↓ | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12476



| Calibration Information | | | | |
|---|------------------------------|------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI +15 mL Ultima LLT | 5 mL DI +15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



Mass Aliquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | CSU (TPU) for Preparation 5.39% | | |
|----------------------------------|----------|---------------------------------|-------------|-------------|
| | | of Critical | Uncertainty | Uncertainty |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Description | relative | CSU (TPU) for Yield Correction 1.00% | | |
|-----------------------------|----------|--------------------------------------|-------------|-------------|
| | | of Critical | Uncertainty | Uncertainty |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 |

| Description | Maximum | CSU (TPU) for Analysis 10.60% | | |
|----------------------------------|---------|-------------------------------|-------------|-------------|
| | | of Critical | Uncertainty | Uncertainty |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| <u>Total Uncertainty</u> | Maximum | of Critical | Uncertainty | Uncertainty |
|--------------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Protocol #: 4

SWIPE_H3_C14

User :

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| PN | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 4 | 1 | 30.00 | 30 | 3.83 | 7.13 | 7.03 | 295.93 | 2 |

Pace Analytical Services
Count Start Date/Time Calculator

| | | | |
|--|--------------|-----------------|------------|
| System #3: | Protocol ID: | SWIPE_H3_C14 | |
| | Data File: | | |
| Date in upper Left hand corner of Printout | | 7/30/2012 13:09 | |
| Sample Ct Duration (min) | | 7.0 | |
| Calculated Count Start | | | |
| S# | ELTIME | Date/Time | Sample ID |
| 1 | 7 | 7/30/2012 13:02 | 3072155009 |
| 2 | 15 | 7/30/2012 13:10 | 3072155016 |
| 3 | 23 | 7/30/2012 13:18 | LCS12502 |
| 4 | 31 | 7/30/2012 13:26 | LCSD12502 |
| 5 | 39 | 7/30/2012 13:34 | 459065 |

OK
7/31/12

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 3.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 20 | 1 | 7.00 | 7 | 4.00 | 6.29 | 6.14 | 314.87 | 3 |
| 20 | 2 | 7.00 | 15 | 4.29 | 7.86 | 7.71 | 294.67 | 2 |
| 20 | 3 | 7.00 | 23 | 47.71 | 64.43 | 64.86 | 323.52 | 0 |
| 20 | 4 | 7.00 | 31 | 43.43 | 58.86 | 59.29 | 332.35 | 0 |
| 20 | 5 | 7.00 | 39 | 4.43 | 7.29 | 7.14 | 299.98 | 3 |

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-------------------|----------|---------------|--------------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| B10 Background | N/A | N/A | 3 | 4 | 7/22/12 1030 | 16 30 | MA | |
| 3072155009 | | | 20 | 20 | | 7 | | |
| W012512 | | | | | | | | |
| W012512 | | | | | | | | |
| MB 454005 | 12490 | | | | | | | |
| 613 MB 454107 | | | 5 (plate) 10 (LPS) | | | 7 | | |
| 30721101817 04107 | | | 27 | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | 12508 | | | | | 7 | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | 15 (plate) | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 31 | | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
 Matrix Smear Analyst RMK
 Batch ID 12476 PrepSOP1 0
 Prep Start 7/16/2012 12:00 PrepSOP2 n/a
 Prep Finish 7/16/2012 AnalSOP1 0
 AnalSOP2 n/a

| Uncertainty Factors | |
|---------------------|--------|
| UE1 | 5.39% |
| UE2 | 10.60% |
| UE3 | 1.00% |
| UE4 | 0.00% |



| Sample | Low Energy Beta Emitters Efficiency (cpm/dpm) | Decay Time (Years) | Decay Factor | Activity (dpm/S) | Count Uncertainty (dpm/S) | C.S.U. (dpm/S) | MDC (dpm/S) | Critical Level (dpm/S) | Zero UNC | Use UNC | Unit Conversion Factor |
|-----------|---|--------------------|--------------|------------------|---------------------------|----------------|-------------|------------------------|----------|---------|------------------------|
| 459058 | -0.0406 | 0.0000 | 1.0000 | 155.001 | -22.098 | 22.369 | -118.059 | -42.770 | -12.594 | -12.594 | 1.00 |
| LCS12476 | 0.5078 | 0.0000 | 1.0000 | 110.816 | 11.675 | 17.635 | 9.450 | 3.423 | 1.008 | 11.675 | 1.00 |
| LCSD12476 | 0.5076 | 0.0000 | 1.0000 | 108.328 | 11.561 | 17.338 | 9.453 | 3.425 | 1.008 | 11.561 | 1.00 |
| LCS12477 | 0.5221 | 0.0000 | 1.0000 | 95.465 | 10.770 | 15.673 | 9.191 | 3.330 | 0.981 | 10.770 | 1.00 |
| LCSD12477 | 0.5036 | 0.0000 | 1.0000 | 104.361 | 11.425 | 16.896 | 9.528 | 3.452 | 1.016 | 11.425 | 1.00 |
| LCS12478 | 0.4961 | 0.0000 | 1.0000 | 105.080 | 11.557 | 17.048 | 9.673 | 3.504 | 1.032 | 11.557 | 1.00 |
| LCSD12478 | 0.5041 | 0.0000 | 1.0000 | 105.391 | 11.468 | 17.015 | 9.519 | 3.448 | 1.015 | 11.468 | 1.00 |
| LCS12479 | 0.4930 | 0.0000 | 1.0000 | 106.606 | 11.671 | 17.259 | 9.733 | 3.526 | 1.038 | 11.671 | 1.00 |
| LCSD12479 | 0.4953 | 0.0000 | 1.0000 | 104.102 | 11.521 | 16.938 | 9.688 | 3.510 | 1.034 | 11.521 | 1.00 |
| LCS12480 | 0.5085 | 0.0000 | 1.0000 | 99.974 | 11.153 | 16.327 | 9.436 | 3.418 | 1.007 | 11.153 | 1.00 |
| LCSD12480 | 0.5061 | 0.0000 | 1.0000 | 113.736 | 11.831 | 18.000 | 9.482 | 3.435 | 1.011 | 11.831 | 1.00 |
| LCS12486 | 0.5221 | 0.0000 | 1.0000 | 106.957 | 11.317 | 17.053 | 9.191 | 3.330 | 0.980 | 11.317 | 1.00 |
| LCSD12486 | 0.5045 | 0.0000 | 1.0000 | 112.973 | 11.818 | 17.923 | 9.512 | 3.446 | 1.015 | 11.818 | 1.00 |
| LCS12487 | 0.4950 | 0.0000 | 1.0000 | 110.294 | 11.818 | 17.684 | 9.693 | 3.512 | 1.034 | 11.818 | 1.00 |
| LCSD12487 | 0.5028 | 0.0000 | 1.0000 | 101.694 | 11.308 | 16.583 | 9.544 | 3.458 | 1.018 | 11.308 | 1.00 |
| LCS12488 | 0.4938 | 0.0000 | 1.0000 | 100.924 | 11.386 | 16.569 | 9.717 | 3.520 | 1.037 | 11.386 | 1.00 |
| LCSD12488 | 0.4939 | 0.0000 | 1.0000 | 109.588 | 11.800 | 17.609 | 9.715 | 3.519 | 1.036 | 11.800 | 1.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

06/13/12

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12476



| Calibration Information | | | | |
|---|-------------------------------|-------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI + 15 mL Ultima LLT | 5 mL DI + 15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



Mass Aliquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | of Critical | CSU (TPU) for Preparation Uncertainty | Uncertainty | 5.39% |
|----------------------------------|----------|-------------|--|-------------|-------|
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| Description | relative | of Critical | CSU (TPU) for Yield Correction Uncertainty | Uncertainty | 1.00% |
|-----------------------------|----------|-------------|---|-------------|-------|
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 | |

| Description | Maximum | of Critical | CSU (TPU) for Analysis Uncertainty | Uncertainty | 10.60% |
|----------------------------------|---------|-------------|---------------------------------------|-------------|--------|
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 | |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| Total Uncertainty | Maximum | of Critical | Uncertainty | Uncertainty |
|-------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Protocol #: 4

SWIPE_H3_C14

User :

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 4 | 1 | 30.00 | 30 | 2.97 | 6.60 | 6.30 | 301.41 | 3 |

BKG 072012

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|-----------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/20/2012 12:10 |
| Sample Ct Duration (min) | | | 7.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 7 | 7/20/2012 12:03 | LCS12476 |
| 2 | 15 | 7/20/2012 12:11 | LCSD12476 |
| 3 | 23 | 7/20/2012 12:19 | LCS12477 |
| 4 | 31 | 7/20/2012 12:27 | LCSD12477 |
| 5 | 39 | 7/20/2012 12:35 | LCS12478 |
| 6 | 47 | 7/20/2012 12:43 | LCSD12478 |
| 7 | 55 | 7/20/2012 12:51 | LCS12479 |
| 8 | 63 | 7/20/2012 12:59 | LCSD12479 |

M
7/31/12

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 6.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 7 | 1 | 7.00 | 7 | 46.14 | 62.43 | 62.57 | 313.20 | 1 |
| 7 | 2 | 7.00 | 15 | 46.00 | 60.71 | 61.29 | 313.43 | 1 |
| 7 | 3 | 7.00 | 23 | 40.86 | 56.14 | 56.14 | 271.48 | 1 |
| 7 | 4 | 7.00 | 31 | 45.29 | 58.14 | 58.86 | 319.04 | 0 |
| 7 | 5 | 7.00 | 39 | 42.29 | 57.86 | 58.43 | 328.18 | 1 |
| 7 | 6 | 7.00 | 47 | 42.71 | 58.14 | 59.43 | 318.39 | 0 |
| 7 | 7 | 7.00 | 55 | 43.43 | 58.86 | 58.86 | 331.51 | 1 |
| 7 | 8 | 7.00 | 63 | 40.00 | 57.29 | 57.86 | 329.08 | 0 |

Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

83 of 100

Part Daily Checks Prior to Sample Protocol

| Sample No. | Worksheet | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|-----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 207210018 | | | 9 | 20 | 7/20/12 0900 | 7 | | M |
| ↓ | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| 19 | | | | | | | | |
| ↓ | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| 20 | | | | | | | | |
| ↓ | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| CS | | | | | | | | |
| CS | | | | | | | | |
| CS | | | | | | | | |
| LCSD12476 | 12476 | Swipe-43-04 | 18 | 7 | 7/26/12 0950 | 7 | NA | RMK |
| LCSD12476 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12477 | 12477 | | | | | | | |
| LCSD12477 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12478 | 12478 | | | | | | | |
| LCSD12478 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12479 | 12479 | | | | | | | |
| LCSD12479 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12480 | 12480 | | | | | | | |
| LCSD12480 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12486 | 12486 | | | | | | | |
| LCSD12486 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12487 | 12487 | | | | | | | |
| LCSD12487 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12488 | 12488 | | | | | | | |
| LCSD12488 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCSD12488 | 12488 | | | | | | | |
| LCSD12488 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |

Run comments:

Peer Review:

Low Energy Beta Sample Analysis Data

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

1 459061-BLANK for HBN 91048 [RADC/1247

Type BLANK Matrix Impact Plate Collected % Moisture
 Client QCACCOUNT WO Work ID

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 06:17 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796076 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 06:17 Dilution
 Method EPA 906.0M Col ID Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796076 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|
| Rad Chemistry | OK | | | | |
| LSC Low Energy Beta | OK | 3.97J ± 3.13 (5.68) | dpm/sa 3.97J ± 3.13 (5.68) | | dpm/sa |

2 3072155021-SU-15-20

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth Location
 1207075

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 04:41 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789876 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 04:41 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789876 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.85 ± 3.20 (5.41) | dpm/sa 5.85 ± 3.20 (5.41) | | dpm/sa | | |

3 3072155022-SU-15-21

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth Location
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

3 3072155022-SU-15-21

Prep Information

Procedure 9060 I LEB **Batch** RADC/12477 **Prep Date** 7/17/2012 04:57 **Dilution**
Method EPA 906.0M **HBN** 91048 **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789877 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 04:57 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789877 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.62J ± 2.86 (5.39) | dpm/sa 2.62J ± 2.86 (5.39) | | dpm/sa | | |

4 3072155023-SU-15-22

Type PS **Matrix** Wipe **Collected** 6/20/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12477 **Prep Date** 7/17/2012 05:13 **Dilution**
Method EPA 906.0M **HBN** 91048 **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789878 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 05:13 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/17/2012 23:59 **Analyst** RMK
Schedule 2789878 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.61 ± 3.27 (5.40) | dpm/sa 6.61 ± 3.27 (5.40) | | dpm/sa | | |

5 3072155024-SU-15-23

Type PS **Matrix** Wipe **Collected** 6/20/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

5 3072155024-SU-15-23

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 05:29 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789879 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 05:29 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789879 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.74U ± 2.78 (5.40) | dpm/sa 1.74U ± 2.78 (5.40) | | | dpm/sa | |

6 3072155025-SU-15-24

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 06:33 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789880 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 06:33 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789880 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.16J ± 3.02 (5.40) | dpm/sa 4.16J ± 3.02 (5.40) | | | dpm/sa | |

7 3072155026-SU-15-25

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

7 3072155026-SU-15-25

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 06:49 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789881 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 06:49 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789881 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.24J ± 2.83 (5.41) | dpm/sa 2.24J ± 2.83 (5.41) | | dpm/sa | | |

8 3072155027-SU-15-26

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 07:05 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789882 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 07:05 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789882 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.91J ± 2.99 (5.40) | dpm/sa 3.91J ± 2.99 (5.40) | | dpm/sa | | |

9 3072155028-SU-15-27

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

9 3072155028-SU-15-27

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 07:21 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789883 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 07:21 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789883 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.86U ± 2.81 (5.44) | dpm/sa 1.86U ± 2.81 (5.44) | | | dpm/sa | |

10 3072155029-SU-15-28

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 07:37 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789884 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 07:37 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789884 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.14 ± 3.24 (5.45) | dpm/sa 6.14 ± 3.24 (5.45) | | | dpm/sa | |

11 3072155030-SU-15-29

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

11 3072155030-SU-15-29

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 07:53 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789885 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 07:53 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789885 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.60U ± 2.76 (5.40) | dpm/sa 1.60U ± 2.76 (5.40) | | dpm/sa | | |

12 3072155031-SU-15-30

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 08:10 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789886 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 08:10 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789886 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.14J ± 2.91 (5.40) | dpm/sa 3.14J ± 2.91 (5.40) | | dpm/sa | | |

13 3072155032-SU-15-30D

Type PS Matrix Wipe Collected 6/20/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

13 3072155032-SU-15-30D

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 08:26 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789887 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 08:26 Dilution
 Method EPA 906.0M Col ID Hold Date 12/17/2012 23:59 Analyst RMK
 Schedule 2789887 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Req. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.73U ± 2.78 (5.40) | dpm/sa 1.73U ± 2.78 (5.40) | | dpm/sa | | |

14 3072155033-SU-06-1

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 08:42 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789888 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 08:42 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789888 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Req. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.85U ± 2.79 (5.40) | dpm/sa 1.85U ± 2.79 (5.40) | | dpm/sa | | |

15 3072155034-SU-06-2

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

15 3072155034-SU-06-2

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 08:58 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789889 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 08:58 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789889 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.36 ± 3.24 (5.40) | dpm/sa 6.36 ± 3.24 (5.40) | | dpm/sa | | |

16 3072155035-SU-06-2D

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 09:14 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789890 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 09:14 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789890 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.78J ± 2.98 (5.40) | dpm/sa 3.78J ± 2.98 (5.40) | | dpm/sa | | |

17 3072155036-SU-06-3

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth Location
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 HBN 91048
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

17 3072155036-SU-06-3

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 09:30 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789891 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 09:30 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789891 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.53J ± 2.95 (5.40) | dpm/sa 3.53J ± 2.95 (5.40) | | dpm/sa | | |

18 3072155037-SU-06-4

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12477 Prep Date 7/17/2012 09:46 Dilution
 Method EPA 906.0M HBN 91048 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789892 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 09:46 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789892 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.05J ± 3.01 (5.40) | dpm/sa 4.05J ± 3.01 (5.40) | | dpm/sa | | |

19 3072155038-SU-06-5

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 **HBN** 91048
Rule 9060 I LEB **Status** RE
Create Date 6/28/2012 **Analyst** RMK

19 3072155038-SU-06-5

Prep Information

Procedure 9060 I LEB **Batch** RADC/12477 **Prep Date** 7/17/2012 10:02 **Dilution**
Method EPA 906.0M **HBN** 91048 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789893 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 10:02 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789893 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|--------|---------------------------|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.55J ± 3.06 (5.41) | dpm/sa | 4.55J ± 3.06 (5.41) | | dpm/sa | |

20 3072155039-SU-06-6

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth **Location**
 1207075

Prep Information

Procedure 9060 I LEB **Batch** RADC/12477 **Prep Date** 7/17/2012 10:18 **Dilution**
Method EPA 906.0M **HBN** 91048 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789894 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 10:18 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789894 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|--------|---------------------------|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.31J ± 3.04 (5.42) | dpm/sa | 4.31J ± 3.04 (5.42) | | dpm/sa | |

21 3072155040-SU-06-7

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth **Location**
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12477 **HBN** 91048
Rule 9060 | LEB **Status** RE
Create Date 6/28/2012 **Analyst** RMK

21 3072155040-SU-06-7

Prep Information

| | | | |
|-----------------------------|-------------------------|----------------------------------|--------------------|
| Procedure 9060 LEB | Batch RADC/12477 | Prep Date 7/17/2012 10:34 | Dilution |
| Method EPA 906.0M | HBN 91048 | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789895 | Instru NONE | | CC OK F |
| Initial Volume 1 mL Default | 1 mL | | |
| Final Volume, 1 mL Default | 1 mL | | |

Analytical Information

| | | | |
|-----------------------------|--------------------|----------------------------------|--------------------|
| Procedure 9060 LEB | Instru NONE | Run Date 7/17/2012 10:34 | Dilution |
| Method EPA 906.0M | Col ID | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789895 | File | | CC OK F |

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|----------------------------|-----------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 0.578U ± 2.66 (5.40) | dpm/sa 0.578U ± 2.66 (5.40) | | dpm/sa | | |

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Creation Date 06/28/2012 13:44 Assigned Analyst RMK
 Batch ID 12477 Earliest Due Date 07/04/2012 07:12
 A-code 9060 I LEB 9060W HBN 91048
 Method EPA 906.0M EPA 906.0m

| Project | Sample ID | Sample Type | Matrix | Collection Date/Time | Client ID | LEB Activity | LEB Unc. | LEB MDC | Analysis Date/Time |
|---------|------------|-------------|--------|----------------------|-----------|--------------|----------|---------|--------------------|
| | 459061 | BLANK | IP | | QCACCOUNT | 3.97J | 3.13 | 5.68 | 7/17/12 6:17 |
| 3072155 | 3072155021 | PS | WP | 6/20/2012 0:01 | RTI | 5.85 | 3.20 | 5.41 | 7/17/12 4:41 |
| 3072155 | 3072155022 | PS | WP | 6/20/2012 0:01 | RTI | 2.62J | 2.86 | 5.39 | 7/17/12 4:57 |
| 3072155 | 3072155023 | PS | WP | 6/20/2012 0:01 | RTI | 6.61 | 3.27 | 5.40 | 7/17/12 5:13 |
| 3072155 | 3072155024 | PS | WP | 6/20/2012 0:01 | RTI | 1.74U | 2.78 | 5.40 | 7/17/12 5:29 |
| 3072155 | 3072155025 | PS | WP | 6/20/2012 0:01 | RTI | 4.16J | 3.02 | 5.40 | 7/17/12 6:33 |
| 3072155 | 3072155026 | PS | WP | 6/20/2012 0:01 | RTI | 2.24J | 2.83 | 5.41 | 7/17/12 6:49 |
| 3072155 | 3072155027 | PS | WP | 6/20/2012 0:01 | RTI | 3.91J | 2.99 | 5.40 | 7/17/12 7:05 |
| 3072155 | 3072155028 | PS | WP | 6/20/2012 0:01 | RTI | 1.86U | 2.81 | 5.44 | 7/17/12 7:21 |
| 3072155 | 3072155029 | PS | WP | 6/20/2012 0:01 | RTI | 6.14 | 3.24 | 5.45 | 7/17/12 7:37 |
| 3072155 | 3072155030 | PS | WP | 6/20/2012 0:01 | RTI | 1.60U | 2.76 | 5.40 | 7/17/12 7:53 |
| 3072155 | 3072155031 | PS | WP | 6/20/2012 0:01 | RTI | 3.14J | 2.91 | 5.40 | 7/17/12 8:10 |
| 3072155 | 3072155032 | PS | WP | 6/20/2012 0:01 | RTI | 1.73U | 2.78 | 5.40 | 7/17/12 8:26 |
| 3072155 | 3072155033 | PS | WP | 6/11/2012 0:01 | RTI | 1.85U | 2.79 | 5.40 | 7/17/12 8:42 |
| 3072155 | 3072155034 | PS | WP | 6/11/2012 0:01 | RTI | 6.36 | 3.24 | 5.40 | 7/17/12 8:58 |
| 3072155 | 3072155035 | PS | WP | 6/11/2012 0:01 | RTI | 3.78J | 2.98 | 5.40 | 7/17/12 9:14 |
| 3072155 | 3072155036 | PS | WP | 6/11/2012 0:01 | RTI | 3.53J | 2.95 | 5.40 | 7/17/12 9:30 |
| 3072155 | 3072155037 | PS | WP | 6/11/2012 0:01 | RTI | 4.05J | 3.01 | 5.40 | 7/17/12 9:46 |
| 3072155 | 3072155038 | PS | WP | 6/11/2012 0:01 | RTI | 4.55J | 3.06 | 5.41 | 7/17/12 10:02 |
| 3072155 | 3072155039 | PS | WP | 6/11/2012 0:01 | RTI | 4.31J | 3.04 | 5.42 | 7/17/12 10:18 |
| 3072155 | 3072155040 | PS | WP | 6/11/2012 0:01 | RTI | 0.578U | 2.66 | 5.40 | 7/17/12 10:34 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Handwritten signature: R7/20/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation



Test Code Low Energy Beta
 Matrix Smear
 Batch ID 12477
 Prep Start 7/16/2012 12:00
 Prep Finish 7/16/2012
 Act. Rpt Units dpm

Analyst RMK
 PrepSOP1
 PrepSOP2 n/a
 AnalSOP1
 AnalSOP2 n/a
 Aliq. Rpt Units Sample

Bkg CPM 4.77
 Bkg Duration 30.0 min
 Bkg Ref BKG 7/17/2012
 Bkg Ct Date/Time: 7/17/2012 13:09
 Instrument ID: System #3

| Sample | Analysis Volume (Sample) | Ref. Date | Count Duration (min) | Count Start Date/Time | Sample Gross CPM | TSIE # | Activity Report Units | TSIE Within Quench Curve |
|------------|--------------------------|--------------|----------------------|-----------------------|------------------|--------|-----------------------|--------------------------|
| 459061 | 1.0 | 7/17/12 6:17 | 15.0 | 7/17/12 6:17 | 6.73 | 331.0 | dpm/S | High, Evaluate |
| 3072155021 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 4:41 | 7.80 | 254.0 | dpm/S | Pass |
| 3072155022 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 4:57 | 6.13 | 269.4 | dpm/S | Pass |
| 3072155023 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 5:13 | 8.20 | 281.6 | dpm/S | Pass |
| 3072155024 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 5:29 | 5.67 | 257.3 | dpm/S | Pass |
| 3072155025 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 6:33 | 6.93 | 282.1 | dpm/S | Pass |
| 3072155026 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 6:49 | 5.93 | 284.2 | dpm/S | Pass |
| 3072155027 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 7:05 | 6.80 | 282.2 | dpm/S | Pass |
| 3072155028 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 7:21 | 5.73 | 294.1 | dpm/S | Pass |
| 3072155029 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 7:37 | 7.93 | 297.1 | dpm/S | Pass |
| 3072155030 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 7:53 | 5.60 | 279.0 | dpm/S | Pass |
| 3072155031 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 8:10 | 6.40 | 263.0 | dpm/S | Pass |
| 3072155032 | 1.0 | 6/20/12 0:01 | 15.0 | 7/17/12 8:26 | 5.67 | 281.7 | dpm/S | Pass |
| 3072155033 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 8:42 | 5.73 | 275.1 | dpm/S | Pass |
| 3072155034 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 8:58 | 8.07 | 272.4 | dpm/S | Pass |
| 3072155035 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 9:14 | 6.73 | 269.7 | dpm/S | Pass |
| 3072155036 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 9:30 | 6.60 | 276.9 | dpm/S | Pass |
| 3072155037 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 9:46 | 6.87 | 264.9 | dpm/S | Pass |
| 3072155038 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 10:02 | 7.13 | 280.4 | dpm/S | Pass |
| 3072155039 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 10:18 | 7.00 | 255.6 | dpm/S | Pass |
| 3072155040 | 1.0 | 6/11/12 0:01 | 15.0 | 7/17/12 10:34 | 5.07 | 273.5 | dpm/S | Pass |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation



| Uncertainty Factors | |
|---------------------|--------|
| UE1 | 5.39% |
| UE2 | 10.60% |
| UE3 | 1.00% |
| UE4 | 0.00% |

Test Code Low Energy Beta Analyst RMK
 Matrix Smear PrepSOP1 0
 Batch ID 12477 PrepSOP2 n/a
 Prep Start 7/16/2012 12:00 AnaISOP1 0
 Prep Finish 7/16/2012 AnaISOP2 n/a

| Sample | Low Energy Beta Emitters Efficiency (cpm/dpm) | Decay Time (Years) | Decay Factor | Activity (dpm/S) | Count Uncertainty (dpm/S) | C.S.U. (dpm/S) | MDC (dpm/S) | Critical Level (dpm/S) | Zero UNC | Use UNC | Unit Conversion Factor |
|------------|---|--------------------|--------------|------------------|---------------------------|----------------|-------------|------------------------|----------|---------|------------------------|
| 459061 | 0.4935 | 0.0000 | 1.0000 | 3.972 | 3.096 | 3.132 | 5.680 | 2.309 | 0.534 | 3.096 | 1.00 |
| 3072155021 | 0.5201 | 0.0745 | 0.9959 | 5.850 | 3.118 | 3.195 | 5.412 | 2.200 | 0.509 | 3.118 | 1.00 |
| 3072155022 | 0.5221 | 0.0745 | 0.9959 | 2.616 | 2.840 | 2.857 | 5.391 | 2.192 | 0.507 | 2.840 | 1.00 |
| 3072155023 | 0.5211 | 0.0745 | 0.9959 | 6.610 | 3.173 | 3.269 | 5.401 | 2.196 | 0.508 | 3.173 | 1.00 |
| 3072155024 | 0.5208 | 0.0745 | 0.9959 | 1.735 | 2.769 | 2.777 | 5.404 | 2.197 | 0.508 | 2.769 | 1.00 |
| 3072155025 | 0.5210 | 0.0747 | 0.9958 | 4.163 | 2.977 | 3.018 | 5.402 | 2.197 | 0.508 | 2.977 | 1.00 |
| 3072155026 | 0.5206 | 0.0747 | 0.9958 | 2.238 | 2.815 | 2.828 | 5.407 | 2.198 | 0.508 | 2.815 | 1.00 |
| 3072155027 | 0.5210 | 0.0747 | 0.9958 | 3.913 | 2.956 | 2.993 | 5.403 | 2.197 | 0.508 | 2.956 | 1.00 |
| 3072155028 | 0.5176 | 0.0748 | 0.9958 | 1.862 | 2.797 | 2.805 | 5.437 | 2.211 | 0.511 | 2.797 | 1.00 |
| 3072155029 | 0.5165 | 0.0748 | 0.9958 | 6.144 | 3.160 | 3.244 | 5.450 | 2.216 | 0.512 | 3.160 | 1.00 |
| 3072155030 | 0.5215 | 0.0748 | 0.9958 | 1.598 | 2.754 | 2.760 | 5.397 | 2.194 | 0.507 | 2.754 | 1.00 |
| 3072155031 | 0.5217 | 0.0749 | 0.9958 | 3.137 | 2.887 | 2.911 | 5.395 | 2.193 | 0.507 | 2.887 | 1.00 |
| 3072155032 | 0.5211 | 0.0749 | 0.9958 | 1.734 | 2.768 | 2.776 | 5.402 | 2.196 | 0.508 | 2.768 | 1.00 |
| 3072155033 | 0.5219 | 0.0996 | 0.9945 | 1.850 | 2.778 | 2.786 | 5.400 | 2.196 | 0.508 | 2.778 | 1.00 |
| 3072155034 | 0.5220 | 0.0996 | 0.9945 | 6.356 | 3.152 | 3.242 | 5.399 | 2.195 | 0.507 | 3.152 | 1.00 |
| 3072155035 | 0.5221 | 0.0996 | 0.9945 | 3.775 | 2.943 | 2.977 | 5.398 | 2.195 | 0.507 | 2.943 | 1.00 |
| 3072155036 | 0.5217 | 0.0996 | 0.9945 | 3.527 | 2.924 | 2.954 | 5.402 | 2.196 | 0.508 | 2.924 | 1.00 |
| 3072155037 | 0.5219 | 0.0997 | 0.9945 | 4.046 | 2.966 | 3.005 | 5.401 | 2.196 | 0.508 | 2.966 | 1.00 |
| 3072155038 | 0.5213 | 0.0997 | 0.9945 | 4.553 | 3.011 | 3.060 | 5.407 | 2.198 | 0.508 | 3.011 | 1.00 |
| 3072155039 | 0.5205 | 0.0997 | 0.9945 | 4.309 | 2.995 | 3.039 | 5.415 | 2.202 | 0.509 | 2.995 | 1.00 |
| 3072155040 | 0.5220 | 0.0998 | 0.9945 | 0.578 | 2.662 | 2.663 | 5.399 | 2.195 | 0.508 | 2.662 | 1.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Quality Control Sample Performance Assessment

RCDU Upload



Analyst: RMK
Date: 7/31/2012
Worklist: 12477
Matrix: Filler

Method: EPA 906.0M
SOP:
MB Sample ID: 459061

| Method Blank Assessment | | | |
|-------------------------|----------------|---------|------------|
| Analyte | Activity | MDC | Assessment |
| LSC Low Energy Beta | 3.9720 | 5.6800 | |
| | 1.96 Sig Unc. | 2.30900 | |
| | Critical Value | | |
| | Flag | | |

| Laboratory Control Sample Assessment | | | |
|--------------------------------------|---------------|---------------|------|
| Analyte: | LCS | LCSD | LCSD |
| LSC Low Energy Beta | 7/20/12 12:19 | 7/20/12 12:27 | |
| Count Date: | 09-009LEB | 09-009LEB | |
| Spike I.D.: | 1184.941 | 1184.941 | |
| Spike Concentration (DPM/Sample): | 0.100 | 0.100 | |
| Volume Used (mL): | 1.000 | 1.000 | |
| Aliquot Volume (L, g, F): | 118.494 | 118.494 | |
| Target Conc. (DPM/Sample, g, F): | 2.137 | 2.137 | |
| 1.96 Sigma Uncertainty (Calculated): | 95.465 | 104.361 | |
| Result (DPM/Sample, g, F): | 15.673 | 16.896 | |
| 1.96 Sigma Unc: | 80.57% | 88.07% | |
| % Recovery: | Pass | Pass | |
| Assessment: | 125.00% | 125.00% | |
| Upper % Recovery Limits: | 75.00% | 75.00% | |
| Lower % Recovery Limits: | | | |

| Duplicate Sample Assessment | | | |
|---|-----------|--|--|
| LCS/LCSD Y or N? | Y | | |
| Analyte: SC Low Energy Beta | | | |
| Sample I.D.: | LCS12477 | | |
| Duplicate Sample I.D.: | LCSD12477 | | |
| Sample Result (DPM/Sample, g, F): | 95.4650 | | |
| 1.96 Sigma Unc: | 15.6730 | | |
| Sample Duplicate Result (DPM/Sample, g, F): | 104.3610 | | |
| Duplicate Sample 1.96 Sigma Unc: | 16.8960 | | |
| Either results below MDC? | NO | | |
| Relative Percent Difference: | 8.90% | | |
| Assessment: | Pass | | |
| % RPD Limit: | 25.00% | | |

Evaluation of duplicate precision is not applicable if either the sample or duplicate results are below the MDC.

Comments:

July 31/12

| Sample Matrix Spike Control Assessment | |
|---|--|
| Analyte: | |
| Sample Collection Date: | |
| Sample I.D.: | |
| Sample MS I.D.: | |
| Sample MSD I.D.: | |
| MS/MSD Decay Corrected Spike Conc. (DPM/Sample): | |
| Spike Volume Used in MS (mL): | |
| MS Aliquot (L, g, F): | |
| MS Target Conc. (DPM/Sample, g, F): | |
| MSD Aliquot (L, g, F): | |
| MSD Target Conc. (DPM/Sample, g, F): | |
| MSD Spike uncertainty (calculated): | |
| MSD Spike uncertainty (calculated): | |
| Sample Result: | |
| Sample 1.96 Sigma Unc.: | |
| Sample Matrix Spike Result: | |
| Sample MS 1.96 Sigma Unc.: | |
| Sample Matrix Spike Duplicate Result: | |
| Sample MSD 1.96 Sigma Unc.: | |
| MS % Recovery: | |
| MSD % Recovery: | |
| MS Assessment: | |
| MSD Assessment: | |
| MS/MSD Upper % Recovery Limits: | |
| MS/MSD Lower % Recovery Limits: | |
| Matrix Spike/Matrix Spike Duplicate Sample Assessment | |

| Matrix Spike/Matrix Spike Duplicate Sample Assessment | |
|---|--|
| Analyte: | |
| Sample I.D.: | |
| Sample MS I.D.: | |
| Sample MSD I.D.: | |
| Sample Matrix Spike Result: | |
| Sample Matrix Spike 1.96 Sigma Unc.: | |
| Sample Matrix Spike Duplicate Result: | |
| Sample Matrix Spike Duplicate 1.96 Sigma Unc.: | |
| MS/MSD Relative Percent Difference: | |
| MS/MSD RPD Assessment: | |
| % RPD Limit: | |

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12477



| Calibration Information | | | | |
|---|------------------------------|------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI +15 mL Ultima LLT | 5 mL DI +15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Protocol #: 2

SWIPE_H3_C14

User :

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 2 | 1 | 30.00 | 30 | 2.13 | 5.53 | 4.77 | 300.09 | 7 |

Bkg 071712

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/17/2012 0:22 | |
| | | Sample Ct Duration (min) | 15.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 15 | 7/17/2012 0:07 | 459058 |
| 2 | 31 | 7/17/2012 0:23 | 3072155001 |
| 3 | 47 | 7/17/2012 0:39 | 3072155002 |
| 4 | 63 | 7/17/2012 0:55 | 3072155003 |
| 5 | 79 | 7/17/2012 1:11 | 3072155004 |
| 6 | 95 | 7/17/2012 1:27 | 3072155005 |
| 7 | 112 | 7/17/2012 1:44 | 3072155006 |
| 8 | 128 | 7/17/2012 2:00 | 3072155007 |
| 9 | 144 | 7/17/2012 2:16 | 3072155008 |
| 10 | 160 | 7/17/2012 2:32 | 3072155010 |
| 11 | 176 | 7/17/2012 2:48 | 3072155011 |
| 12 | 192 | 7/17/2012 3:04 | 3072155012 |
| 13 | 208 | 7/17/2012 3:20 | 3072155013 |
| 14 | 225 | 7/17/2012 3:37 | 3072155014 |
| 15 | 241 | 7/17/2012 3:53 | 3072155017 |
| 16 | 257 | 7/17/2012 4:09 | 3072155018 |
| 17 | 273 | 7/17/2012 4:25 | 3072155019 |
| 18 | 289 | 7/17/2012 4:41 | 3072155021 |
| 19 | 305 | 7/17/2012 4:57 | 3072155022 |
| 20 | 321 | 7/17/2012 5:13 | 3072155023 |
| 21 | 337 | 7/17/2012 5:29 | 3072155024 |
| 22 | 353 | 7/17/2012 5:45 | LCS |
| 23 | 369 | 7/17/2012 6:01 | LCSD |
| 24 | 385 | 7/17/2012 6:17 | 459061 |
| 25 | 401 | 7/17/2012 6:33 | 3072155025 |
| 26 | 417 | 7/17/2012 6:49 | 3072155026 |
| 27 | 433 | 7/17/2012 7:05 | 3072155027 |
| 28 | 449 | 7/17/2012 7:21 | 3072155028 |
| 29 | 465 | 7/17/2012 7:37 | 3072155029 |
| 30 | 481 | 7/17/2012 7:53 | 3072155030 |
| 31 | 498 | 7/17/2012 8:10 | 3072155031 |
| 32 | 514 | 7/17/2012 8:26 | 3072155032 |
| 33 | 530 | 7/17/2012 8:42 | 3072155033 |
| 34 | 546 | 7/17/2012 8:58 | 3072155034 |
| 35 | 562 | 7/17/2012 9:14 | 3072155035 |
| 36 | 578 | 7/17/2012 9:30 | 3072155036 |
| 37 | 594 | 7/17/2012 9:46 | 3072155037 |
| 38 | 610 | 7/17/2012 10:02 | 3072155038 |
| 39 | 626 | 7/17/2012 10:18 | 3072155039 |
| 40 | 642 | 7/17/2012 10:34 | 3072155040 |
| 41 | 659 | 7/17/2012 10:51 | 3072155041 |
| 42 | 675 | 7/17/2012 11:07 | 3072155042 |
| 43 | 691 | 7/17/2012 11:23 | 3072155043 |
| 44 | 707 | 7/17/2012 11:39 | 3072155044 |
| 45 | 722 | 7/17/2012 11:54 | LCS |
| 46 | 738 | 7/17/2012 12:10 | LCSD |

Time: 15.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

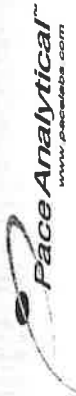
| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 1 | 15.00 | 15 | 4.13 | 7.27 | 7.13 | 322.27 | 3 |
| 19 | 2 | 15.00 | 31 | 3.87 | 6.87 | 6.60 | 287.68 | 3 |
| 19 | 3 | 15.00 | 47 | 3.73 | 6.87 | 6.80 | 231.53 | 2 |
| 19 | 4 | 15.00 | 63 | 4.67 | 7.93 | 8.00 | 287.20 | 2 |
| 19 | 5 | 15.00 | 79 | 3.07 | 6.67 | 6.53 | 271.83 | 3 |
| 19 | 6 | 15.00 | 95 | 3.07 | 6.07 | 6.00 | 286.15 | 2 |
| 19 | 7 | 15.00 | 112 | 3.80 | 6.67 | 6.53 | 279.56 | 3 |
| 19 | 8 | 15.00 | 128 | 3.40 | 6.07 | 6.00 | 300.39 | 3 |
| 19 | 9 | 15.00 | 144 | 2.93 | 5.87 | 5.73 | 320.15 | 3 |
| 19 | 10 | 15.00 | 160 | 3.87 | 7.00 | 6.93 | 291.35 | 3 |
| 19 | 11 | 15.00 | 176 | 3.00 | 6.47 | 6.33 | 251.48 | 3 |
| 19 | 12 | 15.00 | 192 | 3.27 | 6.27 | 6.13 | 280.24 | 3 |
| 19 | 13 | 15.00 | 208 | 3.47 | 6.53 | 6.47 | 300.44 | 2 |
| 19 | 14 | 15.00 | 225 | 4.27 | 7.20 | 7.20 | 279.89 | 3 |
| 19 | 15 | 15.00 | 241 | 3.33 | 6.40 | 6.33 | 284.34 | 2 |
| 19 | 16 | 15.00 | 257 | 3.07 | 6.27 | 6.07 | 269.68 | 3 |
| 19 | 17 | 15.00 | 273 | 3.80 | 7.60 | 7.60 | 265.33 | 2 |
| 19 | 18 | 15.00 | 289 | 4.07 | 7.80 | 7.80 | 254.00 | 2 |
| 19 | 19 | 15.00 | 305 | 3.33 | 6.20 | 6.13 | 269.40 | 3 |
| 19 | 20 | 15.00 | 321 | 4.93 | 8.20 | 8.20 | 281.60 | 2 |
| 19 | 21 | 15.00 | 337 | 2.73 | 5.67 | 5.67 | 257.25 | 3 |
| 19 | 22 | 14.58 | 353 | 672.98 | 677.71 | 702.88 | 321.86 | 0 |
| 19 | 23 | 14.71 | 369 | 665.74 | 672.06 | 695.85 | 322.33 | 0 |
| 19 | 24 | 15.00 | 385 | 4.67 | 6.93 | 6.73 | 331.04 | 2 |
| 19 | 25 | 15.00 | 401 | 4.47 | 6.93 | 6.93 | 282.14 | 2 |
| 19 | 26 | 15.00 | 417 | 2.87 | 6.07 | 5.93 | 284.20 | 4 |
| 19 | 27 | 15.00 | 433 | 3.73 | 6.87 | 6.80 | 282.17 | 3 |
| 19 | 28 | 15.00 | 449 | 3.07 | 5.93 | 5.73 | 294.14 | 3 |
| 19 | 29 | 15.00 | 465 | 4.47 | 8.13 | 7.93 | 297.13 | 2 |
| 19 | 30 | 15.00 | 481 | 3.87 | 5.80 | 5.60 | 279.02 | 4 |
| 19 | 31 | 15.00 | 498 | 2.73 | 6.53 | 6.40 | 262.99 | 3 |
| 19 | 32 | 15.00 | 514 | 3.13 | 5.80 | 5.67 | 281.66 | 2 |
| 19 | 33 | 15.00 | 530 | 3.07 | 5.67 | 5.73 | 275.08 | 3 |
| 19 | 34 | 15.00 | 546 | 4.27 | 8.13 | 8.07 | 272.44 | 2 |
| 19 | 35 | 15.00 | 562 | 3.73 | 6.60 | 6.73 | 269.66 | 2 |
| 19 | 36 | 15.00 | 578 | 3.00 | 6.60 | 6.60 | 276.94 | 2 |
| 19 | 37 | 15.00 | 594 | 4.07 | 6.93 | 6.87 | 264.90 | 2 |
| 19 | 38 | 15.00 | 610 | 3.60 | 7.20 | 7.13 | 280.41 | 2 |
| 19 | 39 | 15.00 | 626 | 4.20 | 7.00 | 7.00 | 255.59 | 2 |

Protocol #:19

SWIFE_H3_C14

User :

| F# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tsIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 40 | 15.00 | 642 | 2.13 | 5.13 | 5.07 | 273.48 | 3 |
| 19 | 41 | 15.00 | 659 | 3.67 | 6.40 | 6.33 | 268.20 | 3 |
| 19 | 42 | 15.00 | 675 | 3.60 | 6.40 | 6.33 | 320.47 | 2 |
| 19 | 43 | 15.00 | 691 | 2.13 | 5.87 | 5.80 | 290.94 | 3 |
| 19 | 44 | 15.00 | 707 | 4.53 | 7.73 | 7.73 | 318.14 | 2 |
| 19 | 45 | 14.55 | 722 | 674.64 | 680.55 | 705.70 | 327.71 | 0 |
| 19 | 46 | 14.55 | 738 | 673.95 | 680.21 | 704.40 | 318.60 | 0 |



Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| DELAY | NA | | | | 7/16/12 2135 | 30 | NA | RMLK |
| DELAY | ↓ | | | | ↓ | ↓ | | |
| BKG 071612 | NA | Swipe-H3-C14 | 20 | 19 | 7/16/12 2135 | 15 | | |
| 3072155001 | 12476 | | | | | | | |
| 002 | | | | | | | | |
| 003 | | | | | | | | |
| 004 | | | | | | | | |
| 005 | | | | | | | | |
| 006 | | | | | | | | |
| 007 | | | | | | | | |
| 008 | | | | | | | | |
| 010 | | | | | | | | |
| 011 | | | | | | | | |
| 012 | | | | | | | | |
| 013 | | | | | | | | |
| 014 | | | 17 | | | | | |
| 017 | | | | | | | | |
| 018 | | | | | | | | |
| 019 | | | | | | | | |
| 021 | 12477 | | | | | | | |
| 022 | ↓ | | | | | | | |
| 023 | ↓ | | | | | | | |
| 024 | ↓ | | | | | | | |
| LCS | NA | | | | | | | |

Run comments:

Peer Review:

Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|----------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| LCS DA 7/16/12 | NA | Swipe-H3-cl4 | 17 | 19 | 7/16/12 2135 | 15 | NA | RMLK |
| BAG-MB(459058) | 12476 | | ↓ | | | | | |
| 3072155025 | 12477 | | 15 | | | | | |
| 026 | | | | | | | | |
| 027 | | | | | | | | |
| 028 | | | | | | | | |
| 029 | | | | | | | | |
| 030 | | | | | | | | |
| 031 | | | | | | | | |
| 032 | | | | | | | | |
| 033 | | | | | | | | |
| 034 | | | | | | | | |
| 035 | | | | | | | | |
| 036 | | | | | | | | |
| 037 | | | | | | | | |
| 038 | | | | | | | | |
| 039 | | | | | | | | |
| 040 | | | | | | | | |
| 041 | 12478 | | | | | | | |
| 042 | | | | | | | | |
| 043 | | | | | | | | |
| 044 | | | | | | | | |
| LCS | NA | | | | | | | |
| LCS | ↓ | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation



Test Code Low Energy Beta
 Matrix Smear
 Batch ID 12476
 Prep Start 7/16/2012 12:00
 Prep Finish 7/16/2012
 Act. Rpt Units dpm

Analyst RMK
 PrepSOP1
 PrepSOP2 n/a
 AnalSOP1
 AnalSOP2 n/a
 Aliq. Rpt Units Sample

Bkg CPM 6.30
 Bkg Duration 30.0 min
 Bkg Ref bkg 07/20/2012
 Bkg Ct Date/Time: 7/20/2012 10:25
 Instrument ID: System #3

| Sample | Analysis Volume (Sample) | Ref. Date | Count Duration (min) | Count Start Date/Time | Sample Gross CPM | TSIE # | Activity Report Units | TSIE Within Quench Curve |
|-----------|--------------------------|---------------|----------------------|-----------------------|------------------|--------|-----------------------|--------------------------|
| 459058 | 1.0 | 1/0/00 0:00 | 7.0 | | | | dpm/S | Low, Reprep |
| LCS12476 | 1.0 | 7/20/12 12:03 | 7.0 | 7/20/12 12:03 | 62.57 | 313.2 | dpm/S | High, Evaluate |
| LCSD12476 | 1.0 | 7/20/12 12:11 | 7.0 | 7/20/12 12:11 | 61.29 | 313.4 | dpm/S | High, Evaluate |
| LCS12477 | 1.0 | 7/20/12 12:19 | 7.0 | 7/20/12 12:19 | 56.14 | 271.5 | dpm/S | Pass |
| LCSD12477 | 1.0 | 7/20/12 12:27 | 7.0 | 7/20/12 12:27 | 58.86 | 319.0 | dpm/S | High, Evaluate |
| LCS12478 | 1.0 | 7/20/12 12:35 | 7.0 | 7/20/12 12:35 | 58.43 | 328.2 | dpm/S | High, Evaluate |
| LCSD12478 | 1.0 | 7/20/12 12:43 | 7.0 | 7/20/12 12:43 | 59.43 | 318.4 | dpm/S | High, Evaluate |
| LCS12479 | 1.0 | 7/20/12 12:51 | 7.0 | 7/20/12 12:51 | 58.86 | 331.5 | dpm/S | High, Evaluate |
| LCSD12479 | 1.0 | 7/20/12 12:59 | 7.0 | 7/20/12 12:59 | 57.86 | 329.1 | dpm/S | High, Evaluate |
| LCS12480 | 1.0 | 7/20/12 13:19 | 7.0 | 7/20/12 13:19 | 57.14 | 312.1 | dpm/S | Pass |
| LCSD12480 | 1.0 | 7/20/12 13:27 | 7.0 | 7/20/12 13:27 | 63.86 | 315.7 | dpm/S | High, Evaluate |
| LCS12486 | 1.0 | 7/20/12 13:35 | 7.0 | 7/20/12 13:35 | 62.14 | 269.0 | dpm/S | Pass |
| LCSD12486 | 1.0 | 7/20/12 13:43 | 7.0 | 7/20/12 13:43 | 63.29 | 317.9 | dpm/S | High, Evaluate |
| LCS12487 | 1.0 | 7/20/12 13:51 | 7.0 | 7/20/12 13:51 | 60.90 | 329.4 | dpm/S | High, Evaluate |
| LCSD12487 | 1.0 | 7/20/12 13:59 | 7.0 | 7/20/12 13:59 | 57.43 | 320.2 | dpm/S | High, Evaluate |
| LCS12488 | 1.0 | 7/20/12 14:07 | 7.0 | 7/20/12 14:07 | 56.14 | 330.7 | dpm/S | High, Evaluate |
| LCSD12488 | 1.0 | 7/20/12 14:15 | 7.0 | 7/20/12 14:15 | 60.43 | 330.5 | dpm/S | High, Evaluate |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
Matrix Smear
Batch ID 12476
Prep Start 7/16/2012 12:00
Prep Finish 7/16/2012

Analyst RMK
PrepSOP1 0
PrepSOP2 n/a
AnalSOP1 0
AnalSOP2 n/a

| Uncertainty Factors | |
|---------------------|--------|
| <i>UE1</i> | 5.39% |
| <i>UE2</i> | 10.60% |
| <i>UE3</i> | 1.00% |
| <i>UE4</i> | 0.00% |



| Sample | Low Energy Beta Emitters Efficiency (cpm/dpm) | Decay Time (Years) | Decay Factor | Activity (dpm/S) | Count Uncertainty (dpm/S) | C.S.U. (dpm/S) | MDC (dpm/S) | Critical Level (dpm/S) | Zero UNC | Use UNC | Unit Conversion Factor |
|-----------|---|--------------------|--------------|------------------|---------------------------|----------------|-------------|------------------------|----------|---------|------------------------|
| 459058 | -0.0406 | 0.0000 | 1.0000 | 155.001 | -22.098 | 22.369 | -118.059 | -42.770 | -12.594 | -12.594 | 1.00 |
| LCS12476 | 0.5078 | 0.0000 | 1.0000 | 110.816 | 11.675 | 17.635 | 9.450 | 3.423 | 1.008 | 11.675 | 1.00 |
| LCSD12476 | 0.5076 | 0.0000 | 1.0000 | 108.328 | 11.561 | 17.338 | 9.453 | 3.425 | 1.008 | 11.561 | 1.00 |
| LCS12477 | 0.5221 | 0.0000 | 1.0000 | 95.465 | 10.770 | 15.673 | 9.191 | 3.330 | 0.981 | 10.770 | 1.00 |
| LCSD12477 | 0.5036 | 0.0000 | 1.0000 | 104.361 | 11.425 | 16.896 | 9.528 | 3.452 | 1.016 | 11.425 | 1.00 |
| LCS12478 | 0.4961 | 0.0000 | 1.0000 | 105.080 | 11.557 | 17.048 | 9.673 | 3.504 | 1.032 | 11.557 | 1.00 |
| LCSD12478 | 0.5041 | 0.0000 | 1.0000 | 105.391 | 11.468 | 17.015 | 9.519 | 3.448 | 1.015 | 11.468 | 1.00 |
| LCS12479 | 0.4930 | 0.0000 | 1.0000 | 106.606 | 11.671 | 17.259 | 9.733 | 3.526 | 1.038 | 11.671 | 1.00 |
| LCSD12479 | 0.4953 | 0.0000 | 1.0000 | 104.102 | 11.521 | 16.938 | 9.688 | 3.510 | 1.034 | 11.521 | 1.00 |
| LCS12480 | 0.5085 | 0.0000 | 1.0000 | 99.974 | 11.153 | 16.327 | 9.436 | 3.418 | 1.007 | 11.153 | 1.00 |
| LCSD12480 | 0.5061 | 0.0000 | 1.0000 | 113.736 | 11.831 | 18.000 | 9.482 | 3.435 | 1.011 | 11.831 | 1.00 |
| LCS12486 | 0.5221 | 0.0000 | 1.0000 | 106.957 | 11.317 | 17.053 | 9.191 | 3.330 | 0.980 | 11.317 | 1.00 |
| LCSD12486 | 0.5045 | 0.0000 | 1.0000 | 112.973 | 11.818 | 17.923 | 9.512 | 3.446 | 1.015 | 11.818 | 1.00 |
| LCS12487 | 0.4950 | 0.0000 | 1.0000 | 110.294 | 11.818 | 17.684 | 9.693 | 3.512 | 1.034 | 11.818 | 1.00 |
| LCSD12487 | 0.5028 | 0.0000 | 1.0000 | 101.694 | 11.308 | 16.583 | 9.544 | 3.458 | 1.018 | 11.308 | 1.00 |
| LCS12488 | 0.4938 | 0.0000 | 1.0000 | 100.924 | 11.386 | 16.569 | 9.717 | 3.520 | 1.037 | 11.386 | 1.00 |
| LCSD12488 | 0.4939 | 0.0000 | 1.0000 | 109.588 | 11.800 | 17.609 | 9.715 | 3.519 | 1.036 | 11.800 | 1.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12476



| Calibration Information | | | | |
|---|-------------------------------|-------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI + 15 mL Ultima LLT | 5 mL DI + 15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



Mass Allquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | of Critical | CSU (TPU) for Preparation 5.39% | |
|----------------------------------|----------|-------------|---------------------------------|-------------|
| | | | Uncertainty | Uncertainty |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Description | relative | of Critical | CSU (TPU) for Yield Correction 1.00% | |
|-----------------------------|----------|-------------|--------------------------------------|-------------|
| | | | Uncertainty | Uncertainty |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 |

| Description | Maximum | of Critical | CSU (TPU) for Analysis 10.60% | |
|----------------------------------|---------|-------------|-------------------------------|-------------|
| | | | Uncertainty | Uncertainty |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Total Uncertainty | Maximum | of Critical | Uncertainty | Uncertainty |
|-------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Protocol #: 4

SWIPE_H3_C14

User :

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKB |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| PH | SH | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 4 | 1 | 30.00 | 30 | 2.97 | 6.60 | 6.30 | 301.41 | 3 |

BKG 072012

Pace Analytical Services
 Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|-----------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/20/2012 12:10 |
| Sample Ct Duration (min) | | | 7.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 7 | 7/20/2012 12:03 | LCS12476 |
| 2 | 15 | 7/20/2012 12:11 | LCSD12476 |
| 3 | 23 | 7/20/2012 12:19 | LCS12477 |
| 4 | 31 | 7/20/2012 12:27 | LCSD12477 |
| 5 | 39 | 7/20/2012 12:35 | LCS12478 |
| 6 | 47 | 7/20/2012 12:43 | LCSD12478 |
| 7 | 55 | 7/20/2012 12:51 | LCS12479 |
| 8 | 63 | 7/20/2012 12:59 | LCSD12479 |

Protocol #: 7

SWIPE_H3_C14

User :

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 6.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 7 | 1 | 7.00 | 7 | 46.14 | 62.43 | 62.57 | 313.20 | 1 |
| 7 | 2 | 7.00 | 15 | 46.00 | 60.71 | 61.29 | 313.43 | 1 |
| 7 | 3 | 7.00 | 23 | 40.86 | 56.14 | 56.14 | 271.48 | 1 |
| 7 | 4 | 7.00 | 31 | 45.29 | 58.14 | 58.86 | 319.04 | 0 |
| 7 | 5 | 7.00 | 39 | 42.29 | 57.86 | 58.43 | 328.18 | 1 |
| 7 | 6 | 7.00 | 47 | 42.71 | 58.14 | 59.43 | 318.39 | 0 |
| 7 | 7 | 7.00 | 55 | 43.43 | 58.86 | 58.86 | 331.51 | 1 |
| 7 | 8 | 7.00 | 63 | 40.00 | 57.29 | 57.86 | 329.08 | 0 |

Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

83 of 100

Part Daily Checks Prior to Sample Protocol

| Sample No. | Worksheet | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|-----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072110018 | | | 9 | 20 | 7/20/12 0900 | 7 | | A |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| UCS | | | | | | | | |
| UCSD | | | | | | | | |
| LCS12476 | 12476 | Swiper-13214 | 18 | 7 | 7/20/12 0950 | 7 | NA | RMK |
| LCS12476 | 12476 | | | | | | | |
| LCS12477 | 12477 | | | | | | | |
| LCS12477 | 12477 | | | | | | | |
| LCS12478 | 12478 | | | | | | | |
| LCS12478 | 12478 | | | | | | | |
| LCS12479 | 12479 | | | | | | | |
| LCS12479 | 12479 | | | | | | | |
| LCS12480 | 12480 | | | | | | | |
| LCS12480 | 12480 | | | | | | | |
| LCS12486 | 12486 | | | | | | | |
| LCS12486 | 12486 | | | | | | | |
| LCS12487 | 12487 | | | | | | | |
| LCS12487 | 12487 | | | | | | | |
| LCS12488 | 12488 | | | | | | | |
| LCS12488 | 12488 | | | | | | | |
| LCS12488 | 12488 | | | | | | | |

Run comments:

Peer Review:

Low Energy Beta Sample Analysis Data

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

1 459062-BLANK for HBN 91049 [RADC/1247

Type BLANK Matrix Impact Plate Collected % Moisture
 Client QCACCOUNT WO Work ID

Prep Information

Procedure 9060 I LEB Batch RADC/12478 Prep Date 7/17/2012 22:34 Dilution
 Method EPA 906.0M HBN 91049 Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796127 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 22:34 Dilution
 Method EPA 906.0M Col ID Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796127 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|
| Rad Chemistry | OK | | | | |
| LSC Low Energy Beta | OK | 1.46U ± 3.31 (6.98) | dpm/sa 1.46U ± 3.31 (6.98) | | dpm/sa |

2 3072155041-SU-06-8

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12478 Prep Date 7/17/2012 10:51 Dilution
 Method EPA 906.0M HBN 91049 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789896 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 10:51 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789896 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.00J ± 3.38 (6.71) | dpm/sa 3.00J ± 3.38 (6.71) | | dpm/sa | | |

3 3072155042-SU-06-9

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 **HBN** 91049
Rule 9060 I LEB **Status** RE
Create Date 6/28/2012 **Analyst** RMK

3 3072155042-SU-06-9

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 11:07 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789897 **Instru** NONE **CC** OK F

 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 11:07 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789897 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.12J ± 3.51 (6.97) | dpm/sa 3.12J ± 3.51 (6.97) | | | dpm/sa | |

4 3072155043-SU-06-9D

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth **Location**
 1207075

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 11:23 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789898 **Instru** NONE **CC** OK F

 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 11:23 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789898 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.00U ± 3.27 (6.75) | dpm/sa 2.00U ± 3.27 (6.75) | | | dpm/sa | |

5 3072155044-SU-06-10

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth **Location**
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

5 3072155044-SU-06-10

Prep Information

Procedure 9060 I LEB Batch RADC/12478 Prep Date 7/17/2012 11:39 Dilution
 Method EPA 906.0M HBN 91049 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789899 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 11:39 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789899 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.90J ± 3.84 (6.94) | dpm/sa 5.90J ± 3.84 (6.94) | | dpm/sa | | |

6 3072155045-SU-06-11

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12478 Prep Date 7/17/2012 21:49 Dilution
 Method EPA 906.0M HBN 91049 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789900 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 21:49 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789900 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.82J ± 3.69 (6.91) | dpm/sa 4.82J ± 3.69 (6.91) | | dpm/sa | | |

7 3072155046-SU-06-12

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

7 3072155046-SU-06-12

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 14:16 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789901 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 14:16 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789901 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.41J ± 3.79 (6.71) | dpm/sa 6.41J ± 3.79 (6.71) | | dpm/sa | | |

8 3072155047-SU-06-13

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 14:27 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789902 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 14:27 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789902 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.60J ± 3.78 (6.89) | dpm/sa 5.60J ± 3.78 (6.89) | | dpm/sa | | |

9 3072155048-SU-06-14

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

9 3072155048-SU-06-14

Prep Information

Procedure 9060 I LEB Batch RADC/12478 Prep Date 7/17/2012 14:38 Dilution
 Method EPA 906.0M HBN 91049 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789903 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 14:38 Dilution
 Method EPA 906.0M CoI ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789903 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.72J ± 3.47 (6.71) | dpm/sa 3.72J ± 3.47 (6.71) | | dpm/sa | | |

10 3072155049-SU-06-15

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12478 Prep Date 7/17/2012 14:49 Dilution
 Method EPA 906.0M HBN 91049 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789904 Instru NONE CC OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 14:49 Dilution
 Method EPA 906.0M CoI ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789904 File CC OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.41U ± 3.18 (6.71) | dpm/sa 1.41U ± 3.18 (6.71) | | dpm/sa | | |

11 3072155050-SU-06-16

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

11 3072155050-SU-06-16

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 15:00 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789905 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 15:00 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789905 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|--------------------------|------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 7.00 ± 3.87 (6.71) | dpm/sa 7.00 ± 3.87 (6.71) | | dpm/sa | | |

12 3072155051-SU-06-17

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 15:11 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789906 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 15:11 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789906 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.63J ± 3.83 (6.73) | dpm/sa 6.63J ± 3.83 (6.73) | | dpm/sa | | |

13 3072155052-SU-06-18

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

13 3072155052-SU-06-18

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 15:22 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789907 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 15:22 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789907 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.63J ± 3.83 (6.74) | dpm/sa 6.63J ± 3.83 (6.74) | | dpm/sa | | |

14 3072155053-SU-06-19

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 15:33 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789908 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 15:33 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789908 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.60U ± 3.22 (6.73) | dpm/sa 1.60U ± 3.22 (6.73) | | dpm/sa | | |

15 3072155054-SU-06-20

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

15 3072155054-SU-06-20

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 15:44 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789909 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 15:44 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789909 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.46J ± 3.82 (6.75) | dpm/sa 6.46J ± 3.82 (6.75) | | dpm/sa | | |

16 3072155055-SU-06-20D

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 15:56 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789910 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 15:56 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789910 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.45J ± 3.68 (6.71) | dpm/sa 5.45J ± 3.68 (6.71) | | dpm/sa | | |

17 3072155056-SU-06-21

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

17 3072155056-SU-06-21

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 16:07 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789911 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 16:07 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789911 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|--------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.57J ± 3.34 (6.73) | dpm/sa 3.34 (6.73) | | dpm/sa | | |

18 3072155057-SU-06-22

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 16:18 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789912 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 16:18 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789912 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|--------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.15J ± 3.40 (6.73) | dpm/sa 3.40 (6.73) | | dpm/sa | | |

19 3072155058-SU-06-23

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 HBN 91049
 Rule 9060 I LEB Status RE
 Create Date 6/28/2012 Analyst RMK

19 3072155058-SU-06-23

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 16:29 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789913 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 16:29 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789913 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.89J ± 3.62 (6.74) | dpm/sa 4.89J ± 3.62 (6.74) | | dpm/sa | | |

20 3072155059-SU-06-24

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12478 **Prep Date** 7/17/2012 16:40 **Dilution**
Method EPA 906.0M **HBN** 91049 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789914 **Instru** NONE **CC** OK F

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 16:40 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789914 **File** **CC** OK F

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.23J ± 3.78 (6.72) | dpm/sa 6.23J ± 3.78 (6.72) | | dpm/sa | | |

21 3072155060-SU-06-25

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12478 **HBN** 91049
Rule 9060 | LEB **Status** RE
Create Date 6/28/2012 **Analyst** RMK

21 3072155060-SU-06-25

Prep Information

| | | | |
|----------------------------------|-------------------------|----------------------------------|--------------------|
| Procedure 9060 LEB | Batch RADC/12478 | Prep Date 7/18/2012 12:40 | Dilution |
| Method EPA 906.0M | HBN 91049 | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789915 | Instru NONE | | CC OK F |
| Initial Volume 1 mL Default | 1 mL | | |
| Final Volume, 1 mL Default | 1 mL | | |

Analytical Information

| | | | |
|-----------------------------|--------------------|----------------------------------|--------------------|
| Procedure 9060 LEB | Instru NONE | Run Date 7/18/2012 12:40 | Dilution |
| Method EPA 906.0M | Col ID | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789915 | File | | CC OK F |

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.36J ± 3.44 (6.75) | dpm/sa 3.36J ± 3.44 (6.75) | | dpm/sa | | |

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Creation Date 06/28/2012 13:44
 Batch ID 12478
 A-code 9060 I LEB 9060W
 Method EPA 906.0M EPA 906.0m

Assigned Analyst RMK
 Earliest Due Date 07/04/2012 07:12
 HBN 91049

| Project | Sample ID | Sample Type | Matrix | Collection Date/Time | Client ID | LEB Activity | LEB Unc. | LEB MDC | Analysis Date/Time |
|---------|------------|-------------|--------|----------------------|-----------|--------------|----------|---------|--------------------|
| | 459062 | BLANK | IP | | QCACCOUNT | 1.46U | 3.31 | 6.98 | 7/17/12 22:34 |
| 3072155 | 3072155041 | PS | WP | 6/11/2012 0:01 | RTI | 3.00J | 3.38 | 6.71 | 7/17/12 10:51 |
| 3072155 | 3072155042 | PS | WP | 6/11/2012 0:01 | RTI | 3.12J | 3.51 | 6.97 | 7/17/12 11:07 |
| 3072155 | 3072155043 | PS | WP | 6/11/2012 0:01 | RTI | 2.00U | 3.27 | 6.75 | 7/17/12 11:23 |
| 3072155 | 3072155044 | PS | WP | 6/11/2012 0:01 | RTI | 5.90J | 3.84 | 6.94 | 7/17/12 11:39 |
| 3072155 | 3072155045 | PS | WP | 6/11/2012 0:01 | RTI | 4.82J | 3.69 | 6.91 | 7/17/12 21:49 |
| 3072155 | 3072155046 | PS | WP | 6/11/2012 0:01 | RTI | 6.41J | 3.79 | 6.71 | 7/17/12 14:16 |
| 3072155 | 3072155047 | PS | WP | 6/11/2012 0:01 | RTI | 5.60J | 3.78 | 6.89 | 7/17/12 14:27 |
| 3072155 | 3072155048 | PS | WP | 6/11/2012 0:01 | RTI | 3.72J | 3.47 | 6.71 | 7/17/12 14:38 |
| 3072155 | 3072155049 | PS | WP | 6/11/2012 0:01 | RTI | 1.41U | 3.18 | 6.71 | 7/17/12 14:49 |
| 3072155 | 3072155050 | PS | WP | 6/11/2012 0:01 | RTI | 7.00 | 3.87 | 6.71 | 7/17/12 15:00 |
| 3072155 | 3072155051 | PS | WP | 6/11/2012 0:01 | RTI | 6.63J | 3.83 | 6.73 | 7/17/12 15:11 |
| 3072155 | 3072155052 | PS | WP | 6/11/2012 0:01 | RTI | 6.63J | 3.83 | 6.74 | 7/17/12 15:22 |
| 3072155 | 3072155053 | PS | WP | 6/11/2012 0:01 | RTI | 1.60U | 3.22 | 6.73 | 7/17/12 15:33 |
| 3072155 | 3072155054 | PS | WP | 6/11/2012 0:01 | RTI | 6.46J | 3.82 | 6.75 | 7/17/12 15:44 |
| 3072155 | 3072155055 | PS | WP | 6/11/2012 0:01 | RTI | 5.45J | 3.68 | 6.71 | 7/17/12 15:56 |
| 3072155 | 3072155056 | PS | WP | 6/11/2012 0:01 | RTI | 2.57J | 3.34 | 6.73 | 7/17/12 16:07 |
| 3072155 | 3072155057 | PS | WP | 6/11/2012 0:01 | RTI | 3.15J | 3.40 | 6.73 | 7/17/12 16:18 |
| 3072155 | 3072155058 | PS | WP | 6/11/2012 0:01 | RTI | 4.89J | 3.62 | 6.74 | 7/17/12 16:29 |
| 3072155 | 3072155059 | PS | WP | 6/11/2012 0:01 | RTI | 6.23J | 3.78 | 6.72 | 7/17/12 16:40 |
| 3072155 | 3072155060 | PS | WP | 6/11/2012 0:01 | RTI | 3.36J | 3.44 | 6.75 | 7/18/12 12:40 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

7/13/12

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12478



| Calibration Information | | | | |
|---|------------------------------|------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI +15 mL Ultima LLT | 5 mL DI +15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



Mass Aliquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | of Critical | CSU (TPU) for Preparation | | 5.39% |
|----------------------------------|----------|-------------|---------------------------|-------------|-------|
| | | | Uncertainty | Uncertainty | |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| Description | relative | of Critical | CSU (TPU) for Yield Correction | | 1.00% |
|-----------------------------|----------|-------------|--------------------------------|-------------|-------|
| | | | Uncertainty | Uncertainty | |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 | |

| Description | Maximum | of Critical | CSU (TPU) for Analysis | | 10.60% |
|----------------------------------|---------|-------------|------------------------|-------------|--------|
| | | | Uncertainty | Uncertainty | |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 | |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| <u>Total Uncertainty</u> | Maximum | of Critical | Uncertainty | Uncertainty |
|--------------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Protocol #: 2

SWIPE_H3_C14

User :

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| PH | SN | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 2 | 1 | 30.00 | 30 | 2.13 | 5.53 | 4.77 | 300.09 | 7 |

Bkg 071712

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/17/2012 0:22 | |
| | | Sample Ct Duration (min) | 15.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 15 | 7/17/2012 0:07 | 459058 |
| 2 | 31 | 7/17/2012 0:23 | 3072155001 |
| 3 | 47 | 7/17/2012 0:39 | 3072155002 |
| 4 | 63 | 7/17/2012 0:55 | 3072155003 |
| 5 | 79 | 7/17/2012 1:11 | 3072155004 |
| 6 | 95 | 7/17/2012 1:27 | 3072155005 |
| 7 | 112 | 7/17/2012 1:44 | 3072155006 |
| 8 | 128 | 7/17/2012 2:00 | 3072155007 |
| 9 | 144 | 7/17/2012 2:16 | 3072155008 |
| 10 | 160 | 7/17/2012 2:32 | 3072155010 |
| 11 | 176 | 7/17/2012 2:48 | 3072155011 |
| 12 | 192 | 7/17/2012 3:04 | 3072155012 |
| 13 | 208 | 7/17/2012 3:20 | 3072155013 |
| 14 | 225 | 7/17/2012 3:37 | 3072155014 |
| 15 | 241 | 7/17/2012 3:53 | 3072155017 |
| 16 | 257 | 7/17/2012 4:09 | 3072155018 |
| 17 | 273 | 7/17/2012 4:25 | 3072155019 |
| 18 | 289 | 7/17/2012 4:41 | 3072155021 |
| 19 | 305 | 7/17/2012 4:57 | 3072155022 |
| 20 | 321 | 7/17/2012 5:13 | 3072155023 |
| 21 | 337 | 7/17/2012 5:29 | 3072155024 |
| 22 | 353 | 7/17/2012 5:45 | LCS |
| 23 | 369 | 7/17/2012 6:01 | LCSD |
| 24 | 385 | 7/17/2012 6:17 | 459061 |
| 25 | 401 | 7/17/2012 6:33 | 3072155025 |
| 26 | 417 | 7/17/2012 6:49 | 3072155026 |
| 27 | 433 | 7/17/2012 7:05 | 3072155027 |
| 28 | 449 | 7/17/2012 7:21 | 3072155028 |
| 29 | 465 | 7/17/2012 7:37 | 3072155029 |
| 30 | 481 | 7/17/2012 7:53 | 3072155030 |
| 31 | 498 | 7/17/2012 8:10 | 3072155031 |
| 32 | 514 | 7/17/2012 8:26 | 3072155032 |
| 33 | 530 | 7/17/2012 8:42 | 3072155033 |
| 34 | 546 | 7/17/2012 8:58 | 3072155034 |
| 35 | 562 | 7/17/2012 9:14 | 3072155035 |
| 36 | 578 | 7/17/2012 9:30 | 3072155036 |
| 37 | 594 | 7/17/2012 9:46 | 3072155037 |
| 38 | 610 | 7/17/2012 10:02 | 3072155038 |
| 39 | 626 | 7/17/2012 10:18 | 3072155039 |
| 40 | 642 | 7/17/2012 10:34 | 3072155040 |
| 41 | 659 | 7/17/2012 10:51 | 3072155041 |
| 42 | 675 | 7/17/2012 11:07 | 3072155042 |
| 43 | 691 | 7/17/2012 11:23 | 3072155043 |
| 44 | 707 | 7/17/2012 11:39 | 3072155044 |
| 45 | 722 | 7/17/2012 11:54 | LCS |
| 46 | 738 | 7/17/2012 12:10 | LCSD |

Time: 15.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3
Luminescence Correction On
Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 1 | 15.00 | 15 | 4.13 | 7.27 | 7.13 | 322.27 | 3 |
| 19 | 2 | 15.00 | 31 | 3.87 | 6.87 | 6.60 | 287.68 | 3 |
| 19 | 3 | 15.00 | 47 | 3.73 | 6.87 | 6.80 | 231.53 | 2 |
| 19 | 4 | 15.00 | 63 | 4.67 | 7.93 | 8.00 | 287.20 | 2 |
| 19 | 5 | 15.00 | 79 | 3.07 | 6.67 | 6.53 | 271.83 | 3 |
| 19 | 6 | 15.00 | 95 | 3.07 | 6.07 | 6.00 | 286.15 | 2 |
| 19 | 7 | 15.00 | 112 | 3.80 | 6.67 | 6.53 | 279.56 | 3 |
| 19 | 8 | 15.00 | 128 | 3.40 | 6.07 | 6.00 | 300.39 | 3 |
| 19 | 9 | 15.00 | 144 | 2.93 | 5.87 | 5.73 | 320.15 | 3 |
| 19 | 10 | 15.00 | 160 | 3.87 | 7.00 | 6.93 | 291.35 | 3 |
| 19 | 11 | 15.00 | 176 | 3.00 | 6.47 | 6.33 | 251.48 | 3 |
| 19 | 12 | 15.00 | 192 | 3.27 | 6.27 | 6.13 | 280.24 | 3 |
| 19 | 13 | 15.00 | 208 | 3.47 | 6.53 | 6.47 | 300.44 | 2 |
| 19 | 14 | 15.00 | 225 | 4.27 | 7.20 | 7.20 | 279.89 | 3 |
| 19 | 15 | 15.00 | 241 | 3.33 | 6.40 | 6.33 | 284.34 | 2 |
| 19 | 16 | 15.00 | 257 | 3.07 | 6.27 | 6.07 | 269.68 | 3 |
| 19 | 17 | 15.00 | 273 | 3.80 | 7.60 | 7.60 | 265.33 | 2 |
| 19 | 18 | 15.00 | 289 | 4.07 | 7.80 | 7.80 | 254.00 | 2 |
| 19 | 19 | 15.00 | 305 | 3.33 | 6.20 | 6.13 | 269.40 | 3 |
| 19 | 20 | 15.00 | 321 | 4.93 | 8.20 | 8.20 | 281.60 | 2 |
| 19 | 21 | 15.00 | 337 | 2.73 | 5.67 | 5.67 | 257.25 | 3 |
| 19 | 22 | 14.58 | 353 | 672.98 | 677.71 | 702.88 | 321.86 | 0 |
| 19 | 23 | 14.71 | 369 | 665.74 | 672.06 | 695.85 | 322.33 | 0 |
| 19 | 24 | 15.00 | 385 | 4.67 | 6.93 | 6.73 | 331.04 | 2 |
| 19 | 25 | 15.00 | 401 | 4.47 | 6.93 | 6.93 | 282.14 | 2 |
| 19 | 26 | 15.00 | 417 | 2.87 | 6.07 | 5.93 | 284.20 | 4 |
| 19 | 27 | 15.00 | 433 | 3.73 | 6.87 | 6.80 | 282.17 | 3 |
| 19 | 28 | 15.00 | 449 | 3.07 | 5.93 | 5.73 | 294.14 | 3 |
| 19 | 29 | 15.00 | 465 | 4.47 | 8.13 | 7.93 | 297.13 | 2 |
| 19 | 30 | 15.00 | 481 | 3.87 | 5.80 | 5.60 | 279.02 | 4 |
| 19 | 31 | 15.00 | 498 | 2.73 | 6.53 | 6.40 | 262.99 | 3 |
| 19 | 32 | 15.00 | 514 | 3.13 | 5.80 | 5.67 | 281.66 | 2 |
| 19 | 33 | 15.00 | 530 | 3.07 | 5.67 | 5.73 | 275.08 | 3 |
| 19 | 34 | 15.00 | 546 | 4.27 | 8.13 | 8.07 | 272.44 | 2 |
| 19 | 35 | 15.00 | 562 | 3.73 | 6.60 | 6.73 | 269.66 | 2 |
| 19 | 36 | 15.00 | 578 | 3.00 | 6.60 | 6.60 | 276.94 | 2 |
| 19 | 37 | 15.00 | 594 | 4.07 | 6.93 | 6.87 | 264.90 | 2 |
| 19 | 38 | 15.00 | 610 | 3.60 | 7.20 | 7.13 | 280.41 | 2 |
| 19 | 39 | 15.00 | 626 | 4.20 | 7.00 | 7.00 | 255.59 | 2 |

Protocol #:19

SWIPE_H3_C14

User :

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tsIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 40 | 15.00 | 642 | 2.13 | 5.13 | 5.07 | 273.48 | 3 |
| 19 | 41 | 15.00 | 659 | 3.67 | 6.40 | 6.33 | 268.20 | 3 |
| 19 | 42 | 15.00 | 675 | 3.60 | 6.40 | 6.33 | 320.47 | 2 |
| 19 | 43 | 15.00 | 691 | 2.13 | 5.87 | 5.80 | 290.94 | 3 |
| 19 | 44 | 15.00 | 707 | 4.53 | 7.73 | 7.73 | 318.14 | 2 |
| 19 | 45 | 14.55 | 722 | 674.64 | 680.55 | 705.70 | 327.71 | 0 |
| 19 | 46 | 14.55 | 738 | 673.95 | 680.21 | 704.40 | 318.60 | 0 |

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/17/2012 14:26 | |
| | | Sample Ct Duration (min) | 10.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/17/2012 14:16 | 3072155046 |
| 2 | 21 | 7/17/2012 14:27 | 3072155047 |
| 3 | 32 | 7/17/2012 14:38 | 3072155048 |
| 4 | 43 | 7/17/2012 14:49 | 3072155049 |
| 5 | 54 | 7/17/2012 15:00 | 3072155050 |
| 6 | 65 | 7/17/2012 15:11 | 3072155051 |
| 7 | 76 | 7/17/2012 15:22 | 3072155052 |
| 8 | 87 | 7/17/2012 15:33 | 3072155053 |
| 9 | 98 | 7/17/2012 15:44 | 3072155054 |
| 10 | 110 | 7/17/2012 15:56 | 3072155055 |
| 11 | 121 | 7/17/2012 16:07 | 3072155056 |
| 12 | 132 | 7/17/2012 16:18 | 3072155057 |
| 13 | 143 | 7/17/2012 16:29 | 3072155058 |
| 14 | 154 | 7/17/2012 16:40 | 3072155059 |
| 15 | 165 | 7/17/2012 16:51 | 3072155061 |
| 16 | 176 | 7/17/2012 17:02 | 3072155062 |
| 17 | 187 | 7/17/2012 17:13 | 3072155063 |
| 18 | 198 | 7/17/2012 17:24 | 3072155064 |
| 19 | 209 | 7/17/2012 17:35 | 3072155065 |
| 20 | 220 | 7/17/2012 17:46 | LCS |
| 21 | 231 | 7/17/2012 17:57 | LCSD |
| 22 | 242 | 7/17/2012 18:08 | 3072155067 |
| 23 | 253 | 7/17/2012 18:19 | 3072155068 |
| 24 | 264 | 7/17/2012 18:30 | 3072155069 |
| 25 | 275 | 7/17/2012 18:41 | 3072155070 |
| 26 | 287 | 7/17/2012 18:53 | 3072155071 |
| 27 | 298 | 7/17/2012 19:04 | 3072155072 |
| 28 | 309 | 7/17/2012 19:15 | 3072155073 |
| 29 | 320 | 7/17/2012 19:26 | 3072155074 |
| 30 | 331 | 7/17/2012 19:37 | 3072155075 |
| 31 | 342 | 7/17/2012 19:48 | 3072155076 |
| 32 | 353 | 7/17/2012 19:59 | 3072155077 |
| 33 | 364 | 7/17/2012 20:10 | 3072155078 |
| 34 | 375 | 7/17/2012 20:21 | 3072155079 |
| 35 | 386 | 7/17/2012 20:32 | 3072155080 |
| 36 | 397 | 7/17/2012 20:43 | 3072155081 |
| 37 | 408 | 7/17/2012 20:54 | 3072155082 |
| 38 | 419 | 7/17/2012 21:05 | 3072155083 |
| 39 | 430 | 7/17/2012 21:16 | 3072155084 |
| 40 | 441 | 7/17/2012 21:27 | 3072155085 |
| 41 | 452 | 7/17/2012 21:38 | 3072155087 |
| 42 | 463 | 7/17/2012 21:49 | 3072155045 |
| 43 | 474 | 7/17/2012 22:00 | LCS |
| 44 | 485 | 7/17/2012 22:11 | LCSD |
| 45 | 496 | 7/17/2012 22:22 | 459061 |
| 46 | 508 | 7/17/2012 22:34 | 459062 |

Handwritten: OK 7/31/12

Protocol #:11

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25Z | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 11 | 1 | 10.00 | 10 | 5.20 | 8.10 | 8.10 | 268.41 | 2 |
| 11 | 2 | 10.00 | 21 | 3.70 | 7.50 | 7.60 | 228.08 | 2 |
| 11 | 3 | 10.00 | 32 | 3.50 | 6.80 | 6.70 | 263.83 | 2 |
| 11 | 4 | 10.00 | 43 | 2.20 | 5.60 | 5.50 | 271.22 | 3 |
| 11 | 5 | 10.00 | 54 | 5.80 | 8.50 | 8.40 | 277.27 | 2 |
| 11 | 6 | 10.00 | 65 | 4.40 | 8.30 | 8.20 | 285.48 | 2 |
| 11 | 7 | 10.00 | 76 | 4.80 | 8.30 | 8.20 | 286.72 | 2 |
| 11 | 8 | 10.00 | 87 | 3.30 | 5.90 | 5.60 | 283.69 | 3 |
| 11 | 9 | 10.00 | 98 | 5.00 | 8.20 | 8.10 | 290.87 | 2 |
| 11 | 10 | 10.00 | 110 | 4.00 | 7.60 | 7.60 | 275.66 | 2 |
| 11 | 11 | 10.00 | 121 | 3.60 | 6.20 | 6.10 | 284.80 | 3 |
| 11 | 12 | 10.00 | 132 | 3.60 | 6.30 | 6.40 | 256.87 | 2 |
| 11 | 13 | 10.00 | 143 | 3.50 | 7.50 | 7.30 | 286.83 | 3 |
| 11 | 14 | 10.00 | 154 | 4.30 | 8.00 | 8.00 | 280.48 | 2 |
| 11 | 15 | 10.00 | 165 | 3.40 | 6.60 | 6.60 | 241.63 | 3 |
| 11 | 16 | 10.00 | 176 | 2.40 | 4.90 | 4.70 | 270.07 | 3 |
| 11 | 17 | 10.00 | 187 | 3.60 | 6.80 | 6.70 | 276.95 | 3 |
| 11 | 18 | 10.00 | 198 | 3.20 | 6.40 | 6.40 | 227.76 | 2 |
| 11 | 19 | 10.00 | 209 | 3.90 | 6.70 | 6.80 | 258.90 | 2 |
| 11 | 20 | 10.00 | 220 | 675.80 | 681.30 | 708.30 | 325.59 | 0 |
| 11 | 21 | 10.00 | 231 | 676.00 | 681.50 | 708.80 | 334.22 | 0 |
| 11 | 22 | 10.00 | 242 | 2.90 | 6.90 | 6.80 | 230.07 | 2 |
| 11 | 23 | 10.00 | 253 | 4.30 | 7.40 | 7.30 | 307.01 | 2 |
| 11 | 24 | 10.00 | 264 | 2.90 | 7.60 | 7.50 | 272.39 | 3 |
| 11 | 25 | 10.00 | 275 | 3.90 | 7.70 | 7.80 | 304.07 | 2 |
| 11 | 26 | 10.00 | 287 | 3.50 | 6.90 | 7.00 | 302.13 | 2 |
| 11 | 27 | 10.00 | 298 | 3.20 | 6.40 | 6.40 | 261.56 | 2 |
| 11 | 28 | 10.00 | 309 | 3.70 | 7.20 | 7.10 | 262.57 | 2 |
| 11 | 29 | 10.00 | 320 | 2.90 | 7.00 | 6.80 | 278.05 | 3 |
| 11 | 30 | 10.00 | 331 | 4.80 | 7.90 | 8.00 | 276.23 | 2 |
| 11 | 31 | 10.00 | 342 | 3.50 | 7.80 | 7.60 | 290.38 | 2 |
| 11 | 32 | 10.00 | 353 | 3.40 | 6.90 | 6.70 | 256.94 | 3 |
| 11 | 33 | 10.00 | 364 | 4.30 | 7.50 | 7.30 | 276.11 | 2 |
| 11 | 34 | 10.00 | 375 | 3.60 | 6.70 | 6.70 | 267.61 | 3 |
| 11 | 35 | 10.00 | 386 | 3.70 | 6.00 | 5.80 | 321.79 | 3 |
| 11 | 36 | 10.00 | 397 | 3.80 | 7.20 | 7.30 | 257.93 | 2 |
| 11 | 37 | 10.00 | 408 | 4.00 | 6.30 | 6.40 | 286.67 | 3 |
| 11 | 38 | 10.00 | 419 | 3.90 | 6.50 | 6.50 | 321.66 | 3 |
| 11 | 39 | 10.00 | 430 | 4.00 | 8.00 | 7.80 | 306.87 | 2 |

Protocol #:11

SWIPE_H3_C14

User :

| F# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tsIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 11 | 40 | 10.00 | 441 | 3.70 | 7.30 | 7.30 | 276.02 | 2 |
| 11 | 41 | 10.00 | 452 | 5.30 | 8.10 | 7.90 | 313.75 | 2 |
| 11 | 42 | 10.00 | 463 | 3.60 | 7.20 | 7.20 | 225.59 | 2 |
| 11 | 43 | 10.00 | 474 | 692.50 | 697.60 | 725.50 | 323.50 | 0 |
| 11 | 44 | 10.00 | 485 | 684.30 | 689.60 | 717.30 | 322.73 | 0 |
| 11 | 45 | 10.00 | 496 | 3.90 | 6.10 | 6.00 | 327.67 | 3 |
| 11 | 46 | 10.00 | 508 | 2.80 | 5.70 | 5.50 | 324.86 | 4 |

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

Pace Analytical Services
 Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/18/2012 12:28 | |
| | | Sample Ct Duration (min) | 10.0 |
| | | | |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/18/2012 12:18 | 3072155015 |
| 2 | 21 | 7/18/2012 12:29 | 3072155020 |
| 3 | 32 | 7/18/2012 12:40 | 3072155060 |
| 4 | 43 | 7/18/2012 12:51 | 3072155066 |
| 5 | 54 | 7/18/2012 13:02 | 3072155086 |
| 6 | 65 | 7/18/2012 13:13 | 3072155094 |
| 7 | 76 | 7/18/2012 13:24 | 3072155100 |
| 8 | 87 | 7/18/2012 13:35 | 459065 |

M
 7/31/12

Protocol #:19

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| F# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 1 | 10.00 | 10 | 3.60 | 6.90 | 6.80 | 269.15 | 2 |
| 19 | 2 | 10.00 | 21 | 5.00 | 7.70 | 7.60 | 288.48 | 2 |
| 19 | 3 | 10.00 | 32 | 3.30 | 6.60 | 6.50 | 248.85 | 2 |
| 19 | 4 | 10.00 | 43 | 3.70 | 6.60 | 6.70 | 269.85 | 2 |
| 19 | 5 | 10.00 | 54 | 4.00 | 6.30 | 6.40 | 291.27 | 2 |
| 19 | 6 | 10.00 | 65 | 3.30 | 6.60 | 6.70 | 269.98 | 2 |
| 19 | 7 | 10.00 | 76 | 4.60 | 7.20 | 7.30 | 315.26 | 3 |
| 19 | 8 | 10.00 | 87 | 216.50 | 220.90 | 228.70 | 298.17 | 0 |

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-----------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| LCS DQ 7/16/12 | NA | Swipe-13-014 | 17 | 19 | 7/16/12 2135 | 15 | NA | PAUK |
| BKG MB (459058) | 12476 | | ↓ | | | | | |
| 3072155025 | 12477 | | 15 | | | | | |
| 026 | | | | | | | | |
| 027 | | | | | | | | |
| 028 | | | | | | | | |
| 029 | | | | | | | | |
| 030 | | | | | | | | |
| 031 | | | | | | | | |
| 032 | | | | | | | | |
| 033 | | | | | | | | |
| 034 | | | | | | | | |
| 035 | | | | | | | | |
| 036 | | | | | | | | |
| 037 | | | | | | | | |
| 038 | | | | | | | | |
| 039 | | | | | | | | |
| 040 | | | | | | | | |
| 041 | 12478 | | | | | | | |
| 042 | | | | | | | | |
| 043 | | | | | | | | |
| 044 | | | | | | | | |
| LCS | NA | | | | | | | |
| LCS | ↓ | | | | | | | |

Run comments:

Peer Review: _____

Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| BKG071712 | NA | SWIPE-13-C14 | 16 | 2 | 7/17/12 1210 | 30 | NA | Rulk |
| 3072155046 | 12478 | | 31 | 11 | | 10 | | |
| 3072155047 | | | | | | | | |
| 048 | | | | | | | | |
| 049 | | | | | | | | |
| 050 | | | | | | | | |
| 051 | | | | | | | | |
| 052 | | | | | | | | |
| 053 | | | | | | | | |
| 054 | | | | | | | | |
| 055 | | | | | | | | |
| 056 | | | | | | | | |
| 057 | | | | | | | | |
| 058 | | | | | | | | |
| 059 | | | | | | | | |
| 061 | 12479 | | | | | | | |
| 062 | | | | | | | | |
| 063 | | | | | | | | |
| 064 | | | | | | | | |
| 065 | | | | | | | | |
| LCS | NA | | | | | | | |
| LCSD | | | | | | | | |
| 3072155067 | 12479 | | | | | | | |
| 068 | | | | | | | | |

Run comments:

Peer Review:



Pace Analytical Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072155069 | 12479 | Swipe-H3-c14 | 4 | 11 | 7/17/12 1210 | 10 | NA | RMLC |
| 070 | | | | | | | | |
| 071 | | | | | | | | |
| 072 | | | | | | | | |
| 073 | | | | | | | | |
| 074 | | | | | | | | |
| 075 | | | | | | | | |
| 076 | | | | | | | | |
| 077 | | | | | | | | |
| 078 | | | | | | | | |
| 079 | | | | | | | | |
| 080 | | | | | | | | |
| 081 | 12480 | | 11 | | | | | |
| 082 | | | | | | | | |
| 083 | | | | | | | | |
| 084 | | | | | | | | |
| 085 | | | | | | | | |
| 087 | | | | | | | | |
| 095 | 12478 | | | | | | | |
| LCS | NA | | | | | | | |
| LCSD | | | | | | | | |
| 3072155088 | | | | | | | | |
| MB (459061) | 12477 | Swipe-H3-c14 | 11 | 11 | 7/17/12 1210 | 10 | NA | RMLC |
| MB (459062) | 12478 | | | | | | | |

7/17/12

Run comments:

Peer Review:

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12476



| Calibration Information | | | | |
|---|------------------------------|------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI +15 mL Ultima LLT | 5 mL DI +15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



Mass Aliquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | of Critical | CSU (TPU) for Preparation | 5.39% |
|----------------------------------|----------|-------------|---------------------------|-------------|
| | | | Uncertainty | Uncertainty |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Description | relative | of Critical | CSU (TPU) for Yield Correction | 1.00% |
|-----------------------------|----------|-------------|--------------------------------|-------------|
| | | | Uncertainty | Uncertainty |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 |

| Description | Maximum | of Critical | CSU (TPU) for Analysis | 10.60% |
|----------------------------------|---------|-------------|------------------------|-------------|
| | | | Uncertainty | Uncertainty |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Total Uncertainty | Maximum | of Critical | Uncertainty | Uncertainty |
|-------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| PH | SH | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 4 | 1 | 30.00 | 30 | 2.97 | 6.60 | 6.30 | 301.41 | 3 |

BKG 072012

Pace Analytical Services
Count Start Date/Time Calculator

| | | | |
|--|--------|--------------------------|-----------------|
| System #3 | | Protocol ID: | SWIPE_H3_C14 |
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/20/2012 12:10 |
| | | Sample Ct Duration (min) | 7.0 |
| | | Calculated Count Start | |
| S# | ELTIME | Date/Time | Sample ID |
| 1 | 7 | 7/20/2012 12:03 | LCS12476 |
| 2 | 15 | 7/20/2012 12:11 | LCSD12476 |
| 3 | 23 | 7/20/2012 12:19 | LCS12477 |
| 4 | 31 | 7/20/2012 12:27 | LCSD12477 |
| 5 | 39 | 7/20/2012 12:35 | LCS12478 |
| 6 | 47 | 7/20/2012 12:43 | LCSD12478 |
| 7 | 55 | 7/20/2012 12:51 | LCS12479 |
| 8 | 63 | 7/20/2012 12:59 | LCSD12479 |

AM
7/31/12

Protocol #: 7

SWIPE_H3_C14

User :

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 6.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 7 | 1 | 7.00 | 7 | 46.14 | 62.43 | 62.57 | 313.20 | 1 |
| 7 | 2 | 7.00 | 15 | 46.00 | 60.71 | 61.29 | 313.43 | 1 |
| 7 | 3 | 7.00 | 23 | 40.86 | 56.14 | 56.14 | 271.48 | 1 |
| 7 | 4 | 7.00 | 31 | 45.29 | 58.14 | 58.86 | 319.04 | 0 |
| 7 | 5 | 7.00 | 39 | 42.29 | 57.86 | 58.43 | 328.18 | 1 |
| 7 | 6 | 7.00 | 47 | 42.71 | 58.14 | 59.43 | 318.39 | 0 |
| 7 | 7 | 7.00 | 55 | 43.43 | 58.86 | 58.86 | 331.51 | 1 |
| 7 | 8 | 7.00 | 63 | 40.00 | 57.29 | 57.86 | 329.08 | 0 |

Per Analytical Services, Inc.-Pittsburgh
 Liquid Scintillation Counter Run Log System 3

Start Daily Checks Prior to Sample Protocol

| Sample No. | Worksheet | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|-----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3073100018 | | | 9 | 20 | 7/20/12 0900 | 7 | | A |
| ↓ 19 | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| ↓ 20 | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| CS | | | | | | | | |
| CS1 | | | | | | | | |
| CS12476 | 12476 | Swipe-43-04 | 18 | 7 | 7/20/12 0950 | 7 | NA | RMK |
| CS12476 | ↓ 12477 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12477 | ↓ 12478 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12477 | ↓ 12479 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12478 | ↓ 12480 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12478 | ↓ 12481 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12479 | ↓ 12482 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12479 | ↓ 12483 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12480 | ↓ 12484 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12480 | ↓ 12485 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12486 | ↓ 12486 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12486 | ↓ 12487 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12487 | ↓ 12488 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12487 | ↓ 12489 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12488 | ↓ 12490 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12488 | ↓ 12491 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12488 | ↓ 12492 | | ↓ | ↓ | ↓ | ↓ | | |
| CS12488 | ↓ 12493 | | ↓ | ↓ | ↓ | ↓ | | |

Run comments:

Peer Review:

Low Energy Beta Sample Analysis Data

7/22/12



Quality Control Review

Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

1 459064-BLANK for HBN 91050 [RADC/1247

Type BLANK Matrix Impact Plate Collected % Moisture
 Client QCAccount WO Work ID

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/18/2012 02:20 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796141 Instru NONE CC OK *
 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/18/2012 02:20 Dilution
 Method EPA 906.0M Col ID Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796141 File CC OK *

| Analyte | CC | Posted | | Result | MDL | RDL |
|---------------------|----|---------------------------|--------|---------------------------|-----|--------|
| | | Result | | | | |
| Rad Chemistry | OK | | | | | |
| LSC Low Energy Beta | OK | 6.68J ± 3.95 (6.99) | dpm/sa | 6.68J ± 3.95 (6.99) | | dpm/sa |

2 3072155061-SU-06-26

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth
 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 16:51 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789916 Instru NONE CC OK *
 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 16:51 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789916 File CC OK *

| Analyte | CC | Posted | | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|--------|---------------------------|-----|--------|-------------|------|
| | | Result | | | | | Low | High |
| Rad Chemistry | OK | | | | | | | |
| LSC Low Energy Beta | OK | 3.57J ± 3.48 (6.79) | dpm/sa | 3.57J ± 3.48 (6.79) | | dpm/sa | | |

3 3072155062-SU-06-27

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth
 1207075 Location

7/23/12

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

3 3072155062-SU-06-27

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/17/2012 17:02 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789917 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 17:02 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789917 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|-----------------------------|------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | -0.135U ± 2.99 (6.71) | dpm/sa -0.135U ± 2.99 (6.71) | | | dpm/sa | |

4 3072155063-SU-06-28

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/17/2012 17:13 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789918 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 17:13 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789918 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|----------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.72J ± 3.47 (6.71) | dpm/sa 3.72J ± 3.47 (6.71) | | | dpm/sa | |

5 3072155064-SU-06-29

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

5 3072155064-SU-06-29

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/17/2012 17:24 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789919 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 17:24 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789919 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.23J ± 3.49 (6.89) | dpm/sa 3.23J ± 3.49 (6.89) | | | dpm/sa | |

6 3072155065-SU-06-30

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/17/2012 17:35 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789920 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 17:35 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789920 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.92J ± 3.50 (6.72) | dpm/sa 3.92J ± 3.50 (6.72) | | | dpm/sa | |

7 3072155066-SU-06-31

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

7 3072155066-SU-06-31

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/18/2012 12:51 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789921 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 12:51 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789921 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.72J ± 3.47 (6.71) | dpm/sa 3.72J ± 3.47 (6.71) | | dpm/sa | | |

8 3072155067-SU-06-32

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth
 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/17/2012 18:08 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789922 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 18:08 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789922 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.01J ± 3.57 (6.87) | dpm/sa 4.01J ± 3.57 (6.87) | | dpm/sa | | |

9 3072155068-SU-07-1

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth
 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

9 3072155068-SU-07-1

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 18:19 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789923 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 18:19 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789923 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.97J ± 3.68 (6.85) | dpm/sa 4.97J ± 3.68 (6.85) | | | dpm/sa | |

10 3072155069-SU-07-2

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 18:30 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789924 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 18:30 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789924 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.26J ± 3.65 (6.71) | dpm/sa 5.26J ± 3.65 (6.71) | | | dpm/sa | |

11 3072155070-SU-07-3

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

11 3072155070-SU-07-3

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 18:41 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789925 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 18:41 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789925 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.94J ± 3.79 (6.82) | dpm/sa 5.94J ± 3.79 (6.82) | | | dpm/sa | |

12 3072155071-SU-07-4

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth Location
 1207075

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 18:53 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789926 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 18:53 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789926 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.36J ± 3.59 (6.81) | dpm/sa 4.36J ± 3.59 (6.81) | | | dpm/sa | |

13 3072155072-SU-07-5

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth Location
 1207075

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

13 3072155072-SU-07-5

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 19:04 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789927 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 19:04 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789927 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.14J ± 3.40 (6.72) | dpm/sa 3.14J ± 3.40 (6.72) | | dpm/sa | | |

14 3072155073-SU-07-6

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 19:15 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789928 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 19:15 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789928 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.49J ± 3.56 (6.71) | dpm/sa 4.49J ± 3.56 (6.71) | | dpm/sa | | |

15 3072155074-SU-07-7

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

15 3072155074-SU-07-7

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 19:26 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789929 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 19:26 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789929 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.91J ± 3.49 (6.71) | dpm/sa 3.91J ± 3.49 (6.71) | | | dpm/sa | |

16 3072155075-SU-07-8

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 19:37 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789930 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 19:37 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789930 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.22J ± 3.77 (6.71) | dpm/sa 6.22J ± 3.77 (6.71) | | | dpm/sa | |

17 3072155076-SU-07-9

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

17 3072155076-SU-07-9

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/17/2012 19:48 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789931 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 19:48 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789931 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.48J ± 3.70 (6.75) | dpm/sa 5.48J ± 3.70 (6.75) | | dpm/sa | | |

18 3072155077-SU-07-10

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth
 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12479 **Prep Date** 7/17/2012 19:59 **Dilution**
Method EPA 906.0M **HBN** 91050 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789932 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 19:59 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789932 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.73J ± 3.47 (6.73) | dpm/sa 3.73J ± 3.47 (6.73) | | dpm/sa | | |

19 3072155078-SU-07-11

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth
 1207075 **Location**

** Indicates QC failure, For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 HBN 91050
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

19 3072155078-SU-07-11

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 20:10 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789933 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 20:10 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789933 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.88J ± 3.61 (6.71) | dpm/sa 4.88J ± 3.61 (6.71) | | | dpm/sa | |

20 3072155079-SU-07-12

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12479 Prep Date 7/17/2012 20:21 Dilution
 Method EPA 906.0M HBN 91050 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789934 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 20:21 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789934 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.72J ± 3.47 (6.71) | dpm/sa 3.72J ± 3.47 (6.71) | | | dpm/sa | |

21 3072155080-SU-07-13

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12479 **HBN** 91050
Rule 9060 I LEB **Status** WP
Create Date 6/28/2012 **Analyst** RMK

21 3072155080-SU-07-13

Prep Information

| | | | |
|-----------------------------|-------------------------|----------------------------------|--------------------|
| Procedure 9060 I LEB | Batch RADC/12479 | Prep Date 7/17/2012 20:32 | Dilution |
| Method EPA 906.0M | HBN 91050 | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789935 | Instru NONE | | CC OK * |

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

| | | | |
|-----------------------------|--------------------|----------------------------------|--------------------|
| Procedure 9060 I LEB | Instru NONE | Run Date 7/17/2012 20:32 | Dilution |
| Method EPA 906.0M | Col ID | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789935 | File | | CC OK * |

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.07U ± 3.39 (6.98) | dpm/sa 2.07U ± 3.39 (6.98) | | dpm/sa | | |

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Creation Date 06/28/2012 13:45 Assigned Analyst RMK
 Batch ID 12479 Earliest Due Date 07/04/2012 07:12
 A-code 9060 I LEB 9060W HBN 91050
 Method EPA 906.0M EPA 906.0m

| Project | Sample ID | Sample Type | Matrix | Collection Date/Time | Client ID | LEB Activity | LEB Unc. | LEB MDC | Analysis Date/Time |
|---------|------------|-------------|--------|----------------------|-----------|--------------|----------|---------|--------------------|
| | 459064 | BLANK | IP | | QCACCOUNT | 6.68J | 3.95 | 6.99 | 7/18/12 2:20 |
| 3072155 | 3072155061 | PS | WP | 6/11/2012 0:01 | RTI | 3.57J | 3.48 | 6.79 | 7/17/12 16:51 |
| 3072155 | 3072155062 | PS | WP | 6/11/2012 0:01 | RTI | -0.135U | 2.99 | 6.71 | 7/17/12 17:02 |
| 3072155 | 3072155063 | PS | WP | 6/11/2012 0:01 | RTI | 3.72J | 3.47 | 6.71 | 7/17/12 17:13 |
| 3072155 | 3072155064 | PS | WP | 6/11/2012 0:01 | RTI | 3.23J | 3.49 | 6.89 | 7/17/12 17:24 |
| 3072155 | 3072155065 | PS | WP | 6/11/2012 0:01 | RTI | 3.92J | 3.50 | 6.72 | 7/17/12 17:35 |
| 3072155 | 3072155066 | PS | WP | 6/11/2012 0:01 | RTI | 3.72J | 3.47 | 6.71 | 7/18/12 12:51 |
| 3072155 | 3072155067 | PS | WP | 6/11/2012 0:01 | RTI | 4.01J | 3.57 | 6.87 | 7/17/12 18:08 |
| 3072155 | 3072155068 | PS | WP | 6/11/2012 0:01 | RTI | 4.97J | 3.68 | 6.85 | 7/17/12 18:19 |
| 3072155 | 3072155069 | PS | WP | 6/11/2012 0:01 | RTI | 5.26J | 3.65 | 6.71 | 7/17/12 18:30 |
| 3072155 | 3072155070 | PS | WP | 6/11/2012 0:01 | RTI | 5.94J | 3.79 | 6.82 | 7/17/12 18:41 |
| 3072155 | 3072155071 | PS | WP | 6/11/2012 0:01 | RTI | 4.36J | 3.59 | 6.81 | 7/17/12 18:53 |
| 3072155 | 3072155072 | PS | WP | 6/11/2012 0:01 | RTI | 3.14J | 3.40 | 6.72 | 7/17/12 19:04 |
| 3072155 | 3072155073 | PS | WP | 6/11/2012 0:01 | RTI | 4.49J | 3.56 | 6.71 | 7/17/12 19:15 |
| 3072155 | 3072155074 | PS | WP | 6/11/2012 0:01 | RTI | 3.91J | 3.49 | 6.71 | 7/17/12 19:26 |
| 3072155 | 3072155075 | PS | WP | 6/11/2012 0:01 | RTI | 6.22J | 3.77 | 6.71 | 7/17/12 19:37 |
| 3072155 | 3072155076 | PS | WP | 6/11/2012 0:01 | RTI | 5.48J | 3.70 | 6.75 | 7/17/12 19:48 |
| 3072155 | 3072155077 | PS | WP | 6/11/2012 0:01 | RTI | 3.73J | 3.47 | 6.73 | 7/17/12 19:59 |
| 3072155 | 3072155078 | PS | WP | 6/11/2012 0:01 | RTI | 4.88J | 3.61 | 6.71 | 7/17/12 20:10 |
| 3072155 | 3072155079 | PS | WP | 6/11/2012 0:01 | RTI | 3.72J | 3.47 | 6.71 | 7/17/12 20:21 |
| 3072155 | 3072155080 | PS | WP | 6/11/2012 0:01 | RTI | 2.07U | 3.39 | 6.98 | 7/17/12 20:32 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

m7/22/12
27/23/12

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12479



| Calibration Information | | | | |
|---|------------------------------|------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI +15 mL Ultima LLT | 5 mL DI +15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Q 7/23/12

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



Mass Aliquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | CSU (TPU) for Preparation 5.39% | | |
|----------------------------------|----------|---------------------------------|-------------|-------------|
| | | of Critical | Uncertainty | Uncertainty |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Description | relative | CSU (TPU) for Yield Correction 1.00% | | |
|-----------------------------|----------|--------------------------------------|-------------|-------------|
| | | of Critical | Uncertainty | Uncertainty |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 |

| Description | Maximum | CSU (TPU) for Analysis 10.60% | | |
|----------------------------------|---------|-------------------------------|-------------|-------------|
| | | of Critical | Uncertainty | Uncertainty |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| <u>Total Uncertainty</u> | Maximum | of Critical | Uncertainty | Uncertainty |
|--------------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Handwritten signature/initials: Q7/23/12

Protocol #: 2

SWIPE_H3_C14

User 1

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 2 | 1 | 30.00 | 30 | 2.13 | 5.53 | 4.77 | 300.09 | 7 |

Bkg 071712

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/17/2012 14:26 | |
| | | Sample Ct Duration (min) | 10.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/17/2012 14:16 | 3072155046 |
| 2 | 21 | 7/17/2012 14:27 | 3072155047 |
| 3 | 32 | 7/17/2012 14:38 | 3072155048 |
| 4 | 43 | 7/17/2012 14:49 | 3072155049 |
| 5 | 54 | 7/17/2012 15:00 | 3072155050 |
| 6 | 65 | 7/17/2012 15:11 | 3072155051 |
| 7 | 76 | 7/17/2012 15:22 | 3072155052 |
| 8 | 87 | 7/17/2012 15:33 | 3072155053 |
| 9 | 98 | 7/17/2012 15:44 | 3072155054 |
| 10 | 110 | 7/17/2012 15:56 | 3072155055 |
| 11 | 121 | 7/17/2012 16:07 | 3072155056 |
| 12 | 132 | 7/17/2012 16:18 | 3072155057 |
| 13 | 143 | 7/17/2012 16:29 | 3072155058 |
| 14 | 154 | 7/17/2012 16:40 | 3072155059 |
| 15 | 165 | 7/17/2012 16:51 | 3072155061 |
| 16 | 176 | 7/17/2012 17:02 | 3072155062 |
| 17 | 187 | 7/17/2012 17:13 | 3072155063 |
| 18 | 198 | 7/17/2012 17:24 | 3072155064 |
| 19 | 209 | 7/17/2012 17:35 | 3072155065 |
| 20 | 220 | 7/17/2012 17:46 | LCS |
| 21 | 231 | 7/17/2012 17:57 | LCSD |
| 22 | 242 | 7/17/2012 18:08 | 3072155067 |
| 23 | 253 | 7/17/2012 18:19 | 3072155068 |
| 24 | 264 | 7/17/2012 18:30 | 3072155069 |
| 25 | 275 | 7/17/2012 18:41 | 3072155070 |
| 26 | 287 | 7/17/2012 18:53 | 3072155071 |
| 27 | 298 | 7/17/2012 19:04 | 3072155072 |
| 28 | 309 | 7/17/2012 19:15 | 3072155073 |
| 29 | 320 | 7/17/2012 19:26 | 3072155074 |
| 30 | 331 | 7/17/2012 19:37 | 3072155075 |
| 31 | 342 | 7/17/2012 19:48 | 3072155076 |
| 32 | 353 | 7/17/2012 19:59 | 3072155077 |
| 33 | 364 | 7/17/2012 20:10 | 3072155078 |
| 34 | 375 | 7/17/2012 20:21 | 3072155079 |
| 35 | 386 | 7/17/2012 20:32 | 3072155080 |
| 36 | 397 | 7/17/2012 20:43 | 3072155081 |
| 37 | 408 | 7/17/2012 20:54 | 3072155082 |
| 38 | 419 | 7/17/2012 21:05 | 3072155083 |
| 39 | 430 | 7/17/2012 21:16 | 3072155084 |
| 40 | 441 | 7/17/2012 21:27 | 3072155085 |
| 41 | 452 | 7/17/2012 21:38 | 3072155087 |
| 42 | 463 | 7/17/2012 21:49 | 3072155045 |
| 43 | 474 | 7/17/2012 22:00 | LCS |
| 44 | 485 | 7/17/2012 22:11 | LCSD |
| 45 | 496 | 7/17/2012 22:22 | 459061 |
| 46 | 508 | 7/17/2012 22:34 | 459062 |

27/23/12
M
7/22/12

Protocol #:11

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 11 | 1 | 10.00 | 10 | 5.20 | 8.10 | 8.10 | 268.41 | 2 |
| 11 | 2 | 10.00 | 21 | 3.70 | 7.50 | 7.60 | 228.08 | 2 |
| 11 | 3 | 10.00 | 32 | 3.50 | 6.80 | 6.70 | 263.83 | 2 |
| 11 | 4 | 10.00 | 43 | 2.20 | 5.60 | 5.50 | 271.22 | 3 |
| 11 | 5 | 10.00 | 54 | 5.80 | 8.50 | 8.40 | 277.27 | 2 |
| 11 | 6 | 10.00 | 65 | 4.40 | 8.30 | 8.20 | 285.48 | 2 |
| 11 | 7 | 10.00 | 76 | 4.80 | 8.30 | 8.20 | 286.72 | 2 |
| 11 | 8 | 10.00 | 87 | 3.30 | 5.90 | 5.60 | 283.69 | 3 |
| 11 | 9 | 10.00 | 98 | 5.00 | 8.20 | 8.10 | 290.87 | 2 |
| 11 | 10 | 10.00 | 110 | 4.00 | 7.60 | 7.60 | 275.66 | 2 |
| 11 | 11 | 10.00 | 121 | 3.60 | 6.20 | 6.10 | 284.80 | 3 |
| 11 | 12 | 10.00 | 132 | 3.60 | 6.30 | 6.40 | 256.87 | 2 |
| 11 | 13 | 10.00 | 143 | 3.50 | 7.50 | 7.30 | 286.83 | 3 |
| 11 | 14 | 10.00 | 154 | 4.30 | 8.00 | 8.00 | 280.48 | 2 |
| 11 | 15 | 10.00 | 165 | 3.40 | 6.60 | 6.60 | 241.63 | 3 |
| 11 | 16 | 10.00 | 176 | 2.40 | 4.90 | 4.70 | 270.07 | 3 |
| 11 | 17 | 10.00 | 187 | 3.60 | 6.80 | 6.70 | 276.95 | 3 |
| 11 | 18 | 10.00 | 198 | 3.20 | 6.40 | 6.40 | 227.76 | 2 |
| 11 | 19 | 10.00 | 209 | 3.90 | 6.70 | 6.80 | 258.90 | 2 |
| 11 | 20 | 10.00 | 220 | 675.80 | 681.30 | 708.30 | 325.59 | 0 |
| 11 | 21 | 10.00 | 231 | 676.00 | 681.50 | 708.80 | 334.22 | 0 |
| 11 | 22 | 10.00 | 242 | 2.90 | 6.90 | 6.80 | 230.07 | 2 |
| 11 | 23 | 10.00 | 253 | 4.30 | 7.40 | 7.30 | 307.01 | 2 |
| 11 | 24 | 10.00 | 264 | 2.90 | 7.60 | 7.50 | 272.39 | 3 |
| 11 | 25 | 10.00 | 275 | 3.90 | 7.70 | 7.80 | 304.07 | 2 |
| 11 | 26 | 10.00 | 287 | 3.50 | 6.90 | 7.00 | 302.13 | 2 |
| 11 | 27 | 10.00 | 298 | 3.20 | 6.40 | 6.40 | 261.56 | 2 |
| 11 | 28 | 10.00 | 309 | 3.70 | 7.20 | 7.10 | 262.57 | 2 |
| 11 | 29 | 10.00 | 320 | 2.90 | 7.00 | 6.80 | 278.05 | 3 |
| 11 | 30 | 10.00 | 331 | 4.80 | 7.90 | 8.00 | 276.23 | 2 |
| 11 | 31 | 10.00 | 342 | 3.50 | 7.80 | 7.60 | 290.38 | 2 |
| 11 | 32 | 10.00 | 353 | 3.40 | 6.90 | 6.70 | 256.94 | 3 |
| 11 | 33 | 10.00 | 364 | 4.30 | 7.50 | 7.30 | 276.11 | 2 |
| 11 | 34 | 10.00 | 375 | 3.60 | 6.70 | 6.70 | 267.61 | 3 |
| 11 | 35 | 10.00 | 386 | 3.70 | 6.00 | 5.80 | 321.79 | 3 |
| 11 | 36 | 10.00 | 397 | 3.80 | 7.20 | 7.30 | 257.93 | 2 |
| 11 | 37 | 10.00 | 408 | 4.00 | 6.30 | 6.40 | 286.67 | 3 |
| 11 | 38 | 10.00 | 419 | 3.90 | 6.50 | 6.50 | 321.66 | 3 |
| 11 | 39 | 10.00 | 430 | 4.00 | 8.00 | 7.80 | 306.87 | 2 |

Protocol #:11

SWIPE_H3_C14

User :

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tsIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 11 | 40 | 10.00 | 441 | 3.70 | 7.30 | 7.30 | 276.02 | 2 |
| 11 | 41 | 10.00 | 452 | 5.30 | 8.10 | 7.90 | 313.75 | 2 |
| 11 | 42 | 10.00 | 463 | 3.60 | 7.20 | 7.20 | 225.59 | 2 |
| 11 | 43 | 10.00 | 474 | 692.50 | 697.60 | 725.50 | 323.50 | 0 |
| 11 | 44 | 10.00 | 485 | 684.30 | 689.60 | 717.30 | 322.73 | 0 |
| 11 | 45 | 10.00 | 496 | 3.90 | 6.10 | 6.00 | 327.67 | 3 |
| 11 | 46 | 10.00 | 508 | 2.80 | 5.70 | 5.50 | 324.86 | 4 |

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|----------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/18/2012 0:06 |
| Sample Ct Duration (min) | | | 10.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/17/2012 23:56 | 3072155088 |
| 2 | 21 | 7/18/2012 0:07 | 3072155089 |
| 3 | 32 | 7/18/2012 0:18 | 3072155090 |
| 4 | 43 | 7/18/2012 0:29 | 3072155091 |
| 5 | 54 | 7/18/2012 0:40 | 3072155092 |
| 6 | 65 | 7/18/2012 0:51 | 3072155093 |
| 7 | 76 | 7/18/2012 1:02 | 3072155095 |
| 8 | 87 | 7/18/2012 1:13 | 3072155096 |
| 9 | 98 | 7/18/2012 1:24 | 3072155097 |
| 10 | 109 | 7/18/2012 1:35 | 3072155098 |
| 11 | 120 | 7/18/2012 1:46 | 3072155099 |
| 12 | 131 | 7/18/2012 1:57 | LCS |
| 13 | 143 | 7/18/2012 2:09 | LCSD |
| 14 | 154 | 7/18/2012 2:20 | 459064 |

M
7/22/12

Q
7/23/12

Protocol #:12

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 12 | 1 | 10.00 | 10 | 4.90 | 8.10 | 8.10 | 259.12 | 3 |
| 12 | 2 | 10.00 | 21 | 2.80 | 5.40 | 5.40 | 290.42 | 4 |
| 12 | 3 | 10.00 | 32 | 4.10 | 7.60 | 7.60 | 298.23 | 1 |
| 12 | 4 | 10.00 | 43 | 3.20 | 7.20 | 7.00 | 324.10 | 3 |
| 12 | 5 | 10.00 | 54 | 3.30 | 7.20 | 6.90 | 277.16 | 4 |
| 12 | 6 | 10.00 | 65 | 4.30 | 7.70 | 7.60 | 281.63 | 3 |
| 12 | 7 | 10.00 | 76 | 3.60 | 7.20 | 7.20 | 276.96 | 2 |
| 12 | 8 | 10.00 | 87 | 4.30 | 7.90 | 7.60 | 281.97 | 3 |
| 12 | 9 | 10.00 | 98 | 4.90 | 8.10 | 8.00 | 283.03 | 2 |
| 12 | 10 | 10.00 | 109 | 3.60 | 7.00 | 6.90 | 285.79 | 3 |
| 12 | 11 | 10.00 | 120 | 3.70 | 7.00 | 6.90 | 272.53 | 3 |
| 12 | 12 | 10.00 | 131 | 671.20 | 676.90 | 702.90 | 327.24 | 0 |
| 12 | 13 | 10.00 | 143 | 682.00 | 686.70 | 712.20 | 329.43 | 0 |
| 12 | 14 | 10.00 | 154 | 4.30 | 8.30 | 8.10 | 325.75 | 2 |

Pace Analytical Services
 Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/18/2012 12:28 | |
| | | Sample Ct Duration (min) | 10.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/18/2012 12:18 | 3072155015 |
| 2 | 21 | 7/18/2012 12:29 | 3072155020 |
| 3 | 32 | 7/18/2012 12:40 | 3072155060 |
| 4 | 43 | 7/18/2012 12:51 | 3072155066 |
| 5 | 54 | 7/18/2012 13:02 | 3072155086 |
| 6 | 65 | 7/18/2012 13:13 | 3072155094 |
| 7 | 76 | 7/18/2012 13:24 | 3072155100 |
| 8 | 87 | 7/18/2012 13:35 | 459065 |

M
7/23/12

Q
7/23/12

Protocol #:19

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| FN | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 1 | 10.00 | 10 | 3.60 | 6.90 | 6.80 | 269.15 | 2 |
| 19 | 2 | 10.00 | 21 | 5.00 | 7.70 | 7.60 | 288.48 | 2 |
| 19 | 3 | 10.00 | 32 | 3.30 | 6.60 | 6.50 | 248.85 | 2 |
| 19 | 4 | 10.00 | 43 | 3.70 | 6.60 | 6.70 | 269.85 | 2 |
| 19 | 5 | 10.00 | 54 | 4.00 | 6.30 | 6.40 | 291.27 | 2 |
| 19 | 6 | 10.00 | 65 | 3.30 | 6.60 | 6.70 | 269.98 | 2 |
| 19 | 7 | 10.00 | 76 | 4.60 | 7.20 | 7.30 | 315.26 | 3 |
| 19 | 8 | 10.00 | 87 | 216.50 | 220.90 | 228.70 | 298.17 | 0 |

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

*M
7/22/12*

Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

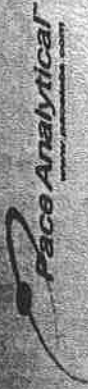
| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| BK6071712 | NA | SAMPLE-13-C14 | 16 | 2 | 7/17/12 1210 | 30 | NA | Rmk |
| 3072155046 | 12478 | | 31 | 11 | | 10 | | |
| 3072155047 | | | | | | | | |
| 048 | | | | | | | | |
| 049 | | | | | | | | |
| 050 | | | | | | | | |
| 051 | | | | | | | | |
| 052 | | | | | | | | |
| 053 | | | | | | | | |
| 054 | | | | | | | | |
| 055 | | | | | | | | |
| 056 | | | | | | | | |
| 057 | | | | | | | | |
| 058 | | | | | | | | |
| 059 | | | | | | | | |
| 061 | 12479 | | | | | | | |
| 062 | | | | | | | | |
| 063 | | | | | | | | |
| 064 | | | | | | | | |
| 065 | | | | | | | | |
| CCS | NA | | | | | | | |
| CCSD | | | | | | | | |
| 3072155067 | 12479 | | | | | | | |
| 068 | | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 3



Logbook ID: 4-R023-3

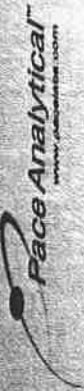
REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072155069 | 12479 | Swire-H3-c14 | 4 | 11 | 7/17/12 1210 | 10 | NA | Rmk |
| 070 | | | | | | | | |
| 071 | | | | | | | | |
| 072 | | | | | | | | |
| 073 | | | | | | | | |
| 074 | | | | | | | | |
| 075 | | | | | | | | |
| 076 | | | | | | | | |
| 077 | | | | | | | | |
| 078 | | | | | | | | |
| 079 | | | | | | | | |
| 080 | 12480 | | 11 | | | | | |
| 081 | | | | | | | | |
| 082 | | | | | | | | |
| 083 | | | | | | | | |
| 084 | | | | | | | | |
| 085 | | | | | | | | |
| 087 | | | | | | | | |
| 045 | 12478 | | | | | | | |
| LCS | NA | | | | | | | |
| LCSD | | | | | | | | |
| 3072155068 | | | | | | | | |
| MB (459061) | 12477 | Swire-H3-c14 | 11 | 11 | 7/17/12 1210 | 10 | NA | Rmk |
| MB (459062) | 12478 | | | | | | | |

7/17/12

Run comments:

Peer Review:



Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

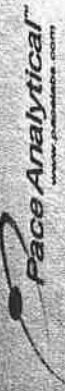
REMINER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|--------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072155088 | 12480 | Swiper-H3-C14 | 6 | 12 | 7/17/12 2:110 | 10 | NA | Rmk |
| 089 | | | | | | | | |
| 090 | | | | | | | | |
| 091 | | | | | | | | |
| 092 | | | | | | | | |
| 093 | | | | | | | | |
| 095 | | | | | | | | |
| 096 | | | | | | | | |
| 097 | | | | | | | | |
| 098 | | | | | | | | |
| 099 | | | | | | | | |
| LCS | NA | | | | | | | |
| LCS D | NA | | 2 | | | | | |
| M13 (459063) | 12479 | | 34 | 2 | 7/17/12 2:110 | 30 | NA | Rmk |
| BK6071812 | NA | | 31 | 11 | | 10 | | |
| 3072157001 | 12486 | | | | | | | |
| C02 | | | | | | | | |
| C03 | | | | | | | | |
| C04 | | | | | | | | |
| C05 | | | | | | | | |
| C06 | | | | | | | | |
| C07 | | | | | | | | |
| C08 | | | | | | | | |
| C09 | | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services, Inc.-Pittsburgh
 Liquid Scintillation Counter Run Log System 3



Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| BK6 | G-14 Cal | Sample H3-C14 | 13 | 9 | 7/18/12 1345 | 3 | nd | Ma |
| C-14-20120718-N1 | | | | | | | | |
| N2 | | | | | | | | |
| N3 | | | | | | | | |
| N4 | | | | | | | | |
| N5 | | | | | | | | |
| N6 | | | | | | | | |
| N7 | | | | | | | | |
| N8 | | | | | | | | |
| N9 | | | | | | | | |
| N10 | | | | | | | | |
| BK6 | H-3 Cal | | 31 | 10 | 7/18/12 1345 | 10 11-7/18/12 | | |
| H3 20120718-N1 | | | | | | | | |
| N2 | | | | | | | | |
| N3 | | | | | | | | |
| N4 | | | | | | | | |
| N5 | | | | | | | | |
| N6 | | | | | | | | |
| N7 | | | | | | | | |
| N8 | | | | | | | | |
| N9 | | | | | | | | |
| N10 | | | | | | | | |
| 2072155015 | 12476 | Swipe-H3-C14 | 20 | 19 | 7/17/12 2130 | 10 | INA | Rmk |
| 020 | | | | | | | | |

Run comments: _____

Peer Review: _____



Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072155060 | 12478 | Swipe-13C14 | 20 | 19 | 7/17/12 2130 | 10 | NA | RMLC |
| 066 | 12479 | | | | | | | |
| 086 | 12480 | | | | | | | |
| 094 | | | | | | | | |
| 100 | | | | | | | | |
| MB (459065) | 12480 | | | | | | | |
| 3072157041 | 12488 | | 6 | 12 | 7/18/12 1210 | 12 | NA | RMLC |
| 042 | | | | | | | | |
| 043 | | | | | | | | |
| 044 | | | | | | | | |
| 045 | | | | | | | | |
| 046 | | | | | | | | |
| 047 | | | | | | | | |
| 048 | | | | | | | | |
| 049 | | | | | | | | |
| 050 | | | | | | | | |
| 051 | | | | | | | | |
| 052 | | | 2 | | | | | |
| 053 | | | | | | | | |
| 054 | | | | | | | | |
| 055 | | | | | | | | |
| 056 | | | | | | | | |
| 057 | | | | | | | | |
| 058 | | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
Matrix Smear
Batch ID 12476
Prep Start 7/16/2012 12:00
Prep Finish 7/16/2012

Analyst RMK
PrepSOP1 0
PrepSOP2 n/a
AnalSOP1 0
AnalSOP2 n/a

| Uncertainty Factors | |
|---------------------|--------|
| UE1 | 5.39% |
| UE2 | 10.60% |
| UE3 | 1.00% |
| UE4 | 0.00% |



| Sample | Low Energy Beta Emitters Efficiency (cpm/dpm) | Decay Time (Years) | Decay Factor | Activity (dpm/S) | Count Uncertainty (dpm/S) | C.S.U. (dpm/S) | MDC (dpm/S) | Critical Level (dpm/S) | Zero UNC | Use UNC | Unit Conversion Factor |
|-----------|---|--------------------|--------------|------------------|---------------------------|----------------|-------------|------------------------|----------|---------|------------------------|
| 459058 | -0.0406 | 0.0000 | 1.0000 | 155.001 | -22.098 | 22.369 | -118.059 | -42.770 | -12.594 | -12.594 | 1.00 |
| LCS12476 | 0.5078 | 0.0000 | 1.0000 | 110.816 | 11.675 | 17.635 | 9.450 | 3.423 | 1.008 | 11.675 | 1.00 |
| LCSD12476 | 0.5076 | 0.0000 | 1.0000 | 108.328 | 11.561 | 17.338 | 9.453 | 3.425 | 1.008 | 11.561 | 1.00 |
| LCS12477 | 0.5221 | 0.0000 | 1.0000 | 95.465 | 10.770 | 15.673 | 9.191 | 3.330 | 0.981 | 10.770 | 1.00 |
| LCSD12477 | 0.5036 | 0.0000 | 1.0000 | 104.361 | 11.425 | 16.896 | 9.528 | 3.452 | 1.016 | 11.425 | 1.00 |
| LCS12478 | 0.4961 | 0.0000 | 1.0000 | 105.080 | 11.557 | 17.048 | 9.673 | 3.504 | 1.032 | 11.557 | 1.00 |
| LCSD12478 | 0.5041 | 0.0000 | 1.0000 | 105.391 | 11.468 | 17.015 | 9.519 | 3.448 | 1.015 | 11.468 | 1.00 |
| LCS12479 | 0.4930 | 0.0000 | 1.0000 | 106.606 | 11.671 | 17.259 | 9.733 | 3.526 | 1.038 | 11.671 | 1.00 |
| LCSD12479 | 0.4953 | 0.0000 | 1.0000 | 104.102 | 11.521 | 16.938 | 9.688 | 3.510 | 1.034 | 11.521 | 1.00 |
| LCS12480 | 0.5085 | 0.0000 | 1.0000 | 99.974 | 11.153 | 16.327 | 9.436 | 3.418 | 1.007 | 11.153 | 1.00 |
| LCSD12480 | 0.5061 | 0.0000 | 1.0000 | 113.736 | 11.831 | 18.000 | 9.482 | 3.435 | 1.011 | 11.831 | 1.00 |
| LCS12486 | 0.5221 | 0.0000 | 1.0000 | 106.957 | 11.317 | 17.053 | 9.191 | 3.330 | 0.980 | 11.317 | 1.00 |
| LCSD12486 | 0.5045 | 0.0000 | 1.0000 | 112.973 | 11.818 | 17.923 | 9.512 | 3.446 | 1.015 | 11.818 | 1.00 |
| LCS12487 | 0.4950 | 0.0000 | 1.0000 | 110.294 | 11.818 | 17.684 | 9.693 | 3.512 | 1.034 | 11.818 | 1.00 |
| LCSD12487 | 0.5028 | 0.0000 | 1.0000 | 101.694 | 11.308 | 16.583 | 9.544 | 3.458 | 1.018 | 11.308 | 1.00 |
| LCS12488 | 0.4938 | 0.0000 | 1.0000 | 100.924 | 11.386 | 16.569 | 9.717 | 3.520 | 1.037 | 11.386 | 1.00 |
| LCSD12488 | 0.4939 | 0.0000 | 1.0000 | 109.588 | 11.800 | 17.609 | 9.715 | 3.519 | 1.036 | 11.800 | 1.00 |

RMK
7/22/12
7/23/12

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12476



| Calibration Information | | | | |
|---|-------------------------------|-------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI + 15 mL Ultima LLT | 5 mL DI + 15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Handwritten signature and date: 7/23/12



Low Energy Beta CSU Derivation

CSU Analysis for Preparation

| Mass Aliquot uncert (g) | mass (g) | rel unc |
|----------------------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | of Critical | CSU (TPU) for Preparation | 5.39% |
|----------------------------------|----------|-------------|---------------------------|--------|
| | | | Uncertainty | |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Description | relative | of Critical | CSU (TPU) for Yield Correction | 1.00% |
|-----------------------------|----------|-------------|--------------------------------|--------|
| | | | Uncertainty | |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 |

| Description | Maximum | of Critical | CSU (TPU) for Analysis | 10.60% |
|----------------------------------|---------|-------------|------------------------|--------|
| | | | Uncertainty | |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 |

| Total Uncertainty | Maximum | of Critical | Uncertainty | Uncertainty |
|-------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Handwritten signature: Q 7/23/12

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 29% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPME | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 4 | 1 | 30.00 | 30 | 2.97 | 6.60 | 6.30 | 301.41 | 3 |

BKG 072012

Pace Analytical Services
 Count Start Date/Time Calculator

| | | | |
|--|--------|--------------------------|-----------------|
| System #3 | | Protocol ID: | SWIPE_H3_C14 |
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/20/2012 12:10 |
| | | Sample Ct Duration (min) | 7.0 |
| | | Calculated Count Start | |
| S# | ELTIME | Date/Time | Sample ID |
| 1 | 7 | 7/20/2012 12:03 | LCS12476 |
| 2 | 15 | 7/20/2012 12:11 | LCSD12476 |
| 3 | 23 | 7/20/2012 12:19 | LCS12477 |
| 4 | 31 | 7/20/2012 12:27 | LCSD12477 |
| 5 | 39 | 7/20/2012 12:35 | LCS12478 |
| 6 | 47 | 7/20/2012 12:43 | LCSD12478 |
| 7 | 55 | 7/20/2012 12:51 | LCS12479 |
| 8 | 63 | 7/20/2012 12:59 | LCSD12479 |

Dr
 7/22/12

Q
 7/23/12

Protocol #: 7

SWIPE_H3_C14

User :

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 6.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 7 | 1 | 7.00 | 7 | 46.14 | 62.43 | 62.57 | 313.20 | 1 |
| 7 | 2 | 7.00 | 15 | 46.00 | 60.71 | 61.29 | 313.43 | 1 |
| 7 | 3 | 7.00 | 23 | 40.86 | 56.14 | 56.14 | 271.48 | 1 |
| 7 | 4 | 7.00 | 31 | 45.29 | 58.14 | 58.86 | 319.04 | 0 |
| 7 | 5 | 7.00 | 39 | 42.29 | 57.86 | 58.43 | 328.18 | 1 |
| 7 | 6 | 7.00 | 47 | 42.71 | 58.14 | 59.43 | 318.39 | 0 |
| 7 | 7 | 7.00 | 55 | 43.43 | 58.86 | 58.86 | 331.51 | 1 |
| 7 | 8 | 7.00 | 63 | 40.00 | 57.29 | 57.86 | 329.08 | 0 |

Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

83 of 100

NOTE: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worksheet | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|-----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072100018 | | | 9 | 20 | 7/20/12 0900 | 7 | | A |
| ↓ | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| UCS | | | | | | | | |
| UCS | | | | | | | | |
| LCSD12476 | 12476 | Swipe-1304 | 18 | 7 | 7/20/12 0950 | 7 | NA | RMK |
| LCSD12476 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12477 | 12477 | | | | | | | |
| LCSD12477 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12478 | 12478 | | | | | | | |
| LCSD12478 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12479 | 12479 | | | | | | | |
| LCSD12479 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12480 | 12480 | | | | | | | |
| LCSD12480 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12486 | 12486 | | | | | | | |
| LCSD12486 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12487 | 12487 | | | | | | | |
| LCSD12487 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12488 | 12488 | | | | | | | |
| LCSD12488 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| LCSD12488 | 12488 | | | | | | | |
| LCSD12488 | ↓ | | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |

Run comments:

Peer Review:

Low Energy Beta Sample Analysis Data

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

1 459065-BLANK for HBN 91051 [RADC/1248

Type BLANK Matrix Impact Plate Collected % Moisture
 Client QCACCOUNT WO Work ID

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/30/2012 13:34 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796142 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/30/2012 13:34 Dilution
 Method EPA 906.0M Col ID Hold Date 12/25/2012 23:59 Analyst RMK
 Schedule 2796142 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|
| Rad Chemistry | OK | | | | |
| LSC Low Energy Beta | OK | 4.60J ± 3.60 (6.76) | dpm/sa 4.60J ± 3.60 (6.76) | | dpm/sa |

2 3072155081-SU-07-14

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/17/2012 20:43 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789936 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 20:43 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789936 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.88J ± 3.61 (6.72) | dpm/sa 4.88J ± 3.61 (6.72) | | dpm/sa | | |

3 3072155082-SU-07-15

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

3 3072155082-SU-07-15

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/17/2012 20:54 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789937 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 20:54 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789937 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 2.96J ± 3.39 (6.74) | dpm/sa 2.96J ± 3.39 (6.74) | | dpm/sa | | |

4 3072155083-SU-07-16

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/17/2012 21:05 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789938 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 21:05 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789938 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.47J ± 3.56 (6.98) | dpm/sa 3.47J ± 3.56 (6.98) | | dpm/sa | | |

5 3072155084-SU-07-17

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

5 3072155084-SU-07-17

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/17/2012 21:16 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789939 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 21:16 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789939 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.35J ± 3.85 (6.84) | dpm/sa 6.35J ± 3.85 (6.84) | | dpm/sa | | |

6 3072155085-SU-07-18

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/17/2012 21:27 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789940 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 21:27 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789940 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.88J ± 3.61 (6.71) | dpm/sa 4.88J ± 3.61 (6.71) | | dpm/sa | | |

7 3072155086-SU-07-19

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 **HBN** 91051
Rule 9060 I LEB **Status** WP
Create Date 6/28/2012 **Analyst** RMK

7 3072155086-SU-07-19

Prep Information

| | | | |
|-----------------------------|-------------------------|----------------------------------|--------------------|
| Procedure 9060 I LEB | Batch RADC/12480 | Prep Date 7/18/2012 13:02 | Dilution |
| Method EPA 906.0M | HBN 91051 | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789941 | Instru NONE | | CC OK * |

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

| | | | |
|-----------------------------|--------------------|----------------------------------|--------------------|
| Procedure 9060 I LEB | Instru NONE | Run Date 7/18/2012 13:02 | Dilution |
| Method EPA 906.0M | Col ID | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789941 | File | | CC OK * |

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.16J ± 3.42 (6.75) | dpm/sa 3.16J ± 3.42 (6.75) | | dpm/sa | | |

8 3072155087-SU-07-20

| | | | |
|-------------------|--------------------|---|-------------------|
| Type PS | Matrix Wipe | Collected 6/11/2012 00:01 | % Moisture |
| Client RTI | WO 3072155 | Work ID Fort Monmouth 1207075 | Location |

Prep Information

| | | | |
|-----------------------------|-------------------------|----------------------------------|--------------------|
| Procedure 9060 I LEB | Batch RADC/12480 | Prep Date 7/17/2012 21:38 | Dilution |
| Method EPA 906.0M | HBN 91051 | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789942 | Instru NONE | | CC OK * |

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

| | | | |
|-----------------------------|--------------------|----------------------------------|--------------------|
| Procedure 9060 I LEB | Instru NONE | Run Date 7/17/2012 21:38 | Dilution |
| Method EPA 906.0M | Col ID | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789942 | File | | CC OK * |

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.20J ± 3.86 (6.90) | dpm/sa 6.20J ± 3.86 (6.90) | | dpm/sa | | |

9 3072155088-SU-07-21

| | | | |
|-------------------|--------------------|---|-------------------|
| Type PS | Matrix Wipe | Collected 6/11/2012 00:01 | % Moisture |
| Client RTI | WO 3072155 | Work ID Fort Monmouth 1207075 | Location |

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

9 3072155088-SU-07-21

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/17/2012 23:56 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789943 Instru NONE CC OK *
 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/17/2012 23:56 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789943 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.43J ± 3.80 (6.72) | dpm/sa 6.43J ± 3.80 (6.72) | | dpm/sa | | |

10 3072155089-SU-07-22

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/18/2012 00:07 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789944 Instru NONE CC OK *
 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/18/2012 00:07 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789944 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 1.22U ± 3.18 (6.75) | dpm/sa 1.22U ± 3.18 (6.75) | | dpm/sa | | |

11 3072155090-SU-07-23

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

11 3072155090-SU-07-23

Prep Information

Procedure 9060 I LEB **Batch** RADC/12480 **Prep Date** 7/18/2012 00:18 **Dilution**
Method EPA 906.0M **HBN** 91051 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789945 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 00:18 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789945 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.52J ± 3.72 (6.79) | dpm/sa 5.52J ± 3.72 (6.79) | | dpm/sa | | |

12 3072155091-SU-07-23D

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12480 **Prep Date** 7/18/2012 00:29 **Dilution**
Method EPA 906.0M **HBN** 91051 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789946 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 00:29 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789946 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.49J ± 3.70 (7.01) | dpm/sa 4.49J ± 3.70 (7.01) | | dpm/sa | | |

13 3072155092-SU-07-24

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

13 3072155092-SU-07-24

Prep Information

Procedure 9060 I LEB **Batch** RADC/12480 **Prep Date** 7/18/2012 00:40 **Dilution**
Method EPA 906.0M **HBN** 91051 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789947 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 00:40 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789947 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.11J ± 3.52 (6.71) | dpm/sa 4.11J ± 3.52 (6.71) | | dpm/sa | | |

14 3072155093-SU-07-25

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12480 **Prep Date** 7/18/2012 00:51 **Dilution**
Method EPA 906.0M **HBN** 91051 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789948 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 00:51 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789948 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.46J ± 3.68 (6.72) | dpm/sa 5.46J ± 3.68 (6.72) | | dpm/sa | | |

15 3072155094-SU-07-26

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmouth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

15 3072155094-SU-07-26

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/18/2012 13:13 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789949 Instru NONE CC OK *
 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/18/2012 13:13 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789949 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 3.72J ± 3.47 (6.71) | dpm/sa 3.72J ± 3.47 (6.71) | | dpm/sa | | |

16 3072155095-SU-07-27

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/18/2012 01:02 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789950 Instru NONE CC OK *
 Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/18/2012 01:02 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789950 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.68J ± 3.59 (6.71) | dpm/sa 4.68J ± 3.59 (6.71) | | dpm/sa | | |

17 3072155096-SU-07-28

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmonth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

17 3072155096-SU-07-28

Prep Information

Procedure 9060 I LEB **Batch** RADC/12480 **Prep Date** 7/18/2012 01:13 **Dilution**
Method EPA 906.0M **HBN** 91051 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789951 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 01:13 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789951 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.46J ± 3.68 (6.72) | dpm/sa 5.46J ± 3.68 (6.72) | | | dpm/sa | |

18 3072155097-SU-07-29

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12480 **Prep Date** 7/18/2012 01:24 **Dilution**
Method EPA 906.0M **HBN** 91051 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789952 **Instru** NONE **CC** OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 01:24 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2789952 **File** **CC** OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|-----|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 6.24J ± 3.78 (6.72) | dpm/sa 6.24J ± 3.78 (6.72) | | | dpm/sa | |

19 3072155098-SU-07-30

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072155 **Work ID** Fort Monmonth 1207075 **Location**

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 HBN 91051
 Rule 9060 I LEB Status WP
 Create Date 6/28/2012 Analyst RMK

19 3072155098-SU-07-30

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/18/2012 01:35 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789953 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/18/2012 01:35 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789953 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.12J ± 3.53 (6.73) | dpm/sa 4.12J ± 3.53 (6.73) | | dpm/sa | | |

20 3072155099-SU-07-31

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

Prep Information

Procedure 9060 I LEB Batch RADC/12480 Prep Date 7/18/2012 01:46 Dilution
 Method EPA 906.0M HBN 91051 Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789954 Instru NONE CC OK *

Initial Volume 1 mL Default 1 mL
 Final Volume, 1 mL Default 1 mL

Analytical Information

Procedure 9060 I LEB Instru NONE Run Date 7/18/2012 01:46 Dilution
 Method EPA 906.0M Col ID Hold Date 12/8/2012 23:59 Analyst RMK
 Schedule 2789954 File CC OK *

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 4.10J ± 3.51 (6.71) | dpm/sa 4.10J ± 3.51 (6.71) | | dpm/sa | | |

21 3072155100-SU-07-31D

Type PS Matrix Wipe Collected 6/11/2012 00:01 % Moisture
 Client RTI WO 3072155 Work ID Fort Monmouth 1207075 Location

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Quality Control Review



Batch RADC/12480 **HBN** 91051
Rule 9060 | LEB **Status** WP
Create Date 6/28/2012 **Analyst** RMK

21 3072155100-SU-07-31D

Prep Information

| | | | |
|-----------------------------|-------------------------|----------------------------------|--------------------|
| Procedure 9060 LEB | Batch RADC/12480 | Prep Date 7/18/2012 13:24 | Dilution |
| Method EPA 906.0M | HBN 91051 | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789955 | Instru NONE | | CC OK * |
| Initial Volume 1 mL Default | 1 mL | | |
| Final Volume, 1 mL Default | 1 mL | | |

Analytical Information

| | | | |
|-----------------------------|--------------------|----------------------------------|--------------------|
| Procedure 9060 LEB | Instru NONE | Run Date 7/18/2012 13:24 | Dilution |
| Method EPA 906.0M | Col ID | Hold Date 12/8/2012 23:59 | Analyst RMK |
| Schedule 2789955 | File | | CC OK * |

| Analyte | CC | Posted Result | Result | MDL | RDL | Reg. Limits | |
|---------------------|----|---------------------------|-------------------------------------|-----|--------|-------------|------|
| | | | | | | Low | High |
| Rad Chemistry | OK | | | | | | |
| LSC Low Energy Beta | OK | 5.02J ± 3.72 (6.92) | dpm/sa 5.02J ± 3.72 (6.92) | | dpm/sa | | |

** Indicates QC failure. For example, blank contamination or recoveries out of range.

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Creation Date 06/28/2012 13:45 Assigned Analyst RMK
 Batch ID 12480 Earliest Due Date 07/04/2012 07:12
 A-code 9060 ILEB 9060W HBN 91051
 Method EPA 906.0M EPA 906.0m

| Project | Sample ID | Sample Type | Matrix | Collection Date/Time | Client ID | LEB Activity | LEB Unc. | LEB MDC | Analysis Date/Time |
|---------|------------|-------------|--------|----------------------|-----------|--------------|----------|---------|--------------------|
| | 459065 | BLANK | IP | | QCACCOUNT | 4.60J | 3.60 | 6.76 | 7/30/12 13:34 |
| 3072155 | 3072155081 | PS | WP | 6/11/2012 0:01 | RTI | 4.88J | 3.61 | 6.72 | 7/17/12 20:43 |
| 3072155 | 3072155082 | PS | WP | 6/11/2012 0:01 | RTI | 2.96J | 3.39 | 6.74 | 7/17/12 20:54 |
| 3072155 | 3072155083 | PS | WP | 6/11/2012 0:01 | RTI | 3.47J | 3.56 | 6.98 | 7/17/12 21:05 |
| 3072155 | 3072155084 | PS | WP | 6/11/2012 0:01 | RTI | 6.35J | 3.85 | 6.84 | 7/17/12 21:16 |
| 3072155 | 3072155085 | PS | WP | 6/11/2012 0:01 | RTI | 4.88J | 3.61 | 6.71 | 7/17/12 21:27 |
| 3072155 | 3072155086 | PS | WP | 6/11/2012 0:01 | RTI | 3.16J | 3.42 | 6.75 | 7/18/12 13:02 |
| 3072155 | 3072155087 | PS | WP | 6/11/2012 0:01 | RTI | 6.20J | 3.86 | 6.90 | 7/17/12 21:38 |
| 3072155 | 3072155088 | PS | WP | 6/11/2012 0:01 | RTI | 6.43J | 3.80 | 6.72 | 7/17/12 23:56 |
| 3072155 | 3072155089 | PS | WP | 6/11/2012 0:01 | RTI | 1.22U | 3.18 | 6.75 | 7/18/12 0:07 |
| 3072155 | 3072155090 | PS | WP | 6/11/2012 0:01 | RTI | 5.52J | 3.72 | 6.79 | 7/18/12 0:18 |
| 3072155 | 3072155091 | PS | WP | 6/11/2012 0:01 | RTI | 4.49J | 3.70 | 7.01 | 7/18/12 0:29 |
| 3072155 | 3072155092 | PS | WP | 6/11/2012 0:01 | RTI | 4.11J | 3.52 | 6.71 | 7/18/12 0:40 |
| 3072155 | 3072155093 | PS | WP | 6/11/2012 0:01 | RTI | 5.46J | 3.68 | 6.72 | 7/18/12 0:51 |
| 3072155 | 3072155094 | PS | WP | 6/11/2012 0:01 | RTI | 3.72J | 3.47 | 6.71 | 7/18/12 13:13 |
| 3072155 | 3072155095 | PS | WP | 6/11/2012 0:01 | RTI | 4.68J | 3.59 | 6.71 | 7/18/12 1:02 |
| 3072155 | 3072155096 | PS | WP | 6/11/2012 0:01 | RTI | 5.46J | 3.68 | 6.72 | 7/18/12 1:13 |
| 3072155 | 3072155097 | PS | WP | 6/11/2012 0:01 | RTI | 6.24J | 3.78 | 6.72 | 7/18/12 1:24 |
| 3072155 | 3072155098 | PS | WP | 6/11/2012 0:01 | RTI | 4.12J | 3.53 | 6.73 | 7/18/12 1:35 |
| 3072155 | 3072155099 | PS | WP | 6/11/2012 0:01 | RTI | 4.10J | 3.51 | 6.71 | 7/18/12 1:46 |
| 3072155 | 3072155100 | PS | WP | 6/11/2012 0:01 | RTI | 5.02J | 3.72 | 6.92 | 7/18/12 13:24 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

06/30/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
 Matrix Smear
 Batch ID 12480
 Prep Start 7/16/2012 12:00
 Prep Finish 7/16/2012
 Act. Rpt Units dpm

Analyst RMK
 PrepSOP1
 PrepSOP2 n/a
 AnalSOP1
 AnalSOP2 n/a
 Aliq. Rpt Units Sample

Bkg CPM 4.77
 Bkg Duration 30.0 min
 Bkg Ref bkg 7/17/2012
 Bkg Ct Date/Time: 7/17/2012 13:09
 Instrument ID: System #3



| Sample | Analysis Volume (Sample) | Ref. Date | Count Duration (min) | Count Start Date/Time | Sample Gross CPM | TSIE # | Activity Report Units | TSIE Within Quench Curve |
|------------|--------------------------|---------------|----------------------|-----------------------|------------------|--------|-----------------------|--------------------------|
| 459065 | 1.0 | 7/30/12 13:34 | 10.0 | 7/30/12 13:34 | 7.14 | 300.0 | dpm/S | Pass |
| 3072155081 | 1.0 | 6/11/12 0:01 | 10.0 | 7/17/12 20:43 | 7.30 | 257.9 | dpm/S | Pass |
| 3072155082 | 1.0 | 6/11/12 0:01 | 10.0 | 7/17/12 20:54 | 6.30 | 286.7 | dpm/S | Pass |
| 3072155083 | 1.0 | 6/11/12 0:01 | 10.0 | 7/17/12 21:05 | 6.50 | 321.7 | dpm/S | High, Evaluate |
| 3072155084 | 1.0 | 6/11/12 0:01 | 10.0 | 7/17/12 21:16 | 8.00 | 306.9 | dpm/S | Pass |
| 3072155085 | 1.0 | 6/11/12 0:01 | 10.0 | 7/17/12 21:27 | 7.30 | 276.0 | dpm/S | Pass |
| 3072155086 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 13:02 | 6.40 | 291.3 | dpm/S | Pass |
| 3072155087 | 1.0 | 6/11/12 0:01 | 10.0 | 7/17/12 21:38 | 7.90 | 313.8 | dpm/S | High, Evaluate |
| 3072155088 | 1.0 | 6/11/12 0:01 | 10.0 | 7/17/12 23:56 | 8.10 | 259.1 | dpm/S | Pass |
| 3072155089 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 0:07 | 5.40 | 290.4 | dpm/S | Pass |
| 3072155090 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 0:18 | 7.60 | 298.2 | dpm/S | Pass |
| 3072155091 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 0:29 | 7.00 | 324.1 | dpm/S | High, Evaluate |
| 3072155092 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 0:40 | 6.90 | 277.2 | dpm/S | Pass |
| 3072155093 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 0:51 | 7.60 | 281.6 | dpm/S | Pass |
| 3072155094 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 13:13 | 6.70 | 270.0 | dpm/S | Pass |
| 3072155095 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 1:02 | 7.20 | 277.0 | dpm/S | Pass |
| 3072155096 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 1:13 | 7.60 | 282.0 | dpm/S | Pass |
| 3072155097 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 1:24 | 8.00 | 283.0 | dpm/S | Pass |
| 3072155098 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 1:35 | 6.90 | 285.8 | dpm/S | Pass |
| 3072155099 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 1:46 | 6.90 | 272.5 | dpm/S | Pass |
| 3072155100 | 1.0 | 6/11/12 0:01 | 10.0 | 7/18/12 13:24 | 7.30 | 315.3 | dpm/S | High, Evaluate |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

7/13/12

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12480



| Calibration Information | | | | |
|---|------------------------------|------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI +15 mL Ultima LLT | 5 mL DI +15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Low Energy Beta CSU Derivation

CSU Analysis for Preparation

Mass Aliquot

| uncert (g) | mass (g) | rel unc |
|------------|----------|---------|
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |



| Description | relative | of Critical | CSU (TPU) for Preparation | Uncertainty | 5.39% |
|----------------------------------|----------|-------------|---------------------------|-------------|-------|
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| Description | relative | of Critical | CSU (TPU) for Yield Correction | Uncertainty | 1.00% |
|-----------------------------|----------|-------------|--------------------------------|-------------|-------|
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 | |

| Description | Maximum | of Critical | CSU (TPU) for Analysis | Uncertainty | 10.60% |
|----------------------------------|---------|-------------|------------------------|-------------|--------|
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 | |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| Total Uncertainty | Maximum | of Critical | Uncertainty | Uncertainty |
|-------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Protocol #: 2

SWIPE_H3_C14

User :

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 2 | 1 | 30.00 | 30 | 2.13 | 5.53 | 4.77 | 300.09 | 7 |

Bkg 071712

Pace Analytical Services
Count Start Date/Time Calculator

| | | | |
|--|--------------|-----------------|------------|
| System #3 | Protocol ID: | SWIPE_H3_C14 | |
| | Data File: | | |
| Date in upper Left hand corner of Printout | | 7/30/2012 13:09 | |
| Sample Ct Duration (min) | | 7.0 | |
| Calculated Count Start | | | |
| S# | ELTIME | Date/Time | Sample ID |
| 1 | 7 | 7/30/2012 13:02 | 3072155009 |
| 2 | 15 | 7/30/2012 13:10 | 3072155016 |
| 3 | 23 | 7/30/2012 13:18 | LCS12502 |
| 4 | 31 | 7/30/2012 13:26 | LCSD12502 |
| 5 | 39 | 7/30/2012 13:34 | 459065 |

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 3.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 20 | 1 | 7.00 | 7 | 4.00 | 6.29 | 6.14 | 314.87 | 3 |
| 20 | 2 | 7.00 | 15 | 4.29 | 7.86 | 7.71 | 294.67 | 2 |
| 20 | 3 | 7.00 | 23 | 47.71 | 64.43 | 64.86 | 323.52 | 0 |
| 20 | 4 | 7.00 | 31 | 43.43 | 58.86 | 59.29 | 332.35 | 0 |
| 20 | 5 | 7.00 | 39 | 4.43 | 7.29 | 7.14 | 299.98 | 3 |

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE H3 C14 |
|--|--------|----------------------------------|-----------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/17/2012 14:26 |
| Sample Ct Duration (min) | | | 10.0 |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 - | 7/17/2012 14:16 | 3072155046 |
| 2 | 21 - | 7/17/2012 14:27 | 3072155047 |
| 3 | 32 - | 7/17/2012 14:38 | 3072155048 |
| 4 | 43 - | 7/17/2012 14:49 | 3072155049 |
| 5 | 54 - | 7/17/2012 15:00 | 3072155050 |
| 6 | 65 - | 7/17/2012 15:11 | 3072155051 |
| 7 | 76 - | 7/17/2012 15:22 | 3072155052 |
| 8 | 87 - | 7/17/2012 15:33 | 3072155053 |
| 9 | 98 - | 7/17/2012 15:44 | 3072155054 |
| 10 | 110 ✓ | 7/17/2012 15:56 | 3072155055 |
| 11 | 121 ✓ | 7/17/2012 16:07 | 3072155056 |
| 12 | 132 ✓ | 7/17/2012 16:18 | 3072155057 |
| 13 | 143 ✓ | 7/17/2012 16:29 | 3072155058 |
| 14 | 154 ✓ | 7/17/2012 16:40 | 3072155059 |
| 15 | 165 ✓ | 7/17/2012 16:51 | 3072155061 |
| 16 | 176 ✓ | 7/17/2012 17:02 | 3072155062 |
| 17 | 187 - | 7/17/2012 17:13 | 3072155063 |
| 18 | 198 - | 7/17/2012 17:24 | 3072155064 |
| 19 | 209 - | 7/17/2012 17:35 | 3072155065 |
| 20 | 220 - | 7/17/2012 17:46 | LCS |
| 21 | 231 - | 7/17/2012 17:57 | LCSD |
| 22 | 242 - | 7/17/2012 18:08 | 3072155067 |
| 23 | 253 ✓ | 7/17/2012 18:19 | 3072155068 |
| 24 | 264 ✓ | 7/17/2012 18:30 | 3072155069 |
| 25 | 275 ✓ | 7/17/2012 18:41 | 3072155070 |
| 26 | 287 - | 7/17/2012 18:53 | 3072155071 |
| 27 | 298 - | 7/17/2012 19:04 | 3072155072 |
| 28 | 309 - | 7/17/2012 19:15 | 3072155073 |
| 29 | 320 - | 7/17/2012 19:26 | 3072155074 |
| 30 | 331 - | 7/17/2012 19:37 | 3072155075 |
| 31 | 342 ✓ | 7/17/2012 19:48 | 3072155076 |
| 32 | 353 ✓ | 7/17/2012 19:59 | 3072155077 |
| 33 | 364 ✓ | 7/17/2012 20:10 | 3072155078 |
| 34 | 375 ✓ | 7/17/2012 20:21 | 3072155079 |
| 35 | 386 - | 7/17/2012 20:32 | 3072155080 |
| 36 | 397 - | 7/17/2012 20:43 | 3072155081 |
| 37 | 408 - | 7/17/2012 20:54 | 3072155082 |
| 38 | 419 - | 7/17/2012 21:05 | 3072155083 |
| 39 | 430 - | 7/17/2012 21:16 | 3072155084 |
| 40 | 441 ✓ | 7/17/2012 21:27 | 3072155085 |
| 41 | 452 - | 7/17/2012 21:38 | 3072155087 |
| 42 | 463 - | 7/17/2012 21:49 | 3072155045 |
| 43 | 474 - | 7/17/2012 22:00 | LCS |
| 44 | 485 - | 7/17/2012 22:11 | LCSD |
| 45 | 496 - | 7/17/2012 22:22 | 459061 |
| 46 | 508 ✓ | 7/17/2012 22:34 | 459062 |

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| F# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 11 | 1 | 10.00 | 10 | 5.20 | 8.10 | 8.10 | 268.41 | 2 |
| 11 | 2 | 10.00 | 21 | 3.70 | 7.50 | 7.60 | 228.08 | 2 |
| 11 | 3 | 10.00 | 32 | 3.50 | 6.80 | 6.70 | 263.83 | 2 |
| 11 | 4 | 10.00 | 43 | 2.20 | 5.60 | 5.50 | 271.22 | 3 |
| 11 | 5 | 10.00 | 54 | 5.80 | 8.50 | 8.40 | 277.27 | 2 |
| 11 | 6 | 10.00 | 65 | 4.40 | 8.30 | 8.20 | 285.48 | 2 |
| 11 | 7 | 10.00 | 76 | 4.80 | 8.30 | 8.20 | 286.72 | 2 |
| 11 | 8 | 10.00 | 87 | 3.30 | 5.90 | 5.60 | 283.69 | 3 |
| 11 | 9 | 10.00 | 98 | 5.00 | 8.20 | 8.10 | 290.87 | 2 |
| 11 | 10 | 10.00 | 110 | 4.00 | 7.60 | 7.60 | 275.66 | 2 |
| 11 | 11 | 10.00 | 121 | 3.60 | 6.20 | 6.10 | 284.80 | 3 |
| 11 | 12 | 10.00 | 132 | 3.60 | 6.30 | 6.40 | 256.87 | 2 |
| 11 | 13 | 10.00 | 143 | 3.50 | 7.50 | 7.30 | 286.83 | 3 |
| 11 | 14 | 10.00 | 154 | 4.30 | 8.00 | 8.00 | 280.48 | 2 |
| 11 | 15 | 10.00 | 165 | 3.40 | 6.60 | 6.60 | 241.63 | 3 |
| 11 | 16 | 10.00 | 176 | 2.40 | 4.90 | 4.70 | 270.07 | 3 |
| 11 | 17 | 10.00 | 187 | 3.60 | 6.80 | 6.70 | 276.95 | 3 |
| 11 | 18 | 10.00 | 198 | 3.20 | 6.40 | 6.40 | 227.76 | 2 |
| 11 | 19 | 10.00 | 209 | 3.90 | 6.70 | 6.80 | 258.90 | 2 |
| 11 | 20 | 10.00 | 220 | 675.80 | 681.30 | 708.30 | 325.59 | 0 |
| 11 | 21 | 10.00 | 231 | 676.00 | 681.50 | 708.80 | 334.22 | 0 |
| 11 | 22 | 10.00 | 242 | 2.90 | 6.90 | 6.80 | 230.07 | 2 |
| 11 | 23 | 10.00 | 253 | 4.30 | 7.40 | 7.30 | 307.01 | 2 |
| 11 | 24 | 10.00 | 264 | 2.90 | 7.60 | 7.50 | 272.39 | 3 |
| 11 | 25 | 10.00 | 275 | 3.90 | 7.70 | 7.80 | 304.07 | 2 |
| 11 | 26 | 10.00 | 287 | 3.50 | 6.90 | 7.00 | 302.13 | 2 |
| 11 | 27 | 10.00 | 298 | 3.20 | 6.40 | 6.40 | 261.56 | 2 |
| 11 | 28 | 10.00 | 309 | 3.70 | 7.20 | 7.10 | 262.57 | 2 |
| 11 | 29 | 10.00 | 320 | 2.90 | 7.00 | 6.80 | 278.05 | 3 |
| 11 | 30 | 10.00 | 331 | 4.80 | 7.90 | 8.00 | 276.23 | 2 |
| 11 | 31 | 10.00 | 342 | 3.50 | 7.80 | 7.60 | 290.38 | 2 |
| 11 | 32 | 10.00 | 353 | 3.40 | 6.90 | 6.70 | 256.94 | 3 |
| 11 | 33 | 10.00 | 364 | 4.30 | 7.50 | 7.30 | 276.11 | 2 |
| 11 | 34 | 10.00 | 375 | 3.60 | 6.70 | 6.70 | 267.61 | 3 |
| 11 | 35 | 10.00 | 386 | 3.70 | 6.00 | 5.80 | 321.79 | 3 |
| 11 | 36 | 10.00 | 397 | 3.80 | 7.20 | 7.30 | 257.93 | 2 |
| 11 | 37 | 10.00 | 408 | 4.00 | 6.30 | 6.40 | 286.67 | 3 |
| 11 | 38 | 10.00 | 419 | 3.90 | 6.50 | 6.50 | 321.66 | 3 |
| 11 | 39 | 10.00 | 430 | 4.00 | 8.00 | 7.80 | 306.87 | 2 |

Protocol #:11

SWIFE_H3_C14

User :

| F# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tsIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 11 | 40 | 10.00 | 441 | 3.70 | 7.30 | 7.30 | 276.02 | 2 |
| 11 | 41 | 10.00 | 452 | 5.30 | 8.10 | 7.90 | 313.75 | 2 |
| 11 | 42 | 10.00 | 463 | 3.60 | 7.20 | 7.20 | 225.59 | 2 |
| 11 | 43 | 10.00 | 474 | 692.50 | 697.60 | 725.50 | 323.50 | 0 |
| 11 | 44 | 10.00 | 485 | 684.30 | 689.60 | 717.30 | 322.73 | 0 |
| 11 | 45 | 10.00 | 496 | 3.90 | 6.10 | 6.00 | 327.67 | 3 |
| 11 | 46 | 10.00 | 508 | 2.80 | 5.70 | 5.50 | 324.86 | 4 |

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

Pace Analytical Services
Count Start Date/Time Calculator

| System #3 | | Protocol ID: | SWIPE_H3_C14 |
|--|--------|----------------------------------|--------------|
| | | Data File: | |
| Date in upper Left hand corner of Printout | | 7/18/2012 0:06 | |
| | | Sample Ct Duration (min) | 10.0 |
| | | | |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/17/2012 23:56 | 3072155088 |
| 2 | 21 | 7/18/2012 0:07 | 3072155089 |
| 3 | 32 | 7/18/2012 0:18 | 3072155090 |
| 4 | 43 | 7/18/2012 0:29 | 3072155091 |
| 5 | 54 | 7/18/2012 0:40 | 3072155092 |
| 6 | 65 | 7/18/2012 0:51 | 3072155093 |
| 7 | 76 | 7/18/2012 1:02 | 3072155095 |
| 8 | 87 | 7/18/2012 1:13 | 3072155096 |
| 9 | 98 | 7/18/2012 1:24 | 3072155097 |
| 10 | 109 | 7/18/2012 1:35 | 3072155098 |
| 11 | 120 | 7/18/2012 1:46 | 3072155099 |
| 12 | 131 | 7/18/2012 1:57 | LCS |
| 13 | 143 | 7/18/2012 2:09 | LCSD |
| 14 | 154 | 7/18/2012 2:20 | 459064 |

Protocol #:12

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 12 | 1 | 10.00 | 10 | 4.90 | 8.10 | 8.10 | 259.12 | 3 |
| 12 | 2 | 10.00 | 21 | 2.80 | 5.40 | 5.40 | 290.42 | 4 |
| 12 | 3 | 10.00 | 32 | 4.10 | 7.60 | 7.60 | 298.23 | 1 |
| 12 | 4 | 10.00 | 43 | 3.20 | 7.20 | 7.00 | 324.10 | 3 |
| 12 | 5 | 10.00 | 54 | 3.30 | 7.20 | 6.90 | 277.16 | 4 |
| 12 | 6 | 10.00 | 65 | 4.30 | 7.70 | 7.60 | 281.63 | 3 |
| 12 | 7 | 10.00 | 76 | 3.60 | 7.20 | 7.20 | 276.96 | 2 |
| 12 | 8 | 10.00 | 87 | 4.30 | 7.90 | 7.60 | 281.97 | 3 |
| 12 | 9 | 10.00 | 98 | 4.90 | 8.10 | 8.00 | 283.03 | 2 |
| 12 | 10 | 10.00 | 109 | 3.60 | 7.00 | 6.90 | 285.79 | 3 |
| 12 | 11 | 10.00 | 120 | 3.70 | 7.00 | 6.90 | 272.53 | 3 |
| 12 | 12 | 10.00 | 131 | 671.20 | 676.90 | 702.90 | 327.24 | 0 |
| 12 | 13 | 10.00 | 143 | 682.00 | 686.70 | 712.20 | 329.43 | 0 |
| 12 | 14 | 10.00 | 154 | 4.30 | 8.30 | 8.10 | 325.75 | 2 |

Pace Analytical Services
 Count Start Date/Time Calculator

| System #3 | Protocol ID: | SWIPE_H3_C14 | |
|--|--------------------------|-------------------------------------|------------|
| | Data File: | | |
| Date in upper Left hand corner of Printout | | 7/18/2012 12:28 | |
| | Sample Ct Duration (min) | 10.0 | |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 10 | 7/18/2012 12:18 | 3072155015 |
| 2 | 21 | 7/18/2012 12:29 | 3072155020 |
| 3 | 32 | 7/18/2012 12:40 | 3072155060 |
| 4 | 43 | 7/18/2012 12:51 | 3072155066 |
| 5 | 54 | 7/18/2012 13:02 | 3072155086 |
| 6 | 65 | 7/18/2012 13:13 | 3072155094 |
| 7 | 76 | 7/18/2012 13:24 | 3072155100 |
| 8 | 87 | 7/18/2012 13:35 | 459065 |

Protocol #:19

SWIPE_H3_C14

User :

Time: 10.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|--------|--------|--------|--------|-----|
| 19 | 1 | 10.00 | 10 | 3.60 | 6.90 | 6.80 | 269.15 | 2 |
| 19 | 2 | 10.00 | 21 | 5.00 | 7.70 | 7.60 | 288.48 | 2 |
| 19 | 3 | 10.00 | 32 | 3.30 | 6.60 | 6.50 | 248.85 | 2 |
| 19 | 4 | 10.00 | 43 | 3.70 | 6.60 | 6.70 | 269.85 | 2 |
| 19 | 5 | 10.00 | 54 | 4.00 | 6.30 | 6.40 | 291.27 | 2 |
| 19 | 6 | 10.00 | 65 | 3.30 | 6.60 | 6.70 | 269.98 | 2 |
| 19 | 7 | 10.00 | 76 | 4.60 | 7.20 | 7.30 | 315.26 | 3 |
| 19 | 8 | 10.00 | 87 | 216.50 | 220.90 | 228.70 | 298.17 | 0 |

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED



Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol

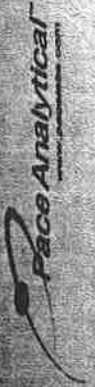
| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072155069 | 12479 | Swape-H3-c14 | 4 | 11 | 7/17/12 1210 | 10 | NA | Rmk |
| 070 | | | | | | | | |
| 071 | | | | | | | | |
| 072 | | | | | | | | |
| 073 | | | | | | | | |
| 074 | | | | | | | | |
| 075 | | | | | | | | |
| 076 | | | | | | | | |
| 077 | | | | | | | | |
| 078 | | | | | | | | |
| 079 | | | | | | | | |
| 080 | | | | | | | | |
| 081 | 12480 | | 11 | | | | | |
| 082 | | | | | | | | |
| 083 | | | | | | | | |
| 084 | | | | | | | | |
| 085 | | | | | | | | |
| 087 | | | | | | | | |
| 045 | 12478 | | | | | | | |
| LCS | NA | | | | | | | |
| LCSD | | | | | | | | |
| 3072155088 | | | | | | | | |
| MB (459061) | 12477 | Swape-H3-c14 | 11 | 11 | 7/17/12 1210 | 10 | NA | Rmk |
| MB (459062) | 12478 | | | | | | | |

Risk comments:

Peer Review:

Pace Analytical Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 3



Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|--------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072155088 | 12480 | Swjpe.H3.C14 | 6 | 12 | 7/17/12 2:110 | 10 | NA | RMLK |
| 089 | | | | | | | | |
| 090 | | | | | | | | |
| 091 | | | | | | | | |
| 092 | | | | | | | | |
| 093 | | | | | | | | |
| 095 | | | | | | | | |
| 096 | | | | | | | | |
| 097 | | | | | | | | |
| 098 | | | | | | | | |
| 099 | | | | | | | | |
| LCS | NA | | | | | | | |
| LCS D | NA | | 2 | | | | | |
| M13 (459063) | 12479 | | 34 | 2 | 7/17/12 2:110 | 30 | NA | RMLK |
| BK6071812 | NA | | 31 | 11 | | 10 | | |
| 3072157001 | 12486 | | | | | | | |
| 002 | | | | | | | | |
| 003 | | | | | | | | |
| 004 | | | | | | | | |
| 005 | | | | | | | | |
| 006 | | | | | | | | |
| 007 | | | | | | | | |
| 008 | | | | | | | | |
| 009 | | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services, Inc.-Pittsburgh
 Liquid Scintillation Counter Run Log System 3



Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3072155060 | 12478 | Swip-43C14 | 20 | 19 | 7/17/12 2130 | 10 | NA | RMLK |
| 0666 | 12479 | | | | | | | |
| 086 | 12480 | | | | | | | |
| 094 | | | | | | | | |
| 100 | | | | | | | | |
| MB (459065) | 12480 | | | | | | | |
| 3072157041 | 12488 | | 6 | 12 | 7/18/12 1210 | 12 | NA | RMLK |
| 042 | | | | | | | | |
| 043 | | | | | | | | |
| 044 | | | | | | | | |
| 045 | | | | | | | | |
| 046 | | | | | | | | |
| 047 | | | | | | | | |
| 048 | | | | | | | | |
| 049 | | | | | | | | |
| 050 | | | | | | | | |
| 051 | | | | | | | | |
| 052 | | | 2 | | | | | |
| 053 | | | | | | | | |
| 054 | | | | | | | | |
| 055 | | | | | | | | |
| 056 | | | | | | | | |
| 057 | | | | | | | | |
| 058 | | | | | | | | |

Run comments:

Peer Review:

Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|----------------|----------|---------------|----------------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| B10 Background | N/A | N/A | 3 | 4 | 7/22/12 10:30 | 46:30 | MA | |
| 3072155009 | | | 20 | 20 | | 7 | | |
| J 110 | | | | | | | | |
| W013502 | | | | | | | | |
| W012502 | | | | | | | | |
| MB 459005 | 12480 | | | | | | | |
| BB 4015 | 459107 | | | | | | | |
| 30721610817 | 004070 | | 5 (plate) 10 (plate) | | | 7 | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | 12508 | | | | | 7 | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 31 | | | | | | | | |

Peer Review: _____

Pace Analytical Services
 Low Energy Beta Emitters by Liquid Scintillation

Test: Low Energy Beta
 Matrix: Smear
 Batch ID: 12476



| Calibration Information | | | | |
|---|-------------------------------|-------------------------------|--|--|
| Instr. ID: | System #2 | System #3 | | |
| Cal Type: | LEB Quenched | LEB Quenched | | |
| Cal ID: | 81012-493 | 81012-493 | | |
| Description: | 5 mL DI + 15 mL Ultima LLT | 5 mL DI + 15 mL Ultima LLT | | |
| Window: | 1.0-160.0 | 1.0-160.0 | | |
| Eff. Date: | 7/20/2012 | 7/19/2012 | | |
| Exp. Date: | 7/20/2013 | 7/19/2013 | | |
| Fit Type: | Polynomial | Polynomial | | |
| polynomial = ax ⁵ + bx ⁴ + cx ³ + dx ² + ex + f | | | | |
| a | 0 | 0 | | |
| b | 0 | 0 | | |
| c | 0 | 0 | | |
| d | -8.4166E-06 | -7.7122E-06 | | |
| e | 4.3584E-03 | 4.1665E-03 | | |
| f | -6.9579E-02 | -4.0645E-02 | | |

Miscellaneous Defaults

| | | |
|--------------|-------------|------|
| PrepSOP1 | Sigma | 1.96 |
| PrepSOP2 n/a | Zero Factor | 2.71 |
| AnalSOP1 | | |
| AnalSOP2 n/a | | |

Low Energy Beta CSU Derivation

CSU Analysis for Preparation



| Mass Aliquot | | |
|--------------|----------|---------|
| uncert (g) | mass (g) | rel unc |
| 0.0003 | 2.000 | 0.02% |

Decay/Ingrowth Correction

| | |
|--------------------------------|-------------|
| Precision of Sample Count Time | 5 min |
| T1/2 | 12.43 years |
| Decay Correction Uncertainty | 0.08% |

| Description | relative | of Critical | CSU (TPU) for Preparation | | 5.39% |
|----------------------------------|----------|-------------|---------------------------|-------------|-------|
| | | | Uncertainty | Uncertainty | |
| Sample Dissolution | 2.00% | 1 | 2.00% | 0.0004 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| Description | relative | of Critical | CSU (TPU) for Yield Correction | | 1.00% |
|-----------------------------|----------|-------------|--------------------------------|-------------|-------|
| | | | Uncertainty | Uncertainty | |
| Absence of Yield Monitoring | 1.00% | 1 | 1.00% | 0.0001 | |

| Description | Maximum | of Critical | CSU (TPU) for Analysis | | 10.60% |
|----------------------------------|---------|-------------|------------------------|-------------|--------|
| | | | Uncertainty | Uncertainty | |
| SRM Uncertainty | 3.50% | 1 | 3.50% | 0.0012 | |
| Source Reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Curve Fitting Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |
| Count reproducibility | 5.00% | 1 | 5.00% | 0.0025 | |
| Decay/Ingrowth Correction | 0.08% | 1 | 0.08% | 0.0000 | |
| Estimated Additional Uncertainty | 5.00% | 1 | 5.00% | 0.0025 | |

| <u>Total Uncertainty</u> | Maximum | of Critical | Uncertainty | Uncertainty |
|--------------------------|---------|-------------|-------------|-------------|
| UE1 | 5.39% | 1 | 5.39% | 0.0029 |
| UE2 | 10.60% | 1 | 10.60% | 0.0112 |
| UE3 | 1.00% | 1 | 1.00% | 0.0001 |
| UE4 | 0.00% | 1 | 0.00% | 0.0000 |

11.93%

Time: 30.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 2S% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 0.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|-------|--------|------|------|------|--------|-----|
| 4 | 1 | 30.00 | 30 | 2.97 | 6.60 | 6.30 | 301.41 | 3 |

BKG 072012

Pace Analytical Services
 Count Start Date/Time Calculator

| | | | |
|--|--------|-------------------------------------|-----------------|
| System #3 | | Protocol ID: | SWIPE_H3_C14 |
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/20/2012 12:10 |
| | | Sample Ct Duration (min) | 7.0 |
| | | | |
| S# | ELTIME | Calculated Count Start Date/Time | Sample ID |
| 1 | 7 | 7/20/2012 12:03 | LCS12476 |
| 2 | 15 | 7/20/2012 12:11 | LCSD12476 |
| 3 | 23 | 7/20/2012 12:19 | LCS12477 |
| 4 | 31 | 7/20/2012 12:27 | LCSD12477 |
| 5 | 39 | 7/20/2012 12:35 | LCS12478 |
| 6 | 47 | 7/20/2012 12:43 | LCSD12478 |
| 7 | 55 | 7/20/2012 12:51 | LCS12479 |
| 8 | 63 | 7/20/2012 12:59 | LCSD12479 |

Protocol #: 7

SWIPE_H3_C14

User :

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 6.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 7 | 1 | 7.00 | 7 | 46.14 | 62.43 | 62.57 | 313.20 | 1 |
| 7 | 2 | 7.00 | 15 | 46.00 | 60.71 | 61.29 | 313.43 | 1 |
| 7 | 3 | 7.00 | 23 | 40.86 | 56.14 | 56.14 | 271.48 | 1 |
| 7 | 4 | 7.00 | 31 | 45.29 | 58.14 | 58.86 | 319.04 | 0 |
| 7 | 5 | 7.00 | 39 | 42.29 | 57.86 | 58.43 | 328.18 | 1 |
| 7 | 6 | 7.00 | 47 | 42.71 | 58.14 | 59.43 | 318.39 | 0 |
| 7 | 7 | 7.00 | 55 | 43.43 | 58.86 | 58.86 | 331.51 | 1 |
| 7 | 8 | 7.00 | 63 | 40.00 | 57.29 | 57.86 | 329.08 | 0 |

Pace Analytical Services
Count Start Date/Time Calculator

| | | | |
|--|--------|--------------------------|-----------------|
| System #3 | | Protocol ID: | SWIPE_H3_C14 |
| | | Data File: | |
| Date in upper Left hand corner of Printout | | | 7/20/2012 13:26 |
| | | Sample Ct Duration (min) | 7.0 |
| | | Calculated Count Start | |
| S# | ELTIME | Date/Time | Sample ID |
| 1 | 7 | 7/20/2012 13:19 | LCS12480 |
| 2 | 15 | 7/20/2012 13:27 | LCSD12480 |
| 3 | 23 | 7/20/2012 13:35 | LCS12486 |
| 4 | 31 | 7/20/2012 13:43 | LCSD12486 |
| 5 | 39 | 7/20/2012 13:51 | LCS12487 |
| 6 | 47 | 7/20/2012 13:59 | LCSD12487 |
| 7 | 55 | 7/20/2012 14:07 | LCS12488 |
| 8 | 63 | 7/20/2012 14:15 | LCSD12488 |

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 0.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 6.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|-------|-------|-------|--------|-----|
| 7 | 1 | 7.00 | 7 | 41.29 | 56.71 | 57.14 | 312.05 | 1 |
| 7 | 2 | 7.00 | 15 | 49.00 | 63.57 | 63.86 | 315.68 | 1 |
| 7 | 3 | 7.00 | 23 | 46.86 | 61.86 | 62.14 | 268.99 | 1 |
| 7 | 4 | 7.00 | 31 | 44.86 | 63.14 | 63.29 | 317.94 | 1 |
| 7 | 5 | 7.00 | 39 | 44.43 | 59.86 | 60.29 | 329.35 | 0 |
| 7 | 6 | 7.00 | 47 | 42.29 | 56.71 | 57.43 | 320.16 | 0 |
| 7 | 7 | 7.00 | 55 | 41.14 | 55.86 | 56.14 | 330.65 | 0 |
| 7 | 8 | 7.00 | 63 | 44.71 | 59.86 | 60.43 | 330.54 | 0 |

Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMEMBER: Start Daily Checks Prior to Sample Protocol!

| Sample No. | Worksheet | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|------------|-----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 307310018 | | | 9 | 20 | 7/20/12 0900 | 7 | | A |
| ↓ | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| 19 | | | | | | | | |
| ↓ | | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| 20 | | | | | | | | |
| U.S.D | | | | | | | | |
| U.S.D | | | | | | | | |
| LCS12476 | 12476 | Swine-43-04 | 18 | 7 | 7/20/12 0950 | 7 | N/A | RMK |
| LCS D12476 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCS12477 | 12477 | | | | | | | |
| LCS D12477 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCS12478 | 12478 | | | | | | | |
| LCS D12478 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCS12479 | 12479 | | | | | | | |
| LCS D12479 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCS12480 | 12480 | | | | | | | |
| LCS D12480 | ↓ | | 6 | | | | | |
| LCS12486 | 12486 | | | | | | | |
| LCS D12486 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCS12487 | 12487 | | | | | | | |
| LCS D12487 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |
| LCS12488 | 12488 | | | | | | | |
| LCS D12488 | ↓ | | ↓ | ↓ | ↓ | ↓ | | ↓ |

Run comments:

Peer Review:

Low Energy Beta Calibration Documentation

Low Energy Beta Smear Calibration Narrative

Applicable to Methods: Smear Counting

Date: 7/19/2012

Calibration Source Prep Analyst: JLK

Calibration Calculations by: JLK

Calibration Description Details:

Five (5.0) mL of DI water was added to each of ten glass liquid scintillation vials with reflective lids. Portions of Analytics SRM 81012-493 were added to each of the calibration vials in the masses documented in the table below. Fifteen (15) ml of Ultima Gold LLT liquid scintillation cocktail was added to each vial. The vials were capped and shaken gently to mix the contents. The caps were carefully removed, and varying volumes of nitromethane were added to the calibration vials in the quantities documented in the table. The calibration sources were capped and shaken to mix, wiped clean with methanol and DI water. A label was attached to the outside of each vial to be consistent with the sample vials.

The samples were counted on each of Pace's 2 liquid scintillation counters, and calculations were performed to determine the ratio of detector Ni-63 efficiency versus quench number (TSIE) for each detector system.

| Cal Source ID | Mass (g) of Ni-63 Standard 81012-493 | Volume of Nitromethane Added (uL) |
|-------------------|--------------------------------------|-----------------------------------|
| Ni63-20120719-N1 | 0.1019 | 0 |
| Ni63-20120719-N2 | 0.0995 | 10 |
| Ni63-20120719-N3 | 0.0998 | 20 |
| Ni63-20120719-N4 | 0.1040 | 30 |
| Ni63-20120719-N5 | 0.1014 | 40 |
| Ni63-20120719-N6 | 0.1015 | 50 |
| Ni63-20120719-N7 | 0.2060 | 60 |
| Ni63-20120719-N8 | 0.2034 | 70 |
| Ni63-20120719-N9 | 0.2044 | 80 |
| Ni63-20120719-N10 | 0.2036 | 90 |

JLK
07/19/12

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

81012-493

Ni-63 5 mL Liquid in Flame Sealed Vial

Customer: Pace Analytical Services, Inc.
P.O. No.: PI-12089, Item 18

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

| Isotope | Half-Life, Days | Activity (Bq) | Uncertainty*, % | | | Reference Date (12:00 PM EST) |
|---------|--------------------|------------------|-----------------|-------|-----|----------------------------------|
| | | | u_A | u_B | U | |
| Ni-63 | 3.656E+04 | 3.456E+03 | 0.2 | 1.5 | 3.0 | 11/05/2009 |

***Uncertainty:** U - Relative expanded uncertainty, $k = 2$. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:

Impurities: γ -impurities < 0.1 %. 4.99626 g 0.1M HCl solution with approximately 30 μ g/g Ni carrier.

Source Prepared by: N.E. Kasate
N.E. Kasate, Radiochemist

QA Approved: D.M. Montgomery
D. M. Montgomery, QA Manager

Date: 11-6-09



Nickel-63 Efficiency Quench Curve Calibration

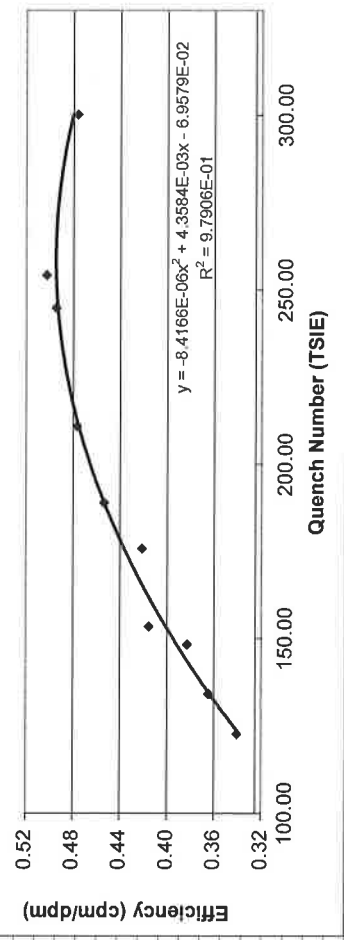


Analyst: J.L.K
 Calibration Date: 7/20/2012
 Ni-63 Standard: 81012-493
 Standard Bq on Reference Date: 3456
 Standard Total Mass (g): 4.99826
 System ID: System #2
 Background: 7.83

Detector System Settings
 Count Mode: Low Level
 Background Subtract: Off
 Low CPM Threshold: Off
 Static Controller: On
 Region: 1.0-160.0

| Source | Standard Mass | Standard Ref Date | Count Date | Decay Days | Standard Decay Factor | Standard Source dpm | Standard Source cpm | Source Ct. time (min) | Source Net Counts | Region 1-160 Ni-63 | | Source Acceptable (<10%) |
|--------------------|---------------|-------------------|------------|------------|-----------------------|---------------------|---------------------|-----------------------|-------------------|-----------------------------|----------------------------------|--------------------------|
| | | | | | | | | | | Source Efficiency (cpm/dpm) | Calculated Efficiency from Curve | |
| Ni-63 20120719-N1 | 0.1019 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 2020.85 | 6.00 | 12078.12 | 0.4760 | 0.4804 | Yes |
| Ni-63 20120719-N2 | 0.0995 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 2082.61 | 6.00 | 12448.68 | 0.5024 | 0.4945 | Yes |
| Ni-63 20120719-N3 | 0.0998 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 2055.91 | 6.00 | 12288.48 | 0.4945 | 0.4930 | Yes |
| Ni-63 20120719-N4 | 0.1040 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 4316.10 | 6.00 | 12345.06 | 0.4767 | 0.4752 | Yes |
| Ni-63 20120719-N5 | 0.1014 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 1915.89 | 6.00 | 11448.36 | 0.4534 | 0.4534 | Yes |
| Ni-63 20120719-N6 | 0.1015 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 4212.34 | 7.00 | 12418.77 | 0.4212 | 0.4365 | Yes |
| Ni-63 20120719-N7 | 0.2060 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 8549.19 | 3.00 | 10648.17 | 0.4152 | 0.4011 | Yes |
| Ni-63 20120719-N8 | 0.2034 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 3239.40 | 4.00 | 12976.28 | 0.3828 | 0.3917 | Yes |
| Ni-63 20120719-N9 | 0.2044 | 11/5/2009 | 7/20/2012 | 988.38 | 0.99995 | 41500.9 | 3100.91 | 4.00 | 12372.32 | 0.3646 | 0.3637 | Yes |
| Ni-63 20120719-N10 | 0.2036 | 11/5/2009 | 7/20/2012 | 988.42 | 0.99995 | 41500.9 | 2889.22 | 4.00 | 11525.56 | 0.3410 | 0.3385 | Yes |

Ni-63 Efficiency vs. Quench Calibration
 System #2 Region 1.0-160.0
 7/20/2012



Jul 20 2012
One Zbach

Assay Definition-

Assay Description:

5 ml DI + FILTER +15 ml ULTIMA GOLD LLT Cocktail

Assay Type: CPM

Report Name: H3report

Output Data Path: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_E

Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_E\20120720_0859.results

RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_E\H3cpm.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_E\12482.txt

Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H-3_C-14_E.lsa

Count Conditions-

Nuclide: FILTER

Quench Indicator: tSIE

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set: n/a

Count Time (min): 8.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

| Regions | LL | UL | 2Sigma % Terminator |
|---------|-----|-------|---------------------|
| A | 2.0 | 20.0 | 0.00 |
| B | 2.0 | 160.0 | 0.00 |
| C | 1.0 | 160.0 | 1.80 |

Count Corrections-

Static Controller: On

Colored Samples: n/a

Coincidence Time (nsec): 18

Luminescence Correction: n/a

Heterogeneity Monitor: n/a

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

| Regions | Half Life | Units | Reference Date | Reference Time |
|---------|-----------|-------|----------------|----------------|
| A | | | | |
| B | | | | |
| C | | | | |

Instrument Block Data

Machine=2900

Version=1.10

426001

MODEL=2900

VERSION=1.10

SERIAL=426001

IPA Block Data

Software Version IC: 2.11

Software Version EC: 1.31

Instrument Model: 2900

Instrument Serial Number: 426001

3H Chi Square: 15.92 Date Processed: 7/19/12 11:40:58 AM

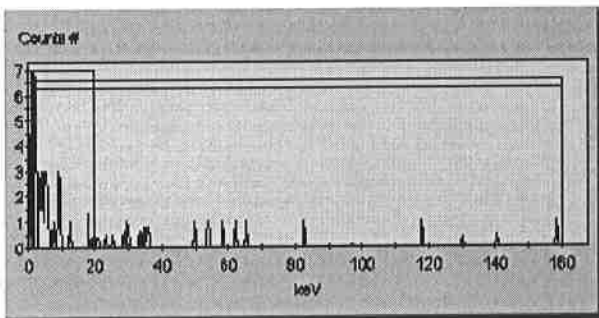
14C Chi Square: 10.90 Date Processed: 7/19/12 11:40:58 AM
 3H E^2/B (1-18.6 keV): 303.70 Date Processed: 7/19/12 11:40:58 AM
 14C E^2/B (4-156 keV): 554.79 Date Processed: 7/19/12 11:40:58 AM
 3H Efficiency (0-18.6 keV): 62.31 Date Processed: 7/19/12 11:40:58 AM
 14C Efficiency (0-156 keV): 95.37 Date Processed: 7/19/12 11:40:58 AM
 IPA Background Date Processed: 7/19/12 11:40:58 AM
 3H Background CPM (0-18.6 keV): 12.62 Date Processed: 7/19/12 11:40:58 AM
 14C Background CPM (0-156 keV): 19.93 Date Processed: 7/19/12 11:40:58 AM
 3H Calibration DPM: 278800
 3H Reference Date: 12/5/07
 14C Calibration DPM: 135100

==== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
 7/19/12 11:40:58 AM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
 == End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

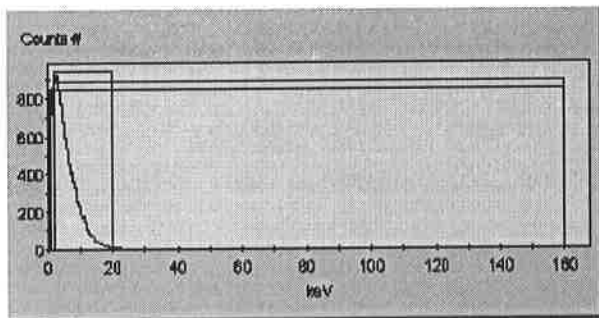
| S# | PID | SMPL ID | C.T. | DATE | CPMA | tSIE | CPMB | CPMC | MESSAGES |
|----|-----|------------|------|---------|------|-------|------|------|----------|
| 1 | 5 | 8:59:56 AM | 8 | 7/20/12 | 4.34 | 317.6 | 6.45 | 7.83 | |

SpectraView Block Data



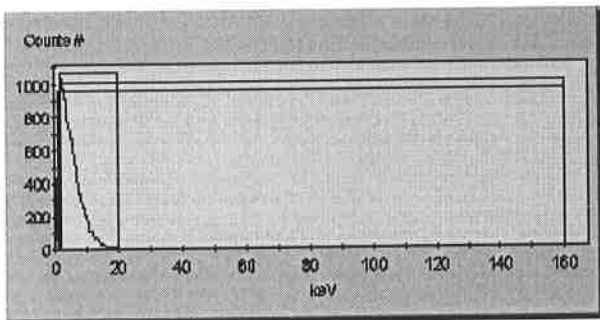
| | | | | | | | | | |
|---|---|------------------|---|---------|---------|-------|---------|---------|--|
| 2 | 5 | NI63-20120719-N1 | 6 | 7/20/12 | 1763.93 | 300.1 | 1771.83 | 2020.85 | |
| | | 9:08:46 AM | 0 | | | | | | |

SpectraView Block Data



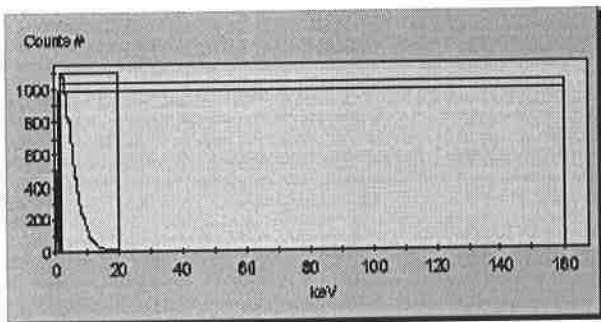
| | | | | | | | | | |
|---|---|------------------|---|---------|---------|-------|---------|---------|--|
| 3 | 5 | NI63-20120179-N2 | 6 | 7/20/12 | 1813.72 | 254.2 | 1818.36 | 2082.61 | |
| | | 9:15:40 AM | 0 | | | | | | |

SpectraView Block Data



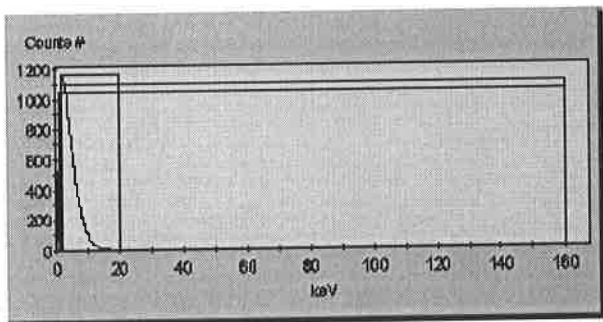
4 5 NI63-20120719-N3 6 7/20/12 1748.50 244.9 1754.08 2055.91
 9:22:22 AM 0

SpectraView Block Data



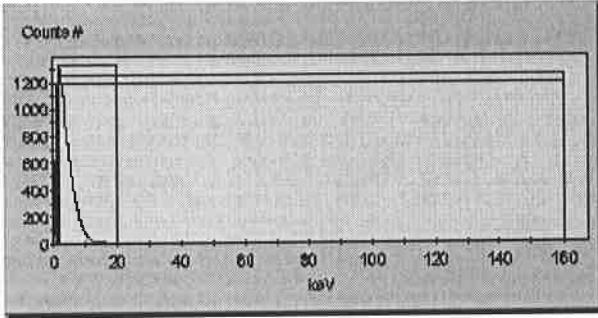
5 5 NI63-20120719-N4 6 7/20/12 1753.03 210.9 1756.32 2065.34
 9:29:11 AM 0

SpectraView Block Data



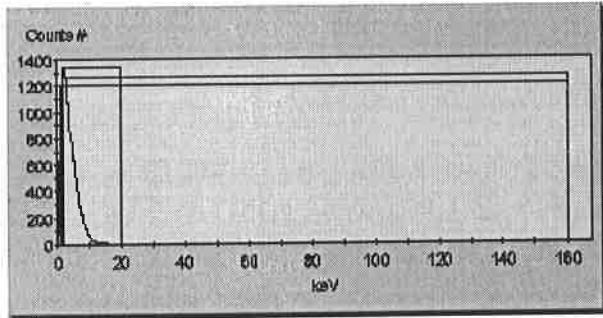
6 5 NI63-20120719-N5 6 7/20/12 1573.37 188.9 1575.74 1915.89
 9:35:58 AM 0

SpectraView Block Data



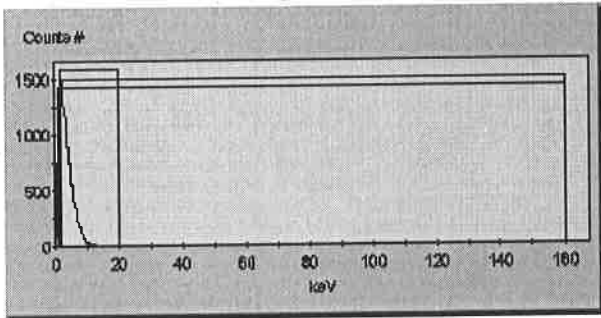
| | | | | | | | | |
|---|---|------------------|---|---------|---------|-------|---------|---------|
| | | NI63-20120719-N6 | 7 | 7/20/12 | 1456.33 | 175.8 | 1458.71 | 1781.94 |
| 7 | 5 | 9:43:13 AM | 0 | | | | | |

SpectraView Block Data



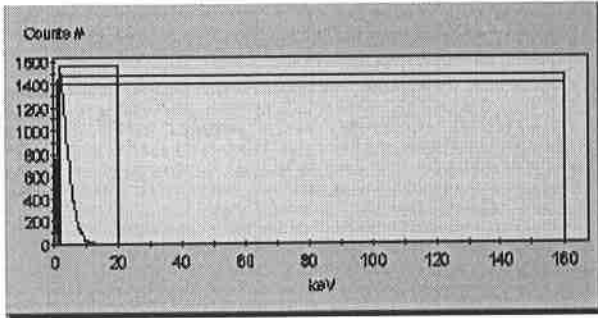
| | | | | | | | | |
|---|---|------------------|---|---------|---------|-------|---------|---------|
| | | NI63-20120719-N7 | 3 | 7/20/12 | 2818.32 | 153.5 | 2821.87 | 3557.22 |
| 8 | 5 | 9:50:58 AM | 0 | | | | | |

SpectraView Block Data



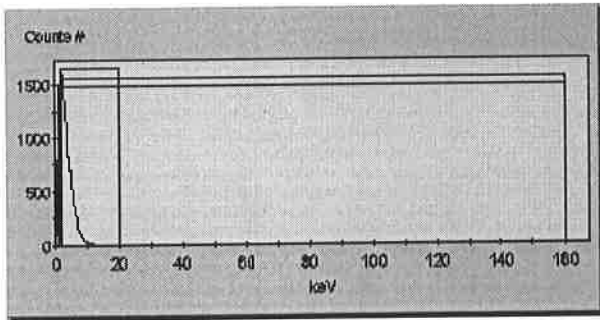
| | | | | | | | | |
|---|---|------------------|---|---------|---------|-------|---------|---------|
| | | NI63-20120719-N8 | 4 | 7/20/12 | 2526.96 | 148.3 | 2529.45 | 3239.40 |
| 9 | 5 | 9:55:12 AM | 0 | | | | | |

SpectraView Block Data



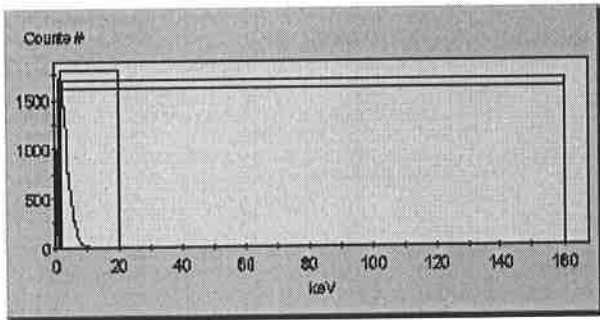
10 NI63-20120719-N9 4 7/20/12 2389.66 134.2 2392.64 3100.91
 5 9:59:47 AM 0

SpectraView Block Data



11 NI63-20120719-N10 4 7/20/12 2122.40 122.7 2124.50 2889.22
 5 10:04:33 AM 0

SpectraView Block Data





Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 2

Logbook ID: 8-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| 3K6 | N Cal | Supr H3/C14 | 5 | 1 | 7/26/12 0545 | 8 | 7/26/12 0900 | Q |
| N1 | | | | | | | | |
| N2 | | | | | | | | |
| N3 | | | | | | | | |
| N4 | | | | | | | | |
| N5 | | | | | | | | |
| N6 | | | | | | | | |
| N7 | | | | | | | | |
| N8 | | | | | | | | |
| N9 | | | | | | | | |
| N10 | | | | | | | | |
| 3072 154038 | | Supr H3/C14 | 12 | 8 | 7/26/12 0945 | 12 | NA | Q |
| 39 | | | | | | | | |
| 40 | | | | | | | | |
| LLS | | | | | | | | |
| LLSD | | | | | | | | |
| TRK | | | | | | | | |

Run comments:

Peer Review:

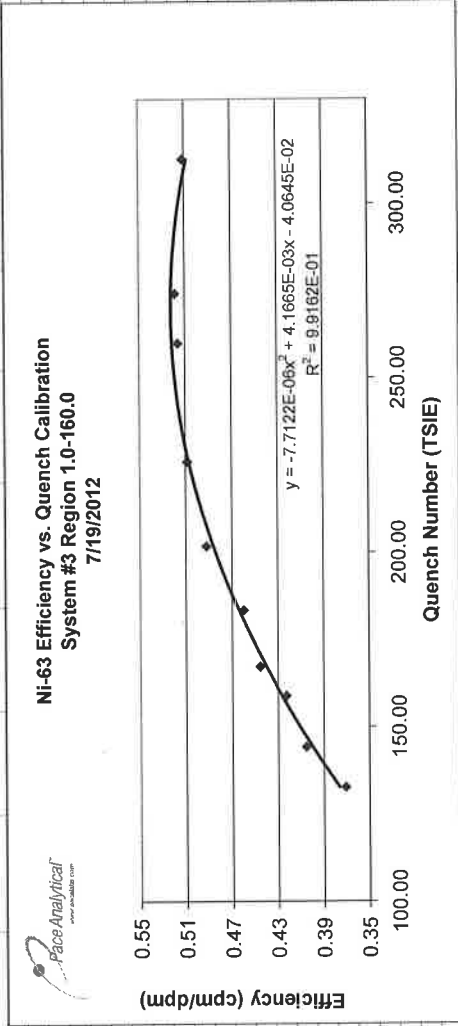
Nickel-63 Efficiency Quench Curve Calibration



Analyst: JLK
Calibration Date: 7/19/2012
Ni-63 Standard: 81012-493
Standard Bq on Reference Date: 3456
Standard Total Mass (g): 4.99626
System ID: System #3
Background: 8.00

Detector System Settings
Count Mode: Low Level
Background Subtract: Off
Low Level Count Mode: On
Luminescence Correction: On
Region: 1.0-160.0

| Source | Standard Mass | Standard Ref Date | Count Date | Decay Days | Standard Decay Factor | Decay dpm/g | Corrected Standard Source dpm | Region 1-160 Ni-63 ROI | | Source Ct. time (min) | Source Net Counts | TSIE | Source Efficiency (cpm/dpm) | Calculated Efficiency from Curve | % Diff from Cal | Source Acceptable (<10%) |
|--------------------|---------------|-------------------|------------|------------|-----------------------|-------------|-------------------------------|------------------------|-----------------|-----------------------|-------------------|--------|-----------------------------|----------------------------------|-----------------|--------------------------|
| | | | | | | | | Standard Source cpm | Standard Source | | | | | | | |
| Ni-63 20120719-N1 | 0.1019 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 4228.94 | 2170.96 | 4.58 | 9906.36 | 312.86 | 0.5115 | 0.5080 | -0.68% | Yes | |
| Ni-63 20120719-N2 | 0.0995 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 4129.34 | 2150.00 | 4.64 | 9938.88 | 274.25 | 0.5187 | 0.5220 | 0.62% | Yes | |
| Ni-63 20120719-N3 | 0.0998 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 4141.79 | 2146.02 | 4.65 | 9941.79 | 260.02 | 0.5162 | 0.5213 | 0.99% | Yes | |
| Ni-63 20120719-N4 | 0.1040 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 4316.10 | 2202.43 | 4.52 | 9918.82 | 226.09 | 0.5084 | 0.5071 | -0.25% | Yes | |
| Ni-63 20120719-N5 | 0.1014 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 4208.19 | 2079.17 | 4.80 | 9941.62 | 201.84 | 0.4922 | 0.4861 | -1.23% | Yes | |
| Ni-63 20120719-N6 | 0.1015 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 4212.34 | 1946.38 | 5.11 | 9905.12 | 183.62 | 0.4602 | 0.4644 | 0.92% | Yes | |
| Ni-63 20120719-N7 | 0.2060 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 8549.19 | 3821.07 | 2.61 | 9952.11 | 167.31 | 0.4460 | 0.4406 | -1.22% | Yes | |
| Ni-63 20120719-N8 | 0.2034 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 8441.29 | 3576.62 | 2.78 | 9920.76 | 158.90 | 0.4228 | 0.4267 | 0.93% | Yes | |
| Ni-63 20120719-N9 | 0.2044 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 8482.79 | 3445.83 | 2.88 | 9900.95 | 144.19 | 0.4053 | 0.3998 | -1.35% | Yes | |
| Ni-63 20120719-N10 | 0.2036 | 11/5/2009 | 7/19/2012 | 987.52 | 0.99995 | 41500.9 | 8449.59 | 3141.96 | 3.17 | 9934.65 | 132.62 | 0.3709 | 0.3763 | 1.45% | Yes | |



7/27/2012
One 7/29/12

Protocol #: 1

SWIPE_H3_C14

User :

Time: 7.00

Data Mode: CPM

Nuclide: MANUAL

Background Subtract: None

| | LL | UL | LCR | 25% | BKG |
|-----------|------------|----|-----|-----|------|
| Region A: | 2.0 - 20.0 | | 0 | 0.0 | 0.00 |
| Region B: | 2.0 - 160 | | 0 | 2.0 | 0.00 |
| Region C: | 1.0 - 160 | | 0 | 2.0 | 0.00 |

Quench Indicator: tSIE/AEC

Ext Std Terminator: Count

Pace Analytical Services, Inc. LSC Instrument 3

Luminescence Correction On

Low Level Count Mode On

| P# | S# | TIME | ELTIME | CPMA | CPMB | CPMC | tSIE | LUM |
|----|----|------|--------|---------|---------|---------|--------|-----|
| 1 | 1 | 7.00 | 7 | 4.14 | 7.86 | 8.00 | 325.58 | 1 |
| 1 | 2 | 4.58 | 13 | 1638.86 | 2147.60 | 2170.96 | 312.86 | 0 |
| 1 | 3 | 4.64 | 18 | 1581.68 | 2130.82 | 2150.00 | 274.25 | 0 |
| 1 | 4 | 4.65 | 24 | 1626.88 | 2127.31 | 2146.02 | 260.02 | 0 |
| 1 | 5 | 4.52 | 30 | 1663.50 | 2189.38 | 2202.43 | 226.09 | 0 |
| 1 | 6 | 4.80 | 35 | 1585.42 | 2070.00 | 2079.17 | 201.84 | 0 |
| 1 | 7 | 5.11 | 42 | 1494.52 | 1941.29 | 1946.38 | 183.62 | 0 |
| 1 | 8 | 2.61 | 45 | 2947.51 | 3815.33 | 3821.07 | 167.31 | 0 |
| 1 | 9 | 2.78 | 49 | 2737.77 | 3572.66 | 3576.62 | 158.90 | 0 |
| 1 | 10 | 2.88 | 53 | 2642.01 | 3442.01 | 3445.83 | 144.19 | 0 |
| 1 | 11 | 3.17 | 58 | 2460.25 | 3136.59 | 3141.96 | 132.62 | 0 |

Pace Analytical Services, Inc.-Pittsburgh
Liquid Scintillation Counter Run Log System 3

Logbook ID: 4-R023-3

REMINDER: Start Daily Checks Prior to Sample Protocol

| Sample No. | Worklist | Protocol Name | Tray Number | Protocol Number | Added to Detector Date & Time | Count time (min) | Actual Count Start Date & Time | Analyst |
|-----------------|----------|---------------|-------------|-----------------|-------------------------------|------------------|--------------------------------|---------|
| N16320120719 N2 | N.6302 | Sample H3C14 | 5 | 1 | 7/19/12 - 1330 | 7 | WA | R |
| N3 | | | | | | | | |
| N4 | | | | | | | | |
| N5 | | | | | | | | |
| N6 | | | | | | | | |
| N7 | | | | | | | | |
| N8 | | | | | | | | |
| N9 | | | | | | | | |
| N10 | | | | | | | | |
| WMB | | Sample H3C14 | 27 | 45 | 7/20/12 0900 | | | R |
| 3072159041 | | | | | | | | |
| 42 | | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |
| 46 | | | | | | | | |
| 47 | | | | | | | | |
| 48 | | | | | | | | |
| 49 | | | | | | | | |
| 50 | | | | | | | | |
| 51 | | | | | | | | |
| 52 | | | 23 | | | | | |
| 53 | | | | | | | | |
| 54 | | | | | | | | |

Run Comments:

Peer Review:

Standards

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

71157A-493

Ni-63 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

| | |
|---|-------------------------|
| ISOTOPE: | Ni-63 |
| ACTIVITY (dps): | 1.061 E4 |
| HALF-LIFE: | 100.1 years |
| CALIBRATION DATE: | April 5, 2005 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 3.0% |

Impurities: γ -impurities <0.1%

5.08501 grams 0.1M HCl solution with 30 μ g/g Ni carrier.

P O NUMBER PI-4864, Item 2

SOURCE PREPARED BY: M. Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED:

W. M. J. 7-22-05



Radioactive Standards Dilution Logbook

09-009 Ni63 Spike Solution

Parent source: 09-008

Parent Conc: 12334.51 dpm/g

Ref date: 4/5/2005 12:00 EST

Expiration: ND

$$\frac{25.26 \text{ g}}{250.0 \text{ ml}} \left(\frac{12334.51 \text{ dpm}}{\text{g}} \right) = 1246.3 \frac{\text{dpm}}{\text{ml}}$$

diluted 25.26 g of 09-008 to 250.0 ml w/
0.1 N HCl on 5/3/2009

0.1 N HCl DL09-0167



Radioactive Standards Dilution Logbook

09-008 N.63 Spike "A" Solution

Parent Source. Analytica 71157A-493
Parent Conc. 10610 DPS (Bq)
Parent Ref date 4/5/2005 12:00 EST
NO EXP ASSIGNED

$$\frac{5.0210 \text{ g}}{5.08501 \text{ g}} \times \frac{10610 \text{ DPS}}{50.9616 \text{ g}} \times \frac{60 \text{ dps}}{\text{dpm}} = 12334.51 \frac{\text{dpm}}{8}$$

diluted 5.0210 g of 71157A-493 to 50.9616 g w/
0.1 N HCl on 5/3/2009

0.1 N HCl DL09-0167

ANALYTICS

1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677

Ni-63

SRS 71157A-493 Qty 0.29 $\mu\text{Ci QA}$ *LM*

Date 04/05/05 12:00 EST Exp. XXXXXX

PO # PI-4864, Item 2

5.08501 g 0.1M HCl solution



CAUTION RADIOACTIVE MATERIAL