Pace Analytical™
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RTI Laboratories, Inc.

Client Ref.: Fort Monmouth 1207078

Pace-Pittsburgh Project No. 3072158

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

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Case Narrative for Pace Analytical Job Number 3072158

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 3072158 with corresponding samples IDs of 3072158001 through 3072158100. 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 3072158

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

8/1/12
Date

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

July 25, 2012

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

RE: Project: Fort Monmouth 1207078
Pace Project No.: 3072158

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 A. Ferris

Carin Ferris

carin.ferris@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
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CERTIFICATIONS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4 Greensburg, PA 15601
ACLASS 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

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SAMPLE SUMMARY

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Lab ID	Sample ID	Matrix	Date Collected	Date Received
3072158001	SU-04-2D	Wipe	06/11/12 00:01	06/25/12 10:15
3072158002	SU-04-3	Wipe	06/11/12 00:01	06/25/12 10:15
3072158003	SU-04-4	Wipe	06/11/12 00:01	06/25/12 10:15
3072158004	SU-04-5	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158007	SU-04-8	Wipe	06/11/12 00:01	06/25/12 10:15
3072158008	SU-04-9	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158029	SU-04-29	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158032	SU-05-2	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158035	SU-05-5	Wipe	06/11/12 00:01	06/25/12 10:15
3072158036	SU-05-6	Wipe	06/11/12 00:01	06/25/12 10:15
3072158037	SU-05-7	Wipe	06/11/12 00:01	06/25/12 10:15

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SAMPLE SUMMARY

Project: Fort Monmouth 1207078
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Lab ID	Sample ID	Matrix	Date Collected	Date Received
3072158038	SU-05-7D	Wipe	06/11/12 00:01	06/25/12 10:15
3072158039	SU-05-8	Wipe	06/11/12 00:01	06/25/12 10:15
3072158040	SU-05-9	Wipe	06/11/12 00:01	06/25/12 10:15
3072158041	SU-05-10	Wipe	06/11/12 00:01	06/25/12 10:15
3072158042	SU-05-11	Wipe	06/11/12 00:01	06/25/12 10:15
3072158043	SU-05-11D	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158067	SU-05-35	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158074	SU-08-6	Wipe	06/11/12 00:01	06/25/12 10:15

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Project: Fort Monmouth 1207078
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Lab ID	Sample ID	Matrix	Date Collected	Date Received
3072158075	SU-08-7	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158084	SU-08-16	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158096	SU-08-28	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158098	SU-08-30	Wipe	06/11/12 00:01	06/25/12 10:15
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3072158100	SU-09-2	Wipe	06/11/12 00:01	06/25/12 10:15

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
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SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3072158001	SU-04-2D	EPA 906.0M	RMK	1	PASI-PA
3072158002	SU-04-3	EPA 906.0M	RMK	1	PASI-PA
3072158003	SU-04-4	EPA 906.0M	RMK	1	PASI-PA
3072158004	SU-04-5	EPA 906.0M	RMK	1	PASI-PA
3072158005	SU-04-6	EPA 906.0M	RMK	1	PASI-PA
3072158006	SU-04-7	EPA 906.0M	RMK	1	PASI-PA
3072158007	SU-04-8	EPA 906.0M	RMK	1	PASI-PA
3072158008	SU-04-9	EPA 906.0M	RMK	1	PASI-PA
3072158009	SU-04-10	EPA 906.0M	RMK	1	PASI-PA
3072158010	SU-04-11	EPA 906.0M	RMK	1	PASI-PA
3072158011	SU-04-12	EPA 906.0M	RMK	1	PASI-PA
3072158012	SU-04-13	EPA 906.0M	RMK	1	PASI-PA
3072158013	SU-04-14	EPA 906.0M	RMK	1	PASI-PA
3072158014	SU-04-15	EPA 906.0M	RMK	1	PASI-PA
3072158015	SU-04-16	EPA 906.0M	RMK	1	PASI-PA
3072158016	SU-04-16D	EPA 906.0M	RMK	1	PASI-PA
3072158017	SU-04-17	EPA 906.0M	RMK	1	PASI-PA
3072158018	SU-04-18	EPA 906.0M	RMK	1	PASI-PA
3072158019	SU-04-19	EPA 906.0M	RMK	1	PASI-PA
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3072158021	SU-04-21	EPA 906.0M	RMK	1	PASI-PA
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3072158023	SU-04-23	EPA 906.0M	RMK	1	PASI-PA
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3072158031	SU-05-1	EPA 906.0M	RMK	1	PASI-PA
3072158032	SU-05-2	EPA 906.0M	RMK	1	PASI-PA
3072158033	SU-05-3	EPA 906.0M	RMK	1	PASI-PA
3072158034	SU-05-4	EPA 906.0M	RMK	1	PASI-PA
3072158035	SU-05-5	EPA 906.0M	RMK	1	PASI-PA
3072158036	SU-05-6	EPA 906.0M	RMK	1	PASI-PA
3072158037	SU-05-7	EPA 906.0M	RMK	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3072158038	SU-05-7D	EPA 906.0M	RMK	1	PASI-PA
3072158039	SU-05-8	EPA 906.0M	RMK	1	PASI-PA
3072158040	SU-05-9	EPA 906.0M	RMK	1	PASI-PA
3072158041	SU-05-10	EPA 906.0M	RMK	1	PASI-PA
3072158042	SU-05-11	EPA 906.0M	RMK	1	PASI-PA
3072158043	SU-05-11D	EPA 906.0M	RMK	1	PASI-PA
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3072158045	SU-05-13	EPA 906.0M	RMK	1	PASI-PA
3072158046	SU-05-14	EPA 906.0M	RMK	1	PASI-PA
3072158047	SU-05-15	EPA 906.0M	RMK	1	PASI-PA
3072158048	SU-05-16	EPA 906.0M	RMK	1	PASI-PA
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3072158052	SU-05-20	EPA 906.0M	RMK	1	PASI-PA
3072158053	SU-05-21	EPA 906.0M	RMK	1	PASI-PA
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3072158059	SU-05-27	EPA 906.0M	RMK	1	PASI-PA
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3072158061	SU-05-29	EPA 906.0M	RMK	1	PASI-PA
3072158062	SU-05-30	EPA 906.0M	RMK	1	PASI-PA
3072158063	SU-05-31	EPA 906.0M	RMK	1	PASI-PA
3072158064	SU-05-32	EPA 906.0M	RMK	1	PASI-PA
3072158065	SU-05-33	EPA 906.0M	RMK	1	PASI-PA
3072158066	SU-05-34	EPA 906.0M	RMK	1	PASI-PA
3072158067	SU-05-35	EPA 906.0M	RMK	1	PASI-PA
3072158068	SU-05-36	EPA 906.0M	RMK	1	PASI-PA
3072158069	SU-08-1	EPA 906.0M	RMK	1	PASI-PA
3072158070	SU-08-2	EPA 906.0M	RMK	1	PASI-PA
3072158071	SU-08-3	EPA 906.0M	RMK	1	PASI-PA
3072158072	SU-08-4	EPA 906.0M	RMK	1	PASI-PA
3072158073	SU-08-5	EPA 906.0M	RMK	1	PASI-PA
3072158074	SU-08-6	EPA 906.0M	RMK	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3072158075	SU-08-7	EPA 906.0M	RMK	1	PASI-PA
3072158076	SU-08-8	EPA 906.0M	RMK	1	PASI-PA
3072158077	SU-08-9	EPA 906.0M	RMK	1	PASI-PA
3072158078	SU-08-10	EPA 906.0M	RMK	1	PASI-PA
3072158079	SU-08-11	EPA 906.0M	RMK	1	PASI-PA
3072158080	SU-08-12	EPA 906.0M	RMK	1	PASI-PA
3072158081	SU-08-13	EPA 906.0M	RMK	1	PASI-PA
3072158082	SU-08-14	EPA 906.0M	RMK	1	PASI-PA
3072158083	SU-08-15	EPA 906.0M	RMK	1	PASI-PA
3072158084	SU-08-16	EPA 906.0M	RMK	1	PASI-PA
3072158085	SU-08-17	EPA 906.0M	RMK	1	PASI-PA
3072158086	SU-08-18	EPA 906.0M	RMK	1	PASI-PA
3072158087	SU-08-19	EPA 906.0M	RMK	1	PASI-PA
3072158088	SU-08-20	EPA 906.0M	RMK	1	PASI-PA
3072158089	SU-08-21	EPA 906.0M	RMK	1	PASI-PA
3072158090	SU-08-22	EPA 906.0M	RMK	1	PASI-PA
3072158091	SU-08-23	EPA 906.0M	RMK	1	PASI-PA
3072158092	SU-08-24	EPA 906.0M	RMK	1	PASI-PA
3072158093	SU-08-25	EPA 906.0M	RMK	1	PASI-PA
3072158094	SU-08-26	EPA 906.0M	RMK	1	PASI-PA
3072158095	SU-08-27	EPA 906.0M	RMK	1	PASI-PA
3072158096	SU-08-28	EPA 906.0M	RMK	1	PASI-PA
3072158097	SU-08-29	EPA 906.0M	RMK	1	PASI-PA
3072158098	SU-08-30	EPA 906.0M	RMK	1	PASI-PA
3072158099	SU-09-1	EPA 906.0M	RMK	1	PASI-PA
3072158100	SU-09-2	EPA 906.0M	RMK	1	PASI-PA

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-04-2D **Lab ID: 3072158001** 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	**7.38J ± 4.80 (8.85)**	dpm/sample	07/19/12 15:45		

Sample: SU-04-3 **Lab ID: 3072158002** 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	**0.443U ± 3.82 (8.78)**	dpm/sample	07/19/12 15:53		

Sample: SU-04-4 **Lab ID: 3072158003** 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	**0.443U ± 3.82 (8.78)**	dpm/sample	07/19/12 16:01		

Sample: SU-04-5 **Lab ID: 3072158004** 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	**3.20J ± 4.20 (8.78)**	dpm/sample	07/19/12 16:09		

Sample: SU-04-6 **Lab ID: 3072158005** 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	**2.64U ± 4.13 (8.79)**	dpm/sample	07/19/12 16:17		

Sample: SU-04-7 **Lab ID: 3072158006** 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	**4.30J ± 4.35 (8.78)**	dpm/sample	07/19/12 16:25		

Sample: SU-04-8 **Lab ID: 3072158007** 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	**4.84J ± 4.43 (8.79)**	dpm/sample	07/19/12 16:33		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-04-9 **Lab ID: 3072158008** 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	**6.76J ± 4.69 (8.78)**	dpm/sample	07/19/12 16:41		

Sample: SU-04-10 **Lab ID: 3072158009** 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	**7.33J ± 4.77 (8.79)**	dpm/sample	07/19/12 16:49		

Sample: SU-04-11 **Lab ID: 3072158010** 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	**1.27U ± 3.95 (8.80)**	dpm/sample	07/19/12 16:57		

Sample: SU-04-12 **Lab ID: 3072158011** 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	**5.13J ± 4.47 (8.78)**	dpm/sample	07/19/12 17:05		

Sample: SU-04-13 **Lab ID: 3072158012** 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	**2.09U ± 4.07 (8.82)**	dpm/sample	07/19/12 17:13		

Sample: SU-04-14 **Lab ID: 3072158013** 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	**2.64U ± 4.13 (8.78)**	dpm/sample	07/19/12 17:21		

Sample: SU-04-15 **Lab ID: 3072158014** 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	**2.91U ± 4.16 (8.78)**	dpm/sample	07/19/12 17:30		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-04-16 **Lab ID: 3072158015** 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	**3.74J ± 4.28 (8.79)**	dpm/sample	07/19/12 17:38		

Sample: SU-04-16D **Lab ID: 3072158016** 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	**4.84J ± 4.43 (8.79)**	dpm/sample	07/19/12 17:46		

Sample: SU-04-17 **Lab ID: 3072158017** 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	**3.74J ± 4.28 (8.78)**	dpm/sample	07/19/12 17:54		

Sample: SU-04-18 **Lab ID: 3072158018** 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	**3.20J ± 4.21 (8.79)**	dpm/sample	07/19/12 18:02		

Sample: SU-04-19 **Lab ID: 3072158019** 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	**2.91U ± 4.16 (8.78)**	dpm/sample	07/19/12 18:10		

Sample: SU-04-20 **Lab ID: 3072158020** 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	**0.983U ± 3.90 (8.78)**	dpm/sample	07/19/12 18:18		

Sample: SU-04-21 **Lab ID: 3072158021** 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 ± 4.40 (9.72)**	dpm/sample	07/19/12 20:25		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-04-22 **Lab ID: 3072158022** 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	**1.32U ± 4.40 (9.79)**	dpm/sample	07/19/12 20:33		

Sample: SU-04-23 **Lab ID: 3072158023** 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	**-0.328U ± 4.17 (9.73)**	dpm/sample	07/19/12 20:41		

Sample: SU-04-24 **Lab ID: 3072158024** 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	**-1.16U ± 4.06 (9.73)**	dpm/sample	07/19/12 20:49		

Sample: SU-04-25 **Lab ID: 3072158025** 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	**4.07J ± 4.71 (9.73)**	dpm/sample	07/19/12 20:57		

Sample: SU-04-26 **Lab ID: 3072158026** 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	**-3.35U ± 3.78 (9.73)**	dpm/sample	07/19/12 21:05		

Sample: SU-04-27 **Lab ID: 3072158027** 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	**3.53U ± 4.65 (9.73)**	dpm/sample	07/19/12 21:13		

Sample: SU-04-28 **Lab ID: 3072158028** 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	**-1.99U ± 3.95 (9.73)**	dpm/sample	07/19/12 21:21		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-04-29 **Lab ID: 3072158029** 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	**-5.29U ± 3.54 (9.74)**	dpm/sample	07/19/12 21:29		

Sample: SU-04-30 **Lab ID: 3072158030** 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	**7.09J ± 5.09 (9.73)**	dpm/sample	07/19/12 21:37		

Sample: SU-05-1 **Lab ID: 3072158031** 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	**-2.54U ± 3.88 (9.73)**	dpm/sample	07/19/12 21:45		

Sample: SU-05-2 **Lab ID: 3072158032** 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	**-0.0579U ± 4.20 (9.73)**	dpm/sample	07/19/12 21:53		

Sample: SU-05-3 **Lab ID: 3072158033** 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	**0.502U ± 4.28 (9.75)**	dpm/sample	07/19/12 22:02		

Sample: SU-05-4 **Lab ID: 3072158034** 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	**-0.890U ± 4.11 (9.77)**	dpm/sample	07/19/12 22:10		

Sample: SU-05-5 **Lab ID: 3072158035** 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	**-0.0578U ± 4.20 (9.72)**	dpm/sample	07/19/12 22:18		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-05-6 **Lab ID: 3072158036** 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	**-1.99U ± 3.96 (9.75)**	dpm/sample	07/19/12 22:26		

Sample: SU-05-7 **Lab ID: 3072158037** 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	**-0.0588U ± 4.27 (9.89)**	dpm/sample	07/19/12 22:34		

Sample: SU-05-7D **Lab ID: 3072158038** 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	**-3.95U ± 3.74 (9.81)**	dpm/sample	07/19/12 22:42		

Sample: SU-05-8 **Lab ID: 3072158039** 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	**2.15U ± 4.50 (9.79)**	dpm/sample	07/19/12 22:50		

Sample: SU-05-9 **Lab ID: 3072158040** 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	**1.31U ± 4.37 (9.73)**	dpm/sample	07/19/12 22:58		

Sample: SU-05-10 **Lab ID: 3072158041** 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	**-1.72U ± 3.99 (9.74)**	dpm/sample	07/19/12 23:30		

Sample: SU-05-11 **Lab ID: 3072158042** 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	**3.59U ± 4.73 (9.90)**	dpm/sample	07/19/12 23:38		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-05-11D **Lab ID: 3072158043** 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	**0.214U ± 4.28 (9.83)**	dpm/sample	07/19/12 23:46		

Sample: SU-05-12 **Lab ID: 3072158044** 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	**6.28J ± 4.99 (9.73)**	dpm/sample	07/19/12 23:54		

Sample: SU-05-13 **Lab ID: 3072158045** 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	**0.502U ± 4.27 (9.74)**	dpm/sample	07/20/12 00:02		

Sample: SU-05-14 **Lab ID: 3072158046** 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	**-1.45U ± 4.08 (9.87)**	dpm/sample	07/20/12 00:10		

Sample: SU-05-15 **Lab ID: 3072158047** 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	**2.46U ± 4.56 (9.84)**	dpm/sample	07/20/12 00:18		

Sample: SU-05-16 **Lab ID: 3072158048** 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	**-4.48U ± 3.64 (9.74)**	dpm/sample	07/20/12 00:26		

Sample: SU-05-17 **Lab ID: 3072158049** 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	**-2.26U ± 3.92 (9.73)**	dpm/sample	07/20/12 00:34		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-05-18 **Lab ID: 3072158050** 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	**1.04U ± 4.33 (9.73)**	dpm/sample	07/20/12 00:42		

Sample: SU-05-19 **Lab ID: 3072158051** 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	**-0.619U ± 4.14 (9.76)**	dpm/sample	07/20/12 00:50		

Sample: SU-05-20 **Lab ID: 3072158052** 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	**-2.54U ± 3.88 (9.73)**	dpm/sample	07/20/12 00:58		

Sample: SU-05-21 **Lab ID: 3072158053** 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	**2.97U ± 4.58 (9.74)**	dpm/sample	07/20/12 01:06		

Sample: SU-05-22 **Lab ID: 3072158054** 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	**-0.617U ± 4.13 (9.74)**	dpm/sample	07/20/12 01:14		

Sample: SU-05-23 **Lab ID: 3072158055** 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	**0.213U ± 4.25 (9.78)**	dpm/sample	07/20/12 01:22		

Sample: SU-05-24 **Lab ID: 3072158056** 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	**-5.03U ± 3.58 (9.76)**	dpm/sample	07/20/12 01:30		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-05-25 **Lab ID: 3072158057** 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	**-0.888U ± 4.10 (9.74)**	dpm/sample	07/20/12 01:38		

Sample: SU-05-26 **Lab ID: 3072158058** 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	**-4.63U ± 3.76 (10.1)**	dpm/sample	07/20/12 01:54		

Sample: SU-05-27 **Lab ID: 3072158059** 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	**1.32U ± 4.41 (9.81)**	dpm/sample	07/20/12 02:02		

Sample: SU-05-28 **Lab ID: 3072158060** 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	**-1.99U ± 3.96 (9.75)**	dpm/sample	07/20/12 02:10		

Sample: SU-05-29 **Lab ID: 3072158061** 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	**0.502U ± 4.27 (9.74)**	dpm/sample	07/20/12 02:41		

Sample: SU-05-30 **Lab ID: 3072158062** 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	**2.14U ± 4.47 (9.73)**	dpm/sample	07/20/12 02:49		

Sample: SU-05-31 **Lab ID: 3072158063** 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	**-0.901U ± 4.16 (9.88)**	dpm/sample	07/20/12 02:57		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-05-32 **Lab ID: 3072158064** 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	**-0.331U ± 4.21 (9.84)**	dpm/sample	07/20/12 03:05		

Sample: SU-05-33 **Lab ID: 3072158065** 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	**-1.72U ± 3.99 (9.73)**	dpm/sample	07/20/12 03:13		

Sample: SU-05-34 **Lab ID: 3072158066** 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	**-0.751U ± 5.02 (11.8)**	dpm/sample	07/20/12 03:21		

Sample: SU-05-35 **Lab ID: 3072158067** 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	**-9.19U ± 3.05 (9.79)**	dpm/sample	07/20/12 03:29		

Sample: SU-05-36 **Lab ID: 3072158068** 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	**-0.887U ± 4.09 (9.73)**	dpm/sample	07/20/12 03:37		

Sample: SU-08-1 **Lab ID: 3072158069** 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 ± 4.77 (9.85)**	dpm/sample	07/20/12 03:45		

Sample: SU-08-2 **Lab ID: 3072158070** 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	**0.771U ± 4.30 (9.73)**	dpm/sample	07/20/12 03:53		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-08-3 **Lab ID: 3072158071** 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	**-1.99U ± 3.96 (9.75)**	dpm/sample	07/20/12 04:01		

Sample: SU-08-4 **Lab ID: 3072158072** 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	**2.43U ± 4.52 (9.75)**	dpm/sample	07/20/12 04:09		

Sample: SU-08-5 **Lab ID: 3072158073** 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	**1.05U ± 4.36 (9.79)**	dpm/sample	07/20/12 04:17		

Sample: SU-08-6 **Lab ID: 3072158074** 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	**-1.72U ± 3.99 (9.74)**	dpm/sample	07/20/12 04:25		

Sample: SU-08-7 **Lab ID: 3072158075** 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	**1.32U ± 4.40 (9.79)**	dpm/sample	07/20/12 04:34		

Sample: SU-08-8 **Lab ID: 3072158076** 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	**-2.26U ± 3.92 (9.74)**	dpm/sample	07/20/12 04:42		

Sample: SU-08-9 **Lab ID: 3072158077** 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	**-0.887U ± 4.10 (9.73)**	dpm/sample	07/20/12 04:50		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-08-10 **Lab ID: 3072158078** 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	**6.29J ± 4.99 (9.74)**	dpm/sample	07/20/12 04:58		

Sample: SU-08-11 **Lab ID: 3072158079** 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	**1.87U ± 4.45 (9.75)**	dpm/sample	07/20/12 05:06		

Sample: SU-08-12 **Lab ID: 3072158080** 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	**7.09J ± 5.09 (9.73)**	dpm/sample	07/20/12 05:14		

Sample: SU-08-13 **Lab ID: 3072158081** 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	**4.07J ± 4.71 (9.73)**	dpm/sample	07/20/12 05:45		

Sample: SU-08-14 **Lab ID: 3072158082** 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	**-2.54U ± 3.88 (9.73)**	dpm/sample	07/20/12 05:54		

Sample: SU-08-15 **Lab ID: 3072158083** 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	**0.504U ± 4.29 (9.78)**	dpm/sample	07/20/12 06:02		

Sample: SU-08-16 **Lab ID: 3072158084** 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	**-2.82U ± 3.86 (9.76)**	dpm/sample	07/20/12 06:10		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-08-17 **Lab ID: 3072158085** 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	**3.24U ± 4.61 (9.73)**	dpm/sample	07/20/12 06:18		

Sample: SU-08-18 **Lab ID: 3072158086** 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	**0.212U ± 4.23 (9.73)**	dpm/sample	07/20/12 06:26		

Sample: SU-08-19 **Lab ID: 3072158087** 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	**1.32U ± 4.38 (9.76)**	dpm/sample	07/20/12 06:34		

Sample: SU-08-20 **Lab ID: 3072158088** 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	**2.15U ± 4.48 (9.75)**	dpm/sample	07/20/12 06:42		

Sample: SU-08-21 **Lab ID: 3072158089** 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	**-1.72U ± 4.01 (9.77)**	dpm/sample	07/20/12 06:50		

Sample: SU-08-22 **Lab ID: 3072158090** 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 ± 4.75 (9.74)**	dpm/sample	07/20/12 06:58		

Sample: SU-08-23 **Lab ID: 3072158091** 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	**2.14U ± 4.48 (9.74)**	dpm/sample	07/20/12 07:06		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-08-24 **Lab ID: 3072158092** 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	**3.24U ± 4.61 (9.73)**	dpm/sample	07/20/12 07:14		

Sample: SU-08-25 **Lab ID: 3072158093** 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	**2.99U ± 4.61 (9.80)**	dpm/sample	07/20/12 07:22		

Sample: SU-08-26 **Lab ID: 3072158094** 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	**0.501U ± 4.27 (9.73)**	dpm/sample	07/20/12 07:31		

Sample: SU-08-27 **Lab ID: 3072158095** 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	**-2.25U ± 3.92 (9.73)**	dpm/sample	07/20/12 07:39		

Sample: SU-08-28 **Lab ID: 3072158096** 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	**-2.56U ± 3.90 (9.78)**	dpm/sample	07/20/12 07:47		

Sample: SU-08-29 **Lab ID: 3072158097** 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	**-0.887U ± 4.09 (9.73)**	dpm/sample	07/20/12 07:55		

Sample: SU-08-30 **Lab ID: 3072158098** 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	**-0.896U ± 4.13 (9.83)**	dpm/sample	07/20/12 08:03		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

Sample: SU-09-1 **Lab ID: 3072158099** 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	**-0.637U ± 4.26 (10.1)**	dpm/sample	07/20/12 08:11		

Sample: SU-09-2 **Lab ID: 3072158100** 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	**-2.85U ± 3.89 (9.84)**	dpm/sample	07/20/12 08:19		

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QUALITY CONTROL DATA

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

QC Batch: RADC/12491 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072158001, 3072158002, 3072158003, 3072158004, 3072158005, 3072158006, 3072158007, 3072158008, 3072158009, 3072158010, 3072158011, 3072158012, 3072158013, 3072158014, 3072158015, 3072158016, 3072158017, 3072158018, 3072158019, 3072158020

METHOD BLANK: 459084 Matrix: Impact Plate
Associated Lab Samples: 3072158001, 3072158002, 3072158003, 3072158004, 3072158005, 3072158006, 3072158007, 3072158008, 3072158009, 3072158010, 3072158011, 3072158012, 3072158013, 3072158014, 3072158015, 3072158016, 3072158017, 3072158018, 3072158019, 3072158020

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	1.88U ± 4.17 (9.12)	dpm/sample	07/19/12 18:40	

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QUALITY CONTROL DATA

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

QC Batch: RADC/12492 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072158021, 3072158022, 3072158023, 3072158024, 3072158025, 3072158026, 3072158027, 3072158028, 3072158029, 3072158030, 3072158031, 3072158032, 3072158033, 3072158034, 3072158035, 3072158036, 3072158037, 3072158038, 3072158039, 3072158040

METHOD BLANK: 459089 Matrix: Impact Plate
Associated Lab Samples: 3072158021, 3072158022, 3072158023, 3072158024, 3072158025, 3072158026, 3072158027, 3072158028, 3072158029, 3072158030, 3072158031, 3072158032, 3072158033, 3072158034, 3072158035, 3072158036, 3072158037, 3072158038, 3072158039, 3072158040

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-2.33U ± 4.05 (10.1)	dpm/sample	07/19/12 23:22	

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QUALITY CONTROL DATA

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

QC Batch: RADC/12493 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072158041, 3072158042, 3072158043, 3072158044, 3072158045, 3072158046, 3072158047, 3072158048, 3072158049, 3072158050, 3072158051, 3072158052, 3072158053, 3072158054, 3072158055, 3072158056, 3072158057, 3072158058, 3072158059, 3072158060

METHOD BLANK: 459090 Matrix: Impact Plate
Associated Lab Samples: 3072158041, 3072158042, 3072158043, 3072158044, 3072158045, 3072158046, 3072158047, 3072158048, 3072158049, 3072158050, 3072158051, 3072158052, 3072158053, 3072158054, 3072158055, 3072158056, 3072158057, 3072158058, 3072158059, 3072158060

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-2.10U ± 4.19 (10.3)	dpm/sample	07/20/12 02:33	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

QC Batch: RADC/12494 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072158061, 3072158062, 3072158063, 3072158064, 3072158065, 3072158066, 3072158067, 3072158068, 3072158069, 3072158070, 3072158071, 3072158072, 3072158073, 3072158074, 3072158075, 3072158076, 3072158077, 3072158078, 3072158079, 3072158080

METHOD BLANK: 459091 Matrix: Impact Plate
Associated Lab Samples: 3072158061, 3072158062, 3072158063, 3072158064, 3072158065, 3072158066, 3072158067, 3072158068, 3072158069, 3072158070, 3072158071, 3072158072, 3072158073, 3072158074, 3072158075, 3072158076, 3072158077, 3072158078, 3072158079, 3072158080

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	1.88U ± 4.46 (9.77)	dpm/sample	07/20/12 05:37	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

QC Batch: RADC/12496 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072158081, 3072158082, 3072158083, 3072158084, 3072158085, 3072158086, 3072158087, 3072158088, 3072158089, 3072158090, 3072158091, 3072158092, 3072158093, 3072158094, 3072158095, 3072158096, 3072158097, 3072158098, 3072158099, 3072158100

METHOD BLANK: 459093 Matrix: Impact Plate
Associated Lab Samples: 3072158081, 3072158082, 3072158083, 3072158084, 3072158085, 3072158086, 3072158087, 3072158088, 3072158089, 3072158090, 3072158091, 3072158092, 3072158093, 3072158094, 3072158095, 3072158096, 3072158097, 3072158098, 3072158099, 3072158100

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-1.45U ± 4.10 (9.91)	dpm/sample	07/20/12 08:42	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: Fort Monmouth 1207078
Pace Project No.: 3072158

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: 3072158

Chain of Custody
And
Sample Receiving Conditions Upon Receipt Form

Pace Analytical
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Company:	US Army Corps of Engineers
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Phone: 443-253-0916	Fax: none
Requested Due Date/TAT:	ASAP

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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

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER NRC

Site Location STATE: NJ

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PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Gross Low Energy Beta Analysis	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N		3072158
286	SU-14-17	WP	G	NA	NA	06/11/12		NA	1	X									X		
287	SU-14-17D	WP	G	NA	NA	06/11/12		NA	1	X									X		
288	SU-14-18	WP	G	NA	NA	06/11/12		NA	1	X									X		
289	SU-14-19	WP	G	NA	NA	06/11/12		NA	1	X									X		
290	SU-14-20	WP	G	NA	NA	06/11/12		NA	1	X									X		
291	SU-14-21	WP	G	NA	NA	06/11/12		NA	1	X									X		
292	SU-14-22	WP	G	NA	NA	06/11/12		NA	1	X									X		
293	SU-14-23	WP	G	NA	NA	06/11/12		NA	1	X									X		
294	SU-14-23D	WP	G	NA	NA	06/11/12		NA	1	X									X		
295	SU-14-24	WP	G	NA	NA	06/11/12		NA	1	X									X		
296	SU-14-25	WP	G	NA	NA	06/11/12		NA	1	X									X		
297	SU-14-26	WP	G	NA	NA	06/11/12		NA	1	X									X		
298	SU-14-27	WP	G	NA	NA	06/11/12		NA	1	X									X		
299	SU-04-1	WP	G	NA	NA	06/11/12		NA	1	X									X		
300	SU-04-2	WP	G	NA	NA	06/11/12		NA	1	X									X		
301	SU-04-2D	WP	G	NA	NA	06/11/12		NA	1	X									X		001
302	SU-04-3	WP	G	NA	NA	06/11/12		NA	1	X									X		002
303	SU-04-4	WP	G	NA	NA	06/11/12		NA	1	X									X		003
304	SU-04-5	WP	G	NA	NA	06/11/12		NA	1	X									X		004
305	SU-04-6	WP	G	NA	NA	06/11/12		NA	1	X									X		005
306	SU-04-7	WP	G	NA	NA	06/11/12		NA	1	X									X		006
307	SU-04-8	WP	G	NA	NA	06/11/12		NA	1	X									X		007

6/25/12 1015

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Copy To:	Alan Warminski
Purchase Order No.:	
Project Name:	Fort Monmouth Rad Survey
Project Number:	

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Attention:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carin Ferris
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER NRC

Site Location STATE: NJ

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OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

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308	SU-04-9	WP	G	NA	NA	06/11/12		NA	1	X								N	X		008
309	SU-04-10	WP	G	NA	NA	06/11/12		NA	1	X									X		009
310	SU-04-11	WP	G	NA	NA	06/11/12		NA	1	X									X		010
311	SU-04-12	WP	G	NA	NA	06/11/12		NA	1	X									X		011
312	SU-04-13	WP	G	NA	NA	06/11/12		NA	1	X									X		012
313	SU-04-14	WP	G	NA	NA	06/11/12		NA	1	X									X		013
314	SU-04-15	WP	G	NA	NA	06/11/12		NA	1	X									X		014
315	SU-04-16	WP	G	NA	NA	06/11/12		NA	1	X									X		015
316	SU-04-16D	WP	G	NA	NA	06/11/12		NA	1	X									X		016
317	SU-04-17	WP	G	NA	NA	06/11/12		NA	1	X									X		017
318	SU-04-18	WP	G	NA	NA	06/11/12		NA	1	X									X		018
319	SU-04-19	WP	G	NA	NA	06/11/12		NA	1	X									X		019
320	SU-04-20	WP	G	NA	NA	06/11/12		NA	1	X									X		020
321	SU-04-21	WP	G	NA	NA	06/11/12		NA	1	X									X		021
322	SU-04-22	WP	G	NA	NA	06/11/12		NA	1	X									X		022
323	SU-04-23	WP	G	NA	NA	06/11/12		NA	1	X									X		023
324	SU-04-24	WP	G	NA	NA	06/11/12		NA	1	X									X		024
325	SU-04-25	WP	G	NA	NA	06/11/12		NA	1	X									X		025
326	SU-04-26	WP	G	NA	NA	06/11/12		NA	1	X									X		026
327	SU-04-27	WP	G	NA	NA	06/11/12		NA	1	X									X		027
328	SU-04-28	WP	G	NA	NA	06/11/12		NA	1	X									X		028
329	SU-04-29	WP	G	NA	NA	06/11/12		NA	1	X									X		029

6/25/12 1015

Pace Analytical
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Purchase Order No.:	
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Project Number:	

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Attention:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carin Ferris
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ ☐ OTHER NRC

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330	SU-04-30	WP	G	NA	NA	06/11/12		NA	1	X									X		030
331	SU-05-1	WP	G	NA	NA	06/11/12		NA	1	X									X		031
332	SU-05-2	WP	G	NA	NA	06/11/12		NA	1	X									X		032
333	SU-05-3	WP	G	NA	NA	06/11/12		NA	1	X									X		033
334	SU-05-4	WP	G	NA	NA	06/11/12		NA	1	X									X		034
335	SU-05-5	WP	G	NA	NA	06/11/12		NA	1	X									X		035
336	SU-05-6	WP	G	NA	NA	06/11/12		NA	1	X									X		036
337	SU-05-7	WP	G	NA	NA	06/11/12		NA	1	X									X		037
338	SU-05-7D	WP	G	NA	NA	06/11/12		NA	1	X									X		038
339	SU-05-8	WP	G	NA	NA	06/11/12		NA	1	X									X		039
340	SU-05-9	WP	G	NA	NA	06/11/12		NA	1	X									X		040
341	SU-05-10	WP	G	NA	NA	06/11/12		NA	1	X									X		041
342	SU-05-11	WP	G	NA	NA	06/11/12		NA	1	X									X		042
343	SU-05-11D	WP	G	NA	NA	06/11/12		NA	1	X									X		043
344	SU-05-12	WP	G	NA	NA	06/11/12		NA	1	X									X		044
345	SU-05-13	WP	G	NA	NA	06/11/12		NA	1	X									X		045
346	SU-05-14	WP	G	NA	NA	06/11/12		NA	1	X									X		046
347	SU-05-15	WP	G	NA	NA	06/11/12		NA	1	X									X		047
348	SU-05-16	WP	G	NA	NA	06/11/12		NA	1	X									X		048
349	SU-05-17	WP	G	NA	NA	06/11/12		NA	1	X									X		049
350	SU-05-18	WP	G	NA	NA	06/11/12		NA	1	X									X		050
351	SU-05-19	WP	G	NA	NA	06/11/12		NA	1	X									X		051

6/25/12 1015

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Phone: 443-253-0916	Fax: none	Project Name:	Fort Monmouth Rad Survey	Pace Project Manager:	Carin Ferris
Requested Due Date/TAT:	ASAP	Project Number:		Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
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																	N			
352	SU-05-20	WP	G	NA	NA	06/11/12		NA	1	X							X			052
353	SU-05-21	WP	G	NA	NA	06/11/12		NA	1	X							X			053
354	SU-05-22	WP	G	NA	NA	06/11/12		NA	1	X							X			054
355	SU-05-23	WP	G	NA	NA	06/11/12		NA	1	X							X			055
356	SU-05-24	WP	G	NA	NA	06/11/12		NA	1	X							X			056
357	SU-05-25	WP	G	NA	NA	06/11/12		NA	1	X							X			057
358	SU-05-26	WP	G	NA	NA	06/11/12		NA	1	X							X			058
359	SU-05-27	WP	G	NA	NA	06/11/12		NA	1	X							X			059
360	SU-05-28	WP	G	NA	NA	06/11/12		NA	1	X							X			060
361	SU-05-29	WP	G	NA	NA	06/11/12		NA	1	X							X			061
362	SU-05-30	WP	G	NA	NA	06/11/12		NA	1	X							X			062
363	SU-05-31	WP	G	NA	NA	06/11/12		NA	1	X							X			063
364	SU-05-32	WP	G	NA	NA	06/11/12		NA	1	X							X			064
365	SU-05-33	WP	G	NA	NA	06/11/12		NA	1	X							X			065
366	SU-05-34	WP	G	NA	NA	06/11/12		NA	1	X							X			066
367	SU-05-35	WP	G	NA	NA	06/11/12		NA	1	X							X			067
368	SU-05-36	WP	G	NA	NA	06/11/12		NA	1	X							X			068
369	SU-08-1	WP	G	NA	NA	06/11/12		NA	1	X							X			069
370	SU-08-2	WP	G	NA	NA	06/11/12		NA	1	X							X			070
371	SU-08-3	WP	G	NA	NA	06/11/12		NA	1	X							X			071
372	SU-08-4	WP	G	NA	NA	06/11/12		NA	1	X							X			072
373	SU-08-5	WP	G	NA	NA	06/11/12		NA	1	X							X			073

6/25/12 1015

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																		N			
374	SU-08-6	WP	G	NA	NA	06/11/12		NA	1	X								X			074
375	SU-08-7	WP	G	NA	NA	06/11/12		NA	1	X								X			075
376	SU-08-8	WP	G	NA	NA	06/11/12		NA	1	X								X			076
377	SU-08-9	WP	G	NA	NA	06/11/12		NA	1	X								X			077
378	SU-08-10	WP	G	NA	NA	06/11/12		NA	1	X								X			078
379	SU-08-11	WP	G	NA	NA	06/11/12		NA	1	X								X			079
380	SU-08-12	WP	G	NA	NA	06/11/12		NA	1	X								X			080
381	SU-08-13	WP	G	NA	NA	06/11/12		NA	1	X								X			081
382	SU-08-14	WP	G	NA	NA	06/11/12		NA	1	X								X			082
383	SU-08-15	WP	G	NA	NA	06/11/12		NA	1	X								X			083
384	SU-08-16	WP	G	NA	NA	06/11/12		NA	1	X								X			084
385	SU-08-17	WP	G	NA	NA	06/11/12		NA	1	X								X			085
386	SU-08-18	WP	G	NA	NA	06/11/12		NA	1	X								X			086
387	SU-08-19	WP	G	NA	NA	06/11/12		NA	1	X								X			087
388	SU-08-20	WP	G	NA	NA	06/11/12		NA	1	X								X			088
389	SU-08-21	WP	G	NA	NA	06/11/12		NA	1	X								X			089
390	SU-08-22	WP	G	NA	NA	06/11/12		NA	1	X								X			090
391	SU-08-23	WP	G	NA	NA	06/11/12		NA	1	X								X			091
392	SU-08-24	WP	G	NA	NA	06/11/12		NA	1	X								X			092
393	SU-08-25	WP	G	NA	NA	06/11/12		NA	1	X								X			093
394	SU-08-26	WP	G	NA	NA	06/11/12		NA	1	X								X			094
395	SU-08-27	WP	G	NA	NA	06/11/12		NA	1	X								X			095

6/25/12

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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:		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		
	Baltimore, MD			Address:	
Email To:	david.j.watters@usace.army.mil	Purchase Order No.:		Pace Quote Reference:	
Phone:	443-253-0916 Fax: none	Project Name:	Fort Monmouth Rad Survey	Pace Project Manager:	Carin Ferris
Requested Due Date/TAT:	ASAP	Project Number:		Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ ☐ OTHER NRC

Site Location STATE: NJ

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes MATRIX / CODE: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Gross Low Energy Beta Analysis	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 3072158
396	SU-08-28		WP	G	NA	NA	06/11/12		NA	1	X									X		096
397	SU-08-29		WP	G	NA	NA	06/11/12		NA	1	X									X		097
398	SU-08-30		WP	G	NA	NA	06/11/12		NA	1	X									X		098
399	SU-09-1		WP	G	NA	NA	06/11/12		NA	1	X									X		099
400	SU-09-2		WP	G	NA	NA	06/11/12		NA	1	X									X		100
401	SU-09-3		WP	G	NA	NA	06/11/12		NA	1	X									X		
402	SU-09-4		WP	G	NA	NA	06/11/12		NA	1	X									X		
403	SU-09-5		WP	G	NA	NA	06/11/12		NA	1	X									X		
404	SU-09-6		WP	G	NA	NA	06/11/12		NA	1	X									X		
405	SU-09-7		WP	G	NA	NA	06/11/12		NA	1	X									X		
406	SU-09-8		WP	G	NA	NA	06/11/12		NA	1	X									X		
407	SU-09-9		WP	G	NA	NA	06/11/12		NA	1	X									X		
408	SU-09-10		WP	G	NA	NA	06/11/12		NA	1	X									X		
409	SU-09-11		WP	G	NA	NA	06/11/12		NA	1	X									X		
410	SU-09-11D		WP	G	NA	NA	06/11/12		NA	1	X									X		
411	SU-09-12		WP	G	NA	NA	06/11/12		NA	1	X									X		
412	SU-09-13		WP	G	NA	NA	06/11/12		NA	1	X									X		
413	SU-09-14		WP	G	NA	NA	06/11/12		NA	1	X									X		
414	SU-09-15		WP	G	NA	NA	06/11/12		NA	1	X									X		
415	SU-09-16		WP	G	NA	NA	06/11/12		NA	1	X									X		
416	SU-09-17		WP	G	NA	NA	06/11/12		NA	1	X									X		
417	SU-09-18		WP	G	NA	NA	06/11/12		NA	1	X									X		

6/25/12 1015

Sample Condition Upon Receipt

Pace Analytical

Client Name: RTI Project # 3072158

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Optional
Proj. Due Date:
Proj. Name:

Tracking #: 8759286537 84

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other cardboard

Thermometer Used 5 6 7 Type of Ice: Wet Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature NA Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: LEN 6/25/12

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☑No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: WP		
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes ☑No	Initial when completed LEN / Lot # of added preservative
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [signature] **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)

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Project Number: 35728158

Client Name: RTI

Item No.													
	Matrix Code	WP →											
1	Glass Jar (120 / 250 / 500 / 1L)												
2	Soil kit (2 SB, 1M, soil jar)												
3	Chemistry (250 / 500 / 1L)												
4	Organics (1L)												
5	Nutrient (250 / 500)												
6	Phenolics (250 ml)												
7	TOC (40 ml / 250 ml)												
8	TOX (250 ml)												
9	Total Metals												
10	Dissolved Metals preserved Y N												
11	O & G (1L)												
12	TPH (1L)												
13	VOA (40 ml 30 ml)												
14	Cyanide (250 ml)												
15	Sulfide (500 ml)												
16	Bacteria (120 ml)												
17	Wipes / swipe/ smear/ filter	←	—										
18	Radchem Nalgene (125 / 250 / 500 / 1L)												
19	Radchem Nalgene (1/2 gal. / 1 gal.L)												
20	Cubitainer (500 ml / 4L)												
21	Ziploc												
22	Other												
23	Other												

SCURF Back (C018-4 15May2012).xls

Low Energy Beta Sample Analysis Data

Quality Control Review

Batch	RADC/12491	**HBN**	91063
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	RMK

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1 459084-BLANK for HBN 91063 [RADC/1249

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12491 **Prep Date** 7/19/2012 18:40 **Dilution**
Method EPA 906.0M **HBN** 91063 **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796215 **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** 7/19/2012 18:40 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796215 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	1.88U ± 4.17 (9.12)	dpm/sa	1.88U ± 4.17 (9.12)		dpm/sa	

2 3072158001-SU-04-2D

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12491 **Prep Date** 7/19/2012 15:45 **Dilution**
Method EPA 906.0M **HBN** 91063 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790358 **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** 7/19/2012 15:45 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790358 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	7.38J ± 4.80 (8.85)	dpm/sa	7.38J ± 4.80 (8.85)		dpm/sa		

3 3072158002-SU-04-3

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

Batch	RADC/12491	HBN	91063
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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3 3072158002-SU-04-3

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790359

Batch RADC/12491
HBN 91063
Instru NONE

Prep Date 7/19/2012 15:53
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790359

Instru NONE
Col ID
File

Run Date 7/19/2012 15:53
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.443U ± 3.82 (8.78)	dpm/sa	0.443U ± 3.82 (8.78)		dpm/sa		

4 3072158003-SU-04-4

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790360

Batch RADC/12491
HBN 91063
Instru NONE

Prep Date 7/19/2012 16:01
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790360

Instru NONE
Col ID
File

Run Date 7/19/2012 16:01
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.443U ± 3.82 (8.78)	dpm/sa	0.443U ± 3.82 (8.78)		dpm/sa		

5 3072158004-SU-04-5

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch	RADC/12491	**HBN**	91063
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	RMK

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5 3072158004-SU-04-5

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790361

Batch RADC/12491
HBN 91063
Instru NONE

Prep Date 7/19/2012 16:09
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790361

Instru NONE
Col ID
File

Run Date 7/19/2012 16:09
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.20J ± 4.20 (8.78)	dpm/sa	3.20J ± 4.20 (8.78)		dpm/sa		

6 3072158005-SU-04-6

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790362

Batch RADC/12491
HBN 91063
Instru NONE

Prep Date 7/19/2012 16:17
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790362

Instru NONE
Col ID
File

Run Date 7/19/2012 16:17
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.64U ± 4.13 (8.79)	dpm/sa	2.64U ± 4.13 (8.79)		dpm/sa		

7 3072158006-SU-04-7

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch	RADC/12491	HBN	91063
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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7 3072158006-SU-04-7

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 16:25	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790363	**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**	7/19/2012 16:25	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790363	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	4.30J ± 4.35 (8.78)	dpm/sa	4.30J ± 4.35 (8.78)		dpm/sa		

8 3072158007-SU-04-8

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 16:33	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790364	**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**	7/19/2012 16:33	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790364	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	4.84J ± 4.43 (8.79)	dpm/sa	4.84J ± 4.43 (8.79)		dpm/sa		

9 3072158008-SU-04-9

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12491	HBN	91063
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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9 3072158008-SU-04-9

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 16:41	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790365	**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**	7/19/2012 16:41	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790365	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	6.76J ± 4.69 (8.78)	dpm/sa	6.76J ± 4.69 (8.78)		dpm/sa		

10 3072158009-SU-04-10

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 16:49	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790366	**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**	7/19/2012 16:49	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790366	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	7.33J ± 4.77 (8.79)	dpm/sa	7.33J ± 4.77 (8.79)		dpm/sa		

11 3072158010-SU-04-11

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12491	HBN	91063
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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11 3072158010-SU-04-11

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 16:57	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790367	**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**	7/19/2012 16:57	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790367	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.27U ± 3.95 (8.80)	dpm/sa	1.27U ± 3.95 (8.80)		dpm/sa		

12 3072158011-SU-04-12

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 17:05	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790368	**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**	7/19/2012 17:05	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790368	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	5.13J ± 4.47 (8.78)	dpm/sa	5.13J ± 4.47 (8.78)		dpm/sa		

13 3072158012-SU-04-13

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

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Batch	RADC/12491	HBN	91063
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

13 3072158012-SU-04-13

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790369

Batch RADC/12491
HBN 91063
Instru NONE

Prep Date 7/19/2012 17:13
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790369

Instru NONE
Col ID
File

Run Date 7/19/2012 17:13
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.09U ± 4.07 (8.82)	dpm/sa	2.09U ± 4.07 (8.82)		dpm/sa		

14 3072158013-SU-04-14

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790370

Batch RADC/12491
HBN 91063
Instru NONE

Prep Date 7/19/2012 17:21
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790370

Instru NONE
Col ID
File

Run Date 7/19/2012 17:21
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.64U ± 4.13 (8.78)	dpm/sa	2.64U ± 4.13 (8.78)		dpm/sa		

15 3072158014-SU-04-15

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch RADC/12491 HBN 91063
Rule 9060 I LEB Status RE
Create Date 6/28/2012 Analyst RMK

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15 3072158014-SU-04-15

Prep Information

Procedure 9060 I LEB **Batch** RADC/12491 **Prep Date** 7/19/2012 17:30 **Dilution**
Method EPA 906.0M **HBN** 91063 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790371 **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** 7/19/2012 17:30 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790371 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.91U ± 4.16 (8.78)	dpm/sa	2.91U ± 4.16 (8.78)		dpm/sa		

16 3072158015-SU-04-16

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12491 **Prep Date** 7/19/2012 17:38 **Dilution**
Method EPA 906.0M **HBN** 91063 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790372 **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** 7/19/2012 17:38 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790372 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.74J ± 4.28 (8.79)	dpm/sa	3.74J ± 4.28 (8.79)		dpm/sa		

17 3072158016-SU-04-16D

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

Batch	RADC/12491	HBN	91063
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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17 3072158016-SU-04-16D

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 17:46	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790373	**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**	7/19/2012 17:46	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790373	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	4.84J ± 4.43 (8.79)	dpm/sa	4.84J ± 4.43 (8.79)		dpm/sa		

18 3072158017-SU-04-17

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 17:54	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790374	**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**	7/19/2012 17:54	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790374	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.74J ± 4.28 (8.78)	dpm/sa	3.74J ± 4.28 (8.78)		dpm/sa		

19 3072158018-SU-04-18

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12491	HBN	91063
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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19 3072158018-SU-04-18

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 18:02	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790375	**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**	7/19/2012 18:02	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790375	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.20J ± 4.21 (8.79)	dpm/sa	3.20J ± 4.21 (8.79)		dpm/sa		

20 3072158019-SU-04-19

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12491	**Prep Date**	7/19/2012 18:10	**Dilution**	
Method	EPA 906.0M	**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790376	**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**	7/19/2012 18:10	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790376	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.91U ± 4.16 (8.78)	dpm/sa	2.91U ± 4.16 (8.78)		dpm/sa		

21 3072158020-SU-04-20

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12491	**HBN**	91063
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	RMK

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21 3072158020-SU-04-20

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12491	**Prep Date**	7/19/2012 18:18	**Dilution**
Method	EPA 906.0M		**HBN**	91063	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790377		**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**	7/19/2012 18:18	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790377		**File**				**CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.983U ± 3.90 (8.78)	dpm/sa	0.983U ± 3.90 (8.78)		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 13:50	Assigned Analyst	RMK
Batch ID	12491	Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB 9060W	HBN	91063
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
	459084	BLANK	IP		QCACCOUNT	1.88U	4.17	9.12	7/19/12 18:40
3072158	3072158001	PS	WP	6/11/2012 0:01	RTI	7.38J	4.80	8.85	7/19/12 15:45
3072158	3072158002	PS	WP	6/11/2012 0:01	RTI	0.443U	3.82	8.78	7/19/12 15:53
3072158	3072158003	PS	WP	6/11/2012 0:01	RTI	0.443U	3.82	8.78	7/19/12 16:01
3072158	3072158004	PS	WP	6/11/2012 0:01	RTI	3.20J	4.20	8.78	7/19/12 16:09
3072158	3072158005	PS	WP	6/11/2012 0:01	RTI	2.64U	4.13	8.79	7/19/12 16:17
3072158	3072158006	PS	WP	6/11/2012 0:01	RTI	4.30J	4.35	8.78	7/19/12 16:25
3072158	3072158007	PS	WP	6/11/2012 0:01	RTI	4.84J	4.43	8.79	7/19/12 16:33
3072158	3072158008	PS	WP	6/11/2012 0:01	RTI	6.76J	4.69	8.78	7/19/12 16:41
3072158	3072158009	PS	WP	6/11/2012 0:01	RTI	7.33J	4.77	8.79	7/19/12 16:49
3072158	3072158010	PS	WP	6/11/2012 0:01	RTI	1.27U	3.95	8.80	7/19/12 16:57
3072158	3072158011	PS	WP	6/11/2012 0:01	RTI	5.13J	4.47	8.78	7/19/12 17:05
3072158	3072158012	PS	WP	6/11/2012 0:01	RTI	2.09U	4.07	8.82	7/19/12 17:13
3072158	3072158013	PS	WP	6/11/2012 0:01	RTI	2.64U	4.13	8.78	7/19/12 17:21
3072158	3072158014	PS	WP	6/11/2012 0:01	RTI	2.91U	4.16	8.78	7/19/12 17:30
3072158	3072158015	PS	WP	6/11/2012 0:01	RTI	3.74J	4.28	8.79	7/19/12 17:38
3072158	3072158016	PS	WP	6/11/2012 0:01	RTI	4.84J	4.43	8.79	7/19/12 17:46
3072158	3072158017	PS	WP	6/11/2012 0:01	RTI	3.74J	4.28	8.78	7/19/12 17:54
3072158	3072158018	PS	WP	6/11/2012 0:01	RTI	3.20J	4.21	8.79	7/19/12 18:02
3072158	3072158019	PS	WP	6/11/2012 0:01	RTI	2.91U	4.16	8.78	7/19/12 18:10
3072158	3072158020	PS	WP	6/11/2012 0:01	RTI	0.983U	3.90	8.78	7/19/12 18:18

JH 7/24/12

LIMS Load
Printed 7/24/2012 at 1:04 PM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK			
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	5.63	
Batch ID	12491	**PrepSOP2**	n/a	**Bkg Duration**	30.0	min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	BKG071812	
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/18/2012 2:31	
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**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
459084	1.0	7/19/12 18:40	7.0	7/19/12 18:40	6.57	323.7	dpm/S	High, Evaluate
3072158001	1.0	6/11/12 0:01	7.0	7/19/12 15:45	9.43	293.8	dpm/S	Pass
3072158002	1.0	6/11/12 0:01	7.0	7/19/12 15:53	5.86	265.4	dpm/S	Pass
3072158003	1.0	6/11/12 0:01	7.0	7/19/12 16:01	5.86	266.0	dpm/S	Pass
3072158004	1.0	6/11/12 0:01	7.0	7/19/12 16:09	7.29	272.9	dpm/S	Pass
3072158005	1.0	6/11/12 0:01	7.0	7/19/12 16:17	7.00	279.5	dpm/S	Pass
3072158006	1.0	6/11/12 0:01	7.0	7/19/12 16:25	7.86	268.8	dpm/S	Pass
3072158007	1.0	6/11/12 0:01	7.0	7/19/12 16:33	8.14	277.0	dpm/S	Pass
3072158008	1.0	6/11/12 0:01	7.0	7/19/12 16:41	9.14	266.4	dpm/S	Pass
3072158009	1.0	6/11/12 0:01	7.0	7/19/12 16:49	9.43	279.4	dpm/S	Pass
3072158010	1.0	6/11/12 0:01	7.0	7/19/12 16:57	6.29	282.0	dpm/S	Pass
3072158011	1.0	6/11/12 0:01	7.0	7/19/12 17:05	8.29	264.9	dpm/S	Pass
3072158012	1.0	6/11/12 0:01	7.0	7/19/12 17:13	6.71	252.9	dpm/S	Pass
3072158013	1.0	6/11/12 0:01	7.0	7/19/12 17:21	7.00	269.0	dpm/S	Pass
3072158014	1.0	6/11/12 0:01	7.0	7/19/12 17:30	7.14	268.3	dpm/S	Pass
3072158015	1.0	6/11/12 0:01	7.0	7/19/12 17:38	7.57	261.4	dpm/S	Pass
3072158016	1.0	6/11/12 0:01	7.0	7/19/12 17:46	8.14	263.1	dpm/S	Pass
3072158017	1.0	6/11/12 0:01	7.0	7/19/12 17:54	7.57	265.7	dpm/S	Pass
3072158018	1.0	6/11/12 0:01	7.0	7/19/12 18:02	7.29	260.9	dpm/S	Pass
3072158019	1.0	6/11/12 0:01	7.0	7/19/12 18:10	7.14	269.6	dpm/S	Pass
3072158020	1.0	6/11/12 0:01	7.0	7/19/12 18:18	6.14	270.3	dpm/S	Pass

7/24/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK
Matrix	Smear	**PrepSOP1**	0
Batch ID	12491	**PrepSOP2**	n/a
Prep Start	7/16/2012 12:00	**AnalSOP1**	0
Prep Finish	7/16/2012	**AnalSOP2**	n/a

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

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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
459084	0.4999	0.0000	1.0000	1.880	4.161	4.167	9.116	3.287	1.024	4.161	1.00
3072158001	0.5178	0.1058	0.9941	7.383	4.718	4.799	8.854	3.193	0.995	4.718	1.00
3072158002	0.5219	0.1058	0.9941	0.443	3.824	3.825	8.784	3.167	0.987	3.824	1.00
3072158003	0.5220	0.1059	0.9941	0.443	3.824	3.824	8.783	3.167	0.987	3.824	1.00
3072158004	0.5220	0.1059	0.9941	3.199	4.187	4.204	8.782	3.167	0.986	4.187	1.00
3072158005	0.5214	0.1059	0.9941	2.643	4.121	4.133	8.792	3.170	0.988	4.121	1.00
3072158006	0.5221	0.1059	0.9941	4.297	4.323	4.353	8.781	3.166	0.986	4.323	1.00
3072158007	0.5217	0.1059	0.9941	4.839	4.392	4.429	8.787	3.168	0.987	4.392	1.00
3072158008	0.5220	0.1059	0.9941	6.764	4.616	4.686	8.783	3.167	0.986	4.616	1.00
3072158009	0.5214	0.1060	0.9941	7.331	4.684	4.765	8.792	3.170	0.988	4.684	1.00
3072158010	0.5210	0.1060	0.9941	1.274	3.944	3.947	8.799	3.173	0.988	3.944	1.00
3072158011	0.5219	0.1060	0.9941	5.127	4.425	4.467	8.784	3.168	0.987	4.425	1.00
3072158012	0.5198	0.1060	0.9941	2.090	4.061	4.069	8.819	3.180	0.991	4.061	1.00
3072158013	0.5221	0.1060	0.9941	2.640	4.116	4.128	8.781	3.166	0.986	4.116	1.00
3072158014	0.5221	0.1060	0.9941	2.910	4.150	4.165	8.781	3.166	0.986	4.150	1.00
3072158015	0.5215	0.1060	0.9941	3.742	4.259	4.282	8.791	3.170	0.987	4.259	1.00
3072158016	0.5217	0.1061	0.9941	4.840	4.392	4.430	8.787	3.169	0.987	4.392	1.00
3072158017	0.5219	0.1061	0.9941	3.739	4.256	4.279	8.783	3.167	0.987	4.256	1.00
3072158018	0.5214	0.1061	0.9941	3.202	4.192	4.209	8.792	3.170	0.988	4.192	1.00
3072158019	0.5221	0.1061	0.9941	2.909	4.150	4.165	8.781	3.166	0.986	4.150	1.00
3072158020	0.5221	0.1061	0.9941	0.983	3.897	3.899	8.781	3.166	0.986	3.897	1.00

7/24/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/31/2012	**Method:**	EPA 906.0M
Worklist:	12491	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459084

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	1.8800	4.1670	9.1160	3.28700		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/20/12 15:20	7/20/12 15:28				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.938	1184.938				
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):	96.271	102.409				
1.96 Sigma Unc:	15.866	16.651				
% Recovery:	81.25%	86.43%				
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 I.D.:	LCS12491					
Duplicate Sample I.D.	LCSD12491					
Sample Result (DPM/Sample, g, F):	96.2710					
1.96 Sigma Unc:	15.8660					
ple Duplicate Result (DPM/Sample, g, F):	102.4090					
Duplicate Sample 1.96 Sigma Unc.	16.6510					
Either results below MDC?	NO					
Relative Percent Difference:	6.18%					
Assessment:	Pass					
% RPD Limit:	25.00%					

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

Sample Matrix Spike Control Assessment

Analyte:			
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:			

Comments:

7/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12491

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	**Maximum**	**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

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	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
2	1	30.00	30	2.53	5.83	5.63	292.82	4

BKG071812

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			7/19/2012 15:52
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
1	7	7/19/2012 15:45	3072158001
2	15	7/19/2012 15:53	3072158002
3	23	7/19/2012 16:01	3072158003
4	31	7/19/2012 16:09	3072158004
5	39	7/19/2012 16:17	3072158005
6	47	7/19/2012 16:25	3072158006
7	55	7/19/2012 16:33	3072158007
8	63	7/19/2012 16:41	3072158008
9	71	7/19/2012 16:49	3072158009
10	79	7/19/2012 16:57	3072158010
11	87	7/19/2012 17:05	3072158011
12	95	7/19/2012 17:13	3072158012
13	103	7/19/2012 17:21	3072158013
14	112	7/19/2012 17:30	3072158014
15	120	7/19/2012 17:38	3072158015
16	128	7/19/2012 17:46	3072158016
17	136	7/19/2012 17:54	3072158017
18	144	7/19/2012 18:02	3072158018
19	152	7/19/2012 18:10	3072158019
20	160	7/19/2012 18:18	3072158020
21	167	7/19/2012 18:25	LCS
22	174	7/19/2012 18:32	LCSD
23	182	7/19/2012 18:40	459084

7/24/12

Protocol #: 7 SWIPE_H3_C14 User :

Time: 7.00
Data Mode: CPM Nuclide: MANUAL
Background Subtract: None

	LL	UL	LCR	2SX	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
7	1	7.00	7	4.29	9.14	9.43	293.83	2
7	2	7.00	15	2.57	6.00	5.86	265.39	3
7	3	7.00	23	2.71	6.00	5.86	265.96	4
7	4	7.00	31	3.71	7.29	7.29	272.85	1
7	5	7.00	39	4.00	7.29	7.00	279.45	3
7	6	7.00	47	4.43	7.86	7.86	268.82	2
7	7	7.00	55	5.57	8.29	8.14	276.97	3
7	8	7.00	63	5.14	9.00	9.14	266.43	1
7	9	7.00	71	4.43	9.29	9.43	279.35	2
7	10	7.00	79	3.14	6.29	6.29	282.04	3
7	11	7.00	87	5.00	8.43	8.29	264.86	2
7	12	7.00	95	3.29	6.71	6.71	252.89	2
7	13	7.00	103	4.14	7.00	7.00	269.04	3
7	14	7.00	112	3.57	7.14	7.14	268.31	2
7	15	7.00	120	3.57	7.57	7.57	261.44	2
7	16	7.00	128	3.71	8.14	8.14	263.08	2
7	17	7.00	136	3.57	7.71	7.57	265.71	3
7	18	7.00	144	3.57	7.29	7.29	260.94	3
7	19	7.00	152	3.00	7.14	7.14	269.64	3
7	20	7.00	160	2.71	6.29	6.14	270.28	3
7	21	5.97	167	703.85	708.54	734.67	333.60	0
7	22	6.20	174	680.81	686.45	711.29	323.72	0
7	23	7.00	182	3.71	6.57	6.57	323.73	3

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

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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	12490	Sample-H3 C14	4	11	7/18/12 1710	12	NA	JLL
LCSD	↓	↓	↓	↓	↓	↓	↓	↓
MB (459082)	↓	↓	↓	↓	↓	↓	↓	↓
3072158001	12491	Sample-H3 C14	17	7	7/19/12 0945	7	NA	JLL
2	↓	↓	↓	↓	↓	↓	↓	↓
3	↓	↓	↓	↓	↓	↓	↓	↓
4	↓	↓	↓	↓	↓	↓	↓	↓
5	↓	↓	↓	↓	↓	↓	↓	↓
6	↓	↓	↓	↓	↓	↓	↓	↓
7	↓	↓	↓	↓	↓	↓	↓	↓
8	↓	↓	↓	↓	↓	↓	↓	↓
9	↓	↓	↓	↓	↓	↓	↓	↓
10	↓	↓	↓	↓	↓	↓	↓	↓
11	↓	↓	↓	↓	↓	↓	↓	↓
12	↓	↓	↓	↓	↓	↓	↓	↓
13	↓	↓	15	↓	↓	↓	↓	↓
14	↓	↓	↓	↓	↓	↓	↓	↓
15	↓	↓	↓	↓	↓	↓	↓	↓
16	↓	↓	↓	↓	↓	↓	↓	↓
17	↓	↓	↓	↓	↓	↓	↓	↓
18	↓	↓	↓	↓	↓	↓	↓	↓
19	↓	↓	↓	↓	↓	↓	↓	↓
20	↓	↓	↓	↓	↓	↓	↓	↓
LCS	↓	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

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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
LLSD	12491	Swipe_H3_C14	15	7	7/19/12 1500	7	NA	JLK
MB (459084)	↓	↓	↓	↓		↓	↓	↓
3072158021	12492	Swipe_H3_C14	9	3		7	NA	JLK
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33			32					
34								
35								
36								
37								
38								
39								
40								
LCS								
LCSD								

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

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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
LCS12489	1.0	7/20/12 14:48	7.0	7/20/12 14:48	59.71	328.5	dpm/S	High, Evaluate
LCSD12489	1.0	7/20/12 14:56	7.0	7/20/12 14:56	65.57	318.3	dpm/S	High, Evaluate
LCS12490	1.0	7/20/12 15:04	7.0	7/20/12 15:04	57.43	329.3	dpm/S	High, Evaluate
LCSD12490	1.0	7/20/12 15:12	7.0	7/20/12 15:12	59.14	327.2	dpm/S	High, Evaluate
LCS12491	1.0	7/20/12 15:20	7.0	7/20/12 15:20	55.43	309.2	dpm/S	Pass
LCSD12491	1.0	7/20/12 15:28	7.0	7/20/12 15:28	58.00	317.4	dpm/S	High, Evaluate
LCS12492	1.0	7/20/12 15:36	7.0	7/20/12 15:36	58.43	268.8	dpm/S	Pass
LCSD12492	1.0	7/20/12 15:44	7.0	7/20/12 15:44	59.86	320.7	dpm/S	High, Evaluate
LCS12493	1.0	7/20/12 15:52	7.0	7/20/12 15:52	56.29	311.8	dpm/S	Pass
LCSD12493	1.0	7/20/12 16:00	7.0	7/20/12 16:00	61.71	319.8	dpm/S	High, Evaluate
LCS12494	1.0	7/20/12 16:08	7.0	7/20/12 16:08	59.14	314.9	dpm/S	High, Evaluate
LCSD12494	1.0	7/20/12 16:16	7.0	7/20/12 16:16	58.57	328.3	dpm/S	High, Evaluate

LEB Data Input
Printed 7/22/2012 at 10:05 AM

7/24/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

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

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

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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
LCS12489	0.4958	0.0000	1.0000	107.723	11.687	17.368	9.678	3.506	1.032	11.687	1.00
LCSD12489	0.5042	0.0000	1.0000	117.548	12.030	18.474	9.517	3.448	1.015	12.030	1.00
LCS12490	0.4951	0.0000	1.0000	103.270	11.483	16.840	9.692	3.511	1.034	11.483	1.00
LCSD12490	0.4970	0.0000	1.0000	106.321	11.605	17.190	9.655	3.498	1.030	11.605	1.00
LCS12491	0.5103	0.0000	1.0000	96.271	10.950	15.866	9.403	3.406	1.003	10.950	1.00
LCSD12491	0.5048	0.0000	1.0000	102.409	11.316	16.651	9.505	3.443	1.014	11.316	1.00
LCS12492	0.5221	0.0000	1.0000	99.851	10.982	16.200	9.191	3.330	0.981	10.982	1.00
LCSD12492	0.5023	0.0000	1.0000	106.619	11.549	17.178	9.552	3.461	1.019	11.549	1.00
LCS12493	0.5087	0.0000	1.0000	98.267	11.067	16.120	9.433	3.417	1.006	11.067	1.00
LCSD12493	0.5030	0.0000	1.0000	110.151	11.706	17.596	9.539	3.456	1.018	11.706	1.00
LCS12494	0.5066	0.0000	1.0000	104.297	11.384	16.862	9.471	3.431	1.010	11.384	1.00
LCSD12494	0.4960	0.0000	1.0000	105.383	11.573	17.086	9.674	3.505	1.032	11.573	1.00

7/24/12

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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%

Time: 30.00
Data Mode: CPM Nuclide: MANUAL
Background Subtract: None

	LL	UL	LCR	2SX	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 14:55
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
2	7	7/20/2012 14:48	LCS12489
3	15	7/20/2012 14:56	LCSD12489
4	23	7/20/2012 15:04	LCS12490
5	31	7/20/2012 15:12	LCSD12490
6	39	7/20/2012 15:20	LCS12491
7	47	7/20/2012 15:28	LCSD12491
8	55	7/20/2012 15:36	LCS12492
9	63	7/20/2012 15:44	LCSD12492
10	71	7/20/2012 15:52	LCS12493
11	79	7/20/2012 16:00	LCSD12493
12	87	7/20/2012 16:08	LCS12494
13	95	7/20/2012 16:16	LCSD12494

JH
7/24/12

Protocol #: 7 SWIPE_H3_C14 User :

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

7/24/12

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 MISSING		TUBE(S)						
7	2	7.00	7	46.29	59.71	59.71	328.50	1
7	3	7.00	15	47.29	64.86	65.57	318.26	0
7	4	7.00	23	41.86	56.71	57.43	329.27	0
7	5	7.00	31	41.00	58.71	59.14	327.18	1
7	6	7.00	39	39.29	55.00	55.43	309.17	1
7	7	7.00	47	41.29	57.43	58.00	317.42	0
7	8	7.00	55	39.71	58.43	58.43	268.79	1
7	9	7.00	63	42.57	59.43	59.86	320.72	1
7	10	7.00	71	41.86	56.00	56.29	311.77	0
7	11	7.00	79	45.43	61.14	61.71	319.83	0
7	12	7.00	87	43.71	59.00	59.14	314.90	0
7	13	7.00	95	44.43	58.00	58.57	328.29	1

Liquid Scintillation Counter Run Log System 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
307211600 18	12502	Swipe_H3_C14	9	20	7/20/12 0900	7	NA	RMK
19	↓	↓	↓	↓	↓	↓	↓	↓
20								
LCS 12502								
LCSD 12502	↓	↓	↓	↓	↓	↓	↓	
LCS 12476	12476	Swipe_H3_C14	18	7	7/20/12 0950	7	NA	RMK
LCSD 12476	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12477	12477	↓	↓	↓	↓	↓	↓	↓
LCSD 12477	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12478	12478	↓	↓	↓	↓	↓	↓	↓
LCSD 12478	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12479	12479	↓	↓	↓	↓	↓	↓	↓
LCSD 12479	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12480	12480	↓	6	↓	↓	↓	↓	↓
LCSD 12480	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12486	12486	↓	↓	↓	↓	↓	↓	↓
LCSD 12486	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12487	12487	↓	↓	↓	↓	↓	↓	↓
LCSD 12487	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12488	12488	↓	↓	↓	↓	↓	↓	↓
LCSD 12488	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12489	12489	Swipe_H3_C14	11	7	7/20/12 1130	7	NA	RMK
LCSD 12489	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12490	12490	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

Liquid Scintillation Runlog (R023-3 7Oct2010).XLS

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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
LCSD 12490	12490	Swipe-H3_C14	11	7	7/20/12 1130	7	NA	RMK
LCS 12491	12491	↓	↓	↓	↓	↓	↓	↓
LCSD 12491	↓							
LCS 12492	12492							
LCSD 12492	↓							
LCS 12493	12493							
LCSD 12493	↓							
LCS 12494	12494							
LCSD 12494	↓							

7/21/12

Run comments: _____

Peer Review: _____

J:\QAQC\Master\Document Management\Radiological\Liquid Scintillation Runlog (R023-3 7Oct2010).XLS

Low Energy Beta Sample Analysis Data

Quality Control Review

Batch	RADC/12492	HBN	91065
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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1 459089-BLANK for HBN 91065 [RADC/1249

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12492 **Prep Date** 7/19/2012 23:22 **Dilution**
Method EPA 906.0M **HBN** 91065 **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796222 **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** 7/19/2012 23:22 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796222 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-2.33U ± 4.05 (10.1)	dpm/sa	-2.33U ± 4.05 (10.1)		dpm/sa	

2 3072158021-SU-04-21

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12492 **Prep Date** 7/19/2012 20:25 **Dilution**
Method EPA 906.0M **HBN** 91065 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790378 **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** 7/19/2012 20:25 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790378 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.60U ± 4.40 (9.72)	dpm/sa	1.60U ± 4.40 (9.72)		dpm/sa		

3 3072158022-SU-04-22

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

Batch	RADC/12492	**HBN**	91065
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	RMK

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3 3072158022-SU-04-22

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12492	**Prep Date**	7/19/2012 20:33	**Dilution**
Method	EPA 906.0M		**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790379		**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**	7/19/2012 20:33	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790379		**File**				**CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.32U ± 4.40 (9.79)	dpm/sa	1.32U ± 4.40 (9.79)		dpm/sa		

4 3072158023-SU-04-23

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12492	**Prep Date**	7/19/2012 20:41	**Dilution**
Method	EPA 906.0M		**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790380		**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**	7/19/2012 20:41	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790380		**File**				**CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.328U ± 4.17 (9.73)	dpm/sa	-0.328U ± 4.17 (9.73)		dpm/sa		

5 3072158024-SU-04-24

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

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

Quality Control Review

Batch	RADC/12492	HBN	91065
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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5 3072158024-SU-04-24

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 20:49	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790381	**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**	7/19/2012 20:49	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790381	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.16U ± 4.06 (9.73)	dpm/sa	-1.16U ± 4.06 (9.73)		dpm/sa		

6 3072158025-SU-04-25

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 20:57	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790382	**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**	7/19/2012 20:57	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790382	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	4.07J ± 4.71 (9.73)	dpm/sa	4.07J ± 4.71 (9.73)		dpm/sa		

7 3072158026-SU-04-26

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12492	HBN	91065
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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7 3072158026-SU-04-26

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 21:05	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790383	**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**	7/19/2012 21:05	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790383	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-3.35U ± 3.78 (9.73)	dpm/sa	-3.35U ± 3.78 (9.73)		dpm/sa		

8 3072158027-SU-04-27

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 21:13	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790384	**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**	7/19/2012 21:13	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790384	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.53U ± 4.65 (9.73)	dpm/sa	3.53U ± 4.65 (9.73)		dpm/sa		

9 3072158028-SU-04-28

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch RADC/12492 HBN 91065
Rule 9060 I LEB Status RE
Create Date 6/28/2012 Analyst RMK

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9 3072158028-SU-04-28

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790385

Batch RADC/12492
HBN 91065
Instru NONE

Prep Date 7/19/2012 21:21
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790385

Instru NONE
Col ID
File

Run Date 7/19/2012 21:21
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.99U ± 3.95 (9.73)	dpm/sa	-1.99U ± 3.95 (9.73)		dpm/sa		

10 3072158029-SU-04-29

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790386

Batch RADC/12492
HBN 91065
Instru NONE

Prep Date 7/19/2012 21:29
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790386

Instru NONE
Col ID
File

Run Date 7/19/2012 21:29
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-5.29U ± 3.54 (9.74)	dpm/sa	-5.29U ± 3.54 (9.74)		dpm/sa		

11 3072158030-SU-04-30

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch RADC/12492 HBN 91065
Rule 9060 I LEB Status RE
Create Date 6/28/2012 Analyst RMK

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11 3072158030-SU-04-30

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790387

Batch RADC/12492
HBN 91065
Instru NONE

Prep Date 7/19/2012 21:37
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790387

Instru NONE
Col ID
File

Run Date 7/19/2012 21:37
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	7.09J ± 5.09 (9.73)	dpm/sa	7.09J ± 5.09 (9.73)		dpm/sa		

12 3072158031-SU-05-1

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790388

Batch RADC/12492
HBN 91065
Instru NONE

Prep Date 7/19/2012 21:45
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790388

Instru NONE
Col ID
File

Run Date 7/19/2012 21:45
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.54U ± 3.88 (9.73)	dpm/sa	-2.54U ± 3.88 (9.73)		dpm/sa		

13 3072158032-SU-05-2

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch	RADC/12492	HBN	91065
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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13 3072158032-SU-05-2

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 21:53
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59
Schedule	2790389	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/19/2012 21:53
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790389	**File**			

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.0579U ± 4.20 (9.73)	dpm/sa	-0.0579U ± 4.20 (9.73)		dpm/sa		

14 3072158033-SU-05-3

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 22:02
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59
Schedule	2790390	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/19/2012 22:02
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790390	**File**			

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.502U ± 4.28 (9.75)	dpm/sa	0.502U ± 4.28 (9.75)		dpm/sa		

15 3072158034-SU-05-4

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch	RADC/12492	HBN	91065
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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15 3072158034-SU-05-4

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 22:10	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790391	**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**	7/19/2012 22:10	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790391	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.890U ± 4.11 (9.77)	dpm/sa	-0.890U ± 4.11 (9.77)		dpm/sa		

16 3072158035-SU-05-5

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 22:18	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790392	**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**	7/19/2012 22:18	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790392	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.0578U ± 4.20 (9.72)	dpm/sa	-0.0578U ± 4.20 (9.72)		dpm/sa		

17 3072158036-SU-05-6

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12492	HBN	91065
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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17 3072158036-SU-05-6

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 22:26	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790393	**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**	7/19/2012 22:26	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790393	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.99U ± 3.96 (9.75)	dpm/sa	-1.99U ± 3.96 (9.75)		dpm/sa		

18 3072158037-SU-05-7

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12492	**Prep Date**	7/19/2012 22:34	**Dilution**	
Method	EPA 906.0M	**HBN**	91065	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790394	**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**	7/19/2012 22:34	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790394	**File**				**CC**	OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.0588U ± 4.27 (9.89)	dpm/sa	-0.0588U ± 4.27 (9.89)		dpm/sa		

19 3072158038-SU-05-7D

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12492	HBN	91065
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	RMK

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19 3072158038-SU-05-7D

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790395

Batch RADC/12492
HBN 91065
Instru NONE

Prep Date 7/19/2012 22:42
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790395

Instru NONE
Col ID
File

Run Date 7/19/2012 22:42
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-3.95U ± 3.74 (9.81)	dpm/sa	-3.95U ± 3.74 (9.81)		dpm/sa		

20 3072158039-SU-05-8

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790396

Batch RADC/12492
HBN 91065
Instru NONE

Prep Date 7/19/2012 22:50
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790396

Instru NONE
Col ID
File

Run Date 7/19/2012 22:50
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.15U ± 4.50 (9.79)	dpm/sa	2.15U ± 4.50 (9.79)		dpm/sa		

21 3072158040-SU-05-9

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch	RADC/12492	**HBN**	91065
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	RMK

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21 3072158040-SU-05-9

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790397

Batch RADC/12492
HBN 91065
Instru NONE

Prep Date 7/19/2012 22:58
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790397

Instru NONE
Col ID
File

Run Date 7/19/2012 22:58
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL		Req. Limits Low	Req. Limits High
Rad Chemistry	OK								
LSC Low Energy Beta	OK	1.31U ± 4.37 (9.73)	dpm/sa	1.31U ± 4.37 (9.73)			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 13:51	Assigned Analyst	RMK
Batch ID	12492	Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB 9060W	HBN	91065
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
	459089	BLANK	IP		QCACCOUNT	-2.33U	4.05	10.1	7/19/12 23:22
3072158	3072158021	PS	WP	6/11/2012 0:01	RTI	1.60U	4.40	9.72	7/19/12 20:25
3072158	3072158022	PS	WP	6/11/2012 0:01	RTI	1.32U	4.40	9.79	7/19/12 20:33
3072158	3072158023	PS	WP	6/11/2012 0:01	RTI	-0.328U	4.17	9.73	7/19/12 20:41
3072158	3072158024	PS	WP	6/11/2012 0:01	RTI	-1.16U	4.06	9.73	7/19/12 20:49
3072158	3072158025	PS	WP	6/11/2012 0:01	RTI	4.07J	4.71	9.73	7/19/12 20:57
3072158	3072158026	PS	WP	6/11/2012 0:01	RTI	-3.35U	3.78	9.73	7/19/12 21:05
3072158	3072158027	PS	WP	6/11/2012 0:01	RTI	3.53U	4.65	9.73	7/19/12 21:13
3072158	3072158028	PS	WP	6/11/2012 0:01	RTI	-1.99U	3.95	9.73	7/19/12 21:21
3072158	3072158029	PS	WP	6/11/2012 0:01	RTI	-5.29U	3.54	9.74	7/19/12 21:29
3072158	3072158030	PS	WP	6/11/2012 0:01	RTI	7.09J	5.09	9.73	7/19/12 21:37
3072158	3072158031	PS	WP	6/11/2012 0:01	RTI	-2.54U	3.88	9.73	7/19/12 21:45
3072158	3072158032	PS	WP	6/11/2012 0:01	RTI	-0.0579U	4.20	9.73	7/19/12 21:53
3072158	3072158033	PS	WP	6/11/2012 0:01	RTI	0.502U	4.28	9.75	7/19/12 22:02
3072158	3072158034	PS	WP	6/11/2012 0:01	RTI	-0.890U	4.11	9.77	7/19/12 22:10
3072158	3072158035	PS	WP	6/11/2012 0:01	RTI	-0.0578U	4.20	9.72	7/19/12 22:18
3072158	3072158036	PS	WP	6/11/2012 0:01	RTI	-1.99U	3.96	9.75	7/19/12 22:26
3072158	3072158037	PS	WP	6/11/2012 0:01	RTI	-0.0588U	4.27	9.89	7/19/12 22:34
3072158	3072158038	PS	WP	6/11/2012 0:01	RTI	-3.95U	3.74	9.81	7/19/12 22:42
3072158	3072158039	PS	WP	6/11/2012 0:01	RTI	2.15U	4.50	9.79	7/19/12 22:50
3072158	3072158040	PS	WP	6/11/2012 0:01	RTI	1.31U	4.37	9.73	7/19/12 22:58

mn 7/24/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK			
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	7.03	
Batch ID	12492	**PrepSOP2**	n/a	**Bkg Duration**	30.0	min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	BKG071912	
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/19/2012 20:53	
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**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
459089	1.0	7/19/12 23:22	7.0	7/19/12 23:22	5.86	321.2	dpm/S	High, Evaluate
3072158021	1.0	6/11/12 0:01	7.0	7/19/12 20:25	7.86	269.4	dpm/S	Pass
3072158022	1.0	6/11/12 0:01	7.0	7/19/12 20:33	7.71	248.7	dpm/S	Pass
3072158023	1.0	6/11/12 0:01	7.0	7/19/12 20:41	6.86	261.6	dpm/S	Pass
3072158024	1.0	6/11/12 0:01	7.0	7/19/12 20:49	6.43	263.1	dpm/S	Pass
3072158025	1.0	6/11/12 0:01	7.0	7/19/12 20:57	9.14	267.3	dpm/S	Pass
3072158026	1.0	6/11/12 0:01	7.0	7/19/12 21:05	5.29	265.6	dpm/S	Pass
3072158027	1.0	6/11/12 0:01	7.0	7/19/12 21:13	8.86	277.5	dpm/S	Pass
3072158028	1.0	6/11/12 0:01	7.0	7/19/12 21:21	6.00	275.4	dpm/S	Pass
3072158029	1.0	6/11/12 0:01	7.0	7/19/12 21:29	4.29	279.3	dpm/S	Pass
3072158030	1.0	6/11/12 0:01	7.0	7/19/12 21:37	10.71	272.0	dpm/S	Pass
3072158031	1.0	6/11/12 0:01	7.0	7/19/12 21:45	5.71	266.4	dpm/S	Pass
3072158032	1.0	6/11/12 0:01	7.0	7/19/12 21:53	7.00	278.4	dpm/S	Pass
3072158033	1.0	6/11/12 0:01	7.0	7/19/12 22:02	7.29	282.5	dpm/S	Pass
3072158034	1.0	6/11/12 0:01	7.0	7/19/12 22:10	6.57	287.9	dpm/S	Pass
3072158035	1.0	6/11/12 0:01	7.0	7/19/12 22:18	7.00	269.2	dpm/S	Pass
3072158036	1.0	6/11/12 0:01	7.0	7/19/12 22:26	6.00	283.2	dpm/S	Pass
3072158037	1.0	6/11/12 0:01	7.0	7/19/12 22:34	7.00	303.3	dpm/S	Pass
3072158038	1.0	6/11/12 0:01	7.0	7/19/12 22:42	5.00	294.7	dpm/S	Pass
3072158039	1.0	6/11/12 0:01	7.0	7/19/12 22:50	8.14	292.0	dpm/S	Pass
3072158040	1.0	6/11/12 0:01	7.0	7/19/12 22:58	7.71	276.8	dpm/S	Pass

MM 7/24/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK
Matrix	Smear	**PrepSOP1**	0
Batch ID	12492	**PrepSOP2**	n/a
Prep Start	7/16/2012 12:00	**AnalSOP1**	0
Prep Finish	7/16/2012	**AnalSOP2**	n/a

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

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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
459089	0.5020	0.0000	1.0000	-2.331	4.041	4.051	10.054	3.658	1.020	4.041	1.00
3072158021	0.5221	0.1064	0.9941	1.599	4.400	4.404	9.725	3.538	0.986	4.400	1.00
3072158022	0.5186	0.1064	0.9941	1.319	4.394	4.397	9.791	3.562	0.993	4.394	1.00
3072158023	0.5215	0.1064	0.9941	-0.328	4.166	4.166	9.735	3.542	0.987	4.166	1.00
3072158024	0.5217	0.1064	0.9941	-1.157	4.058	4.060	9.732	3.541	0.987	4.058	1.00
3072158025	0.5220	0.1064	0.9941	4.066	4.687	4.712	9.726	3.539	0.986	4.687	1.00
3072158026	0.5219	0.1064	0.9941	-3.354	3.759	3.780	9.728	3.539	0.987	3.759	1.00
3072158027	0.5217	0.1065	0.9941	3.529	4.629	4.648	9.732	3.541	0.987	4.629	1.00
3072158028	0.5219	0.1065	0.9941	-1.985	3.947	3.954	9.729	3.540	0.987	3.947	1.00
3072158029	0.5214	0.1065	0.9941	-5.286	3.480	3.537	9.737	3.543	0.988	3.480	1.00
3072158030	0.5221	0.1065	0.9941	7.091	5.017	5.087	9.725	3.538	0.986	5.017	1.00
3072158031	0.5220	0.1065	0.9941	-2.544	3.871	3.883	9.727	3.539	0.987	3.871	1.00
3072158032	0.5216	0.1065	0.9941	-0.058	4.200	4.200	9.734	3.542	0.987	4.200	1.00
3072158033	0.5209	0.1065	0.9941	0.502	4.275	4.276	9.747	3.546	0.989	4.275	1.00
3072158034	0.5196	0.1066	0.9941	-0.890	4.109	4.111	9.770	3.555	0.991	4.109	1.00
3072158035	0.5221	0.1066	0.9941	-0.058	4.196	4.196	9.725	3.538	0.986	4.196	1.00
3072158036	0.5208	0.1066	0.9941	-1.990	3.955	3.963	9.749	3.547	0.989	3.955	1.00
3072158037	0.5136	0.1066	0.9941	-0.059	4.265	4.265	9.886	3.597	1.003	4.265	1.00
3072158038	0.5174	0.1066	0.9941	-3.947	3.711	3.741	9.812	3.570	0.995	3.711	1.00
3072158039	0.5184	0.1066	0.9941	2.154	4.496	4.503	9.794	3.564	0.993	4.496	1.00
3072158040	0.5217	0.1067	0.9941	1.311	4.368	4.370	9.731	3.541	0.987	4.368	1.00

7/24/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/31/2012	**Method:**	EPA 906.0M
Worklist:	12492	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459089

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-2.3310	4.0510	10.0540	3.65800		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/20/12 15:36	7/20/12 15:44				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.938	1184.938				
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):	99.851	106.619				
1.96 Sigma Unc:	16.200	17.178				
% Recovery:	84.27%	89.98%				
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 I.D.:	LCS12492					
Duplicate Sample I.D.	LCSD12492					
Sample Result (DPM/Sample, g, F):	99.8510					
1.96 Sigma Unc:	16.2000					
ple Duplicate Result (DPM/Sample, g, F):	106.6190					
Duplicate Sample 1.96 Sigma Unc.	17.1780					
Either results below MDC?	NO					
Relative Percent Difference:	6.56%					
Assessment:	Pass					
% RPD Limit:	25.00%					

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

Sample Matrix Spike Control Assessment

Analyte:			
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:			

Comments:

7/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12492

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	**Maximum**	**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

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	3.77	7.03	7.03	301.65	2

BKG 071912

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			7/19/2012 20:32
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
1	7	7/19/2012 20:25	3072158021
2	15	7/19/2012 20:33	3072158022
3	23	7/19/2012 20:41	3072158023
4	31	7/19/2012 20:49	3072158024
5	39	7/19/2012 20:57	3072158025
6	47	7/19/2012 21:05	3072158026
7	55	7/19/2012 21:13	3072158027
8	63	7/19/2012 21:21	3072158028
9	71	7/19/2012 21:29	3072158029
10	79	7/19/2012 21:37	3072158030
11	87	7/19/2012 21:45	3072158031
12	95	7/19/2012 21:53	3072158032
13	104	7/19/2012 22:02	3072158033
14	112	7/19/2012 22:10	3072158034
15	120	7/19/2012 22:18	3072158035
16	128	7/19/2012 22:26	3072158036
17	136	7/19/2012 22:34	3072158037
18	144	7/19/2012 22:42	3072158038
19	152	7/19/2012 22:50	3072158039
20	160	7/19/2012 22:58	3072158040
21	168	7/19/2012 23:06	LCS
22	176	7/19/2012 23:14	LCSD
23	184	7/19/2012 23:22	459089
24	192	7/19/2012 23:30	3072158041
25	200	7/19/2012 23:38	3072158042
26	208	7/19/2012 23:46	3072158043
27	216	7/19/2012 23:54	3072158044
28	224	7/20/2012 0:02	3072158045
29	232	7/20/2012 0:10	3072158046
30	240	7/20/2012 0:18	3072158047
31	248	7/20/2012 0:26	3072158048
32	256	7/20/2012 0:34	3072158049
33	264	7/20/2012 0:42	3072158050
34	272	7/20/2012 0:50	3072158051
35	280	7/20/2012 0:58	3072158052
36	288	7/20/2012 1:06	3072158053
37	296	7/20/2012 1:14	3072158054
38	304	7/20/2012 1:22	3072158055
39	312	7/20/2012 1:30	3072158056
40	320	7/20/2012 1:38	3072158057
41	336	7/20/2012 1:54	3072158058
42	344	7/20/2012 2:02	3072158059
43	352	7/20/2012 2:10	3072158060
44	360	7/20/2012 2:18	LCS
45	367	7/20/2012 2:25	LCSD
46	375	7/20/2012 2:33	459090

7/24/12

Protocol #: 3 SWIPE_H3_C14 User :

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
3	1	7.00	7	3.00	7.71	7.86	269.42	3
3	2	7.00	15	3.86	7.57	7.71	248.73	4
3	3	7.00	23	3.71	7.14	6.86	261.64	5
3	4	7.00	31	3.71	6.43	6.43	263.11	2
3	5	7.00	39	6.00	9.00	9.14	267.25	1
3	6	7.00	47	3.71	5.43	5.29	265.60	4
3	7	7.00	55	5.71	8.86	8.86	277.45	4
3	8	7.00	63	2.43	6.14	6.00	275.36	4
3	9	7.00	71	2.29	4.71	4.29	279.31	6
3	10	7.00	79	5.86	10.57	10.71	272.02	2
3	11	7.00	87	2.57	6.00	5.71	266.40	3
3	12	7.00	95	3.86	7.00	7.00	278.35	3
3	13	7.00	104	3.71	7.29	7.29	282.53	2
3	14	7.00	112	3.57	6.71	6.57	287.92	3
3	15	7.00	120	4.86	7.00	7.00	269.19	2
3	16	7.00	128	3.43	6.14	6.00	283.19	3
3	17	7.00	136	3.57	7.00	7.00	303.34	2
3	18	7.00	144	2.57	5.14	5.00	294.69	3
3	19	7.00	152	4.14	8.29	8.14	292.04	2
3	20	7.00	160	5.14	7.71	7.71	276.81	2
3	21	6.83	168	621.38	626.21	644.36	284.64	0
3	22	6.96	176	598.13	603.30	630.03	321.90	0
3	23	7.00	184	3.14	6.14	5.86	321.16	3
3	24	7.00	192	2.57	6.29	6.14	279.58	3
3	25	7.00	200	5.14	9.00	8.86	305.19	2
3	26	7.00	208	3.86	7.29	7.14	297.39	2
3	27	7.00	216	5.86	10.29	10.29	273.39	1
3	28	7.00	224	4.43	7.43	7.29	259.60	2
3	29	7.00	232	3.00	6.14	6.29	301.25	2
3	30	7.00	240	4.43	8.00	8.29	298.09	2
3	31	7.00	248	2.86	5.00	4.71	279.96	3
3	32	7.00	256	3.14	6.00	5.86	275.11	3
3	33	7.00	264	4.29	7.57	7.57	271.59	2
3	34	7.00	272	2.57	6.86	6.71	286.68	3
3	35	7.00	280	3.43	5.86	5.71	267.24	4
3	36	7.00	288	4.86	8.57	8.57	281.29	2
3	37	7.00	296	4.29	6.86	6.71	280.13	1
3	38	7.00	304	4.57	7.14	7.14	289.70	3
3	39	7.00	312	1.86	4.57	4.43	284.88	4

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P#	S#	TIME	ELTIME	CPMA	CPMB	CPMC	tSIE	LUM
3	40	7.00	320	3.86	6.71	6.57	281.59	4
3	41	7.00	336	2.71	4.71	4.71	317.77	1
3	42	7.00	344	5.00	7.86	7.71	294.32	1
3	43	7.00	352	3.14	6.14	6.00	283.71	4
3	44	7.00	360	601.57	605.43	626.57	303.51	0
3	45	6.34	367	664.35	670.19	693.38	317.93	0
3	46	7.00	375	3.29	6.14	6.00	335.13	4

7/24/12

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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
LCSD	12491	Swipe-143_C14	15	7	7/19/12 1500	7	NA	JLK
MB (459084)	↓	↓	↓	↓	↓	↓	↓	↓
3072158021	12492	Swipe-143_C14	9	3	↓	7	NA	JLK
22	↓	↓	↓	↓	↓	↓	↓	↓
23								
24								
25								
26								
27								
28								
29								
30								
31								
32			↓					
33			32					
34			↓					
35								
36								
37								
38								
39								
40								
LCS								
LCSD	↓	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

Pace Analytical

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
MB (459089)	12492	Swipe_H3_C14	32	3	7/19/12 1500	7	NA	JLK
3072158041	12493		↓					
42			39					
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53			↓					
54			34					
55								
56								
57								
58								
59								
60								
LCS								
LCSD								
MB (459090)	↓	↓	↓	↓	↓	↓	↓	↓

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

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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
LCS12489	1.0	7/20/12 14:48	7.0	7/20/12 14:48	59.71	328.5	dpm/S	High, Evaluate
LCSD12489	1.0	7/20/12 14:56	7.0	7/20/12 14:56	65.57	318.3	dpm/S	High, Evaluate
LCS12490	1.0	7/20/12 15:04	7.0	7/20/12 15:04	57.43	329.3	dpm/S	High, Evaluate
LCSD12490	1.0	7/20/12 15:12	7.0	7/20/12 15:12	59.14	327.2	dpm/S	High, Evaluate
LCS12491	1.0	7/20/12 15:20	7.0	7/20/12 15:20	55.43	309.2	dpm/S	Pass
LCSD12491	1.0	7/20/12 15:28	7.0	7/20/12 15:28	58.00	317.4	dpm/S	High, Evaluate
LCS12492	1.0	7/20/12 15:36	7.0	7/20/12 15:36	58.43	268.8	dpm/S	Pass
LCSD12492	1.0	7/20/12 15:44	7.0	7/20/12 15:44	59.86	320.7	dpm/S	High, Evaluate
LCS12493	1.0	7/20/12 15:52	7.0	7/20/12 15:52	56.29	311.8	dpm/S	Pass
LCSD12493	1.0	7/20/12 16:00	7.0	7/20/12 16:00	61.71	319.8	dpm/S	High, Evaluate
LCS12494	1.0	7/20/12 16:08	7.0	7/20/12 16:08	59.14	314.9	dpm/S	High, Evaluate
LCSD12494	1.0	7/20/12 16:16	7.0	7/20/12 16:16	58.57	328.3	dpm/S	High, Evaluate

7/24/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

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

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

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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
LCS12489	0.4958	0.0000	1.0000	107.723	11.687	17.368	9.678	3.506	1.032	11.687	1.00
LCSD12489	0.5042	0.0000	1.0000	117.548	12.030	18.474	9.517	3.448	1.015	12.030	1.00
LCS12490	0.4951	0.0000	1.0000	103.270	11.483	16.840	9.692	3.511	1.034	11.483	1.00
LCSD12490	0.4970	0.0000	1.0000	106.321	11.605	17.190	9.655	3.498	1.030	11.605	1.00
LCS12491	0.5103	0.0000	1.0000	96.271	10.950	15.866	9.403	3.406	1.003	10.950	1.00
LCSD12491	0.5048	0.0000	1.0000	102.409	11.316	16.651	9.505	3.443	1.014	11.316	1.00
LCS12492	0.5221	0.0000	1.0000	99.851	10.982	16.200	9.191	3.330	0.981	10.982	1.00
LCSD12492	0.5023	0.0000	1.0000	106.619	11.549	17.178	9.552	3.461	1.019	11.549	1.00
LCS12493	0.5087	0.0000	1.0000	98.267	11.067	16.120	9.433	3.417	1.006	11.067	1.00
LCSD12493	0.5030	0.0000	1.0000	110.151	11.706	17.596	9.539	3.456	1.018	11.706	1.00
LCS12494	0.5066	0.0000	1.0000	104.297	11.384	16.862	9.471	3.431	1.010	11.384	1.00
LCSD12494	0.4960	0.0000	1.0000	105.383	11.573	17.086	9.674	3.505	1.032	11.573	1.00

m 7/24/12

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	**Maximum**	**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

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

DR 7/24/12

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 14:55
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
2	7	7/20/2012 14:48	LCS12489
3	15	7/20/2012 14:56	LCSD12489
4	23	7/20/2012 15:04	LCS12490
5	31	7/20/2012 15:12	LCSD12490
6	39	7/20/2012 15:20	LCS12491
7	47	7/20/2012 15:28	LCSD12491
8	55	7/20/2012 15:36	LCS12492
9	63	7/20/2012 15:44	LCSD12492
10	71	7/20/2012 15:52	LCS12493
11	79	7/20/2012 16:00	LCSD12493
12	87	7/20/2012 16:08	LCS12494
13	95	7/20/2012 16:16	LCSD12494

7/24/12

Protocol #: 7 SWIPE_H3_C14 User :

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

7/24/12

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 MISSING TUBE(S)								
7	2	7.00	7	46.29	59.71	59.71	328.50	1
7	3	7.00	15	47.29	64.86	65.57	318.26	0
7	4	7.00	23	41.86	56.71	57.43	329.27	0
7	5	7.00	31	41.00	58.71	59.14	327.18	1
7	6	7.00	39	39.29	55.00	55.43	309.17	1
7	7	7.00	47	41.29	57.43	58.00	317.42	0
7	8	7.00	55	39.71	58.43	58.43	268.79	1
7	9	7.00	63	42.57	59.43	59.86	320.72	1
7	10	7.00	71	41.86	56.00	56.29	311.77	0
7	11	7.00	79	45.43	61.14	61.71	319.83	0
7	12	7.00	87	43.71	59.00	59.14	314.90	0
7	13	7.00	95	44.43	58.00	58.57	328.29	1

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
30721600 18	12502	Swipe_H3_C14	9	20	7/20/12 0900	7	NA	JL
19								
20								
LCS 12502								
LCSD 12502								
LCS 12476	12476	Swipe_H3_C14	18	7	7/20/12 0950	7	NA	RMK
LCSD 12476								
LCS 12477	12477							
LCSD 12477								
LCS 12478	12478							
LCSD 12478								
LCS 12479	12479							
LCSD 12479								
LCS 12480	12480		6					
LCSD 12480								
LCS 12486	12486							
LCSD 12486								
LCS 12487	12487							
LCSD 12487								
LCS 12488	12488							
LCSD 12488								
LCS 12489	12489	Swipe_H3_C14	11	7	7/20/12 1130	7	NA	RMK
LCSD 12489								
LCS 12490	12490							

Run comments: _____

Peer Review: _____

Liquid Scintillation Runlog (R023-3 7Oct2010).XLS

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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
LCSD 12490	12490	Swipe-H3_C14	11	7	7/20/12 1130	7	NA	RMK
LCS 12491	12491	↓	↓	↓	↓	↓	↓	↓
LCSD 12491	↓							
LCS 12492	12492							
LCSD 12492	↓							
LCS 12493	12493							
LCSD 12493	↓							
LCS 12494	12494							
LCSD 12494	↓							

7/21/12

Run comments: _____

Peer Review: _____

Low Energy Beta Sample Analysis Data

7/22/12

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

1 459090-BLANK for HBN 91066 [RADC/1249

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12493 **Prep Date** 7/20/2012 02:33 **Dilution**
Method EPA 906.0M **HBN** 91066 **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796223 **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** 7/20/2012 02:33 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796223 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-2.10U ± 4.19 (10.3)	dpm/sa	-2.10U ± 4.19 (10.3)			dpm/sa

2 3072158041-SU-05-10

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12493 **Prep Date** 7/19/2012 23:30 **Dilution**
Method EPA 906.0M **HBN** 91066 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790398 **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** 7/19/2012 23:30 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790398 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.72U ± 3.99 (9.74)	dpm/sa	-1.72U ± 3.99 (9.74)			dpm/sa	

3 3072158042-SU-05-11

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

3 3072158042-SU-05-11

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790399

Batch RADC/12493
HBN 91066
Instru NONE

Prep Date 7/19/2012 23:38
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK **

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790399

Instru NONE
Col ID
File

Run Date 7/19/2012 23:38
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.59U ± 4.73 (9.90)	dpm/sa	3.59U ± 4.73 (9.90)		dpm/sa		

4 3072158043-SU-05-11D

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790400

Batch RADC/12493
HBN 91066
Instru NONE

Prep Date 7/19/2012 23:46
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790400

Instru NONE
Col ID
File

Run Date 7/19/2012 23:46
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.214U ± 4.28 (9.83)	dpm/sa	0.214U ± 4.28 (9.83)		dpm/sa		

5 3072158044-SU-05-12

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

5 3072158044-SU-05-12

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790401

Batch RADC/12493
HBN 91066
Instru NONE

Prep Date 7/19/2012 23:54
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790401

Instru NONE
Col ID
File

Run Date 7/19/2012 23:54
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	6.28J ± 4.99 (9.73)	dpm/sa	6.28J ± 4.99 (9.73)		dpm/sa		

6 3072158045-SU-05-13

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790402

Batch RADC/12493
HBN 91066
Instru NONE

Prep Date 7/20/2012 00:02
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790402

Instru NONE
Col ID
File

Run Date 7/20/2012 00:02
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.502U ± 4.27 (9.74)	dpm/sa	0.502U ± 4.27 (9.74)		dpm/sa		

7 3072158046-SU-05-14

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

7 3072158046-SU-05-14

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12493	**Prep Date**	7/20/2012 00:10	**Dilution**
Method	EPA 906.0M		**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790403		**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**	7/20/2012 00:10	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790403		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.45U ± 4.08 (9.87)	dpm/sa	-1.45U ± 4.08 (9.87)		dpm/sa		

8 3072158047-SU-05-15

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12493	**Prep Date**	7/20/2012 00:18	**Dilution**
Method	EPA 906.0M		**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790404		**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**	7/20/2012 00:18	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790404		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.46U ± 4.56 (9.84)	dpm/sa	2.46U ± 4.56 (9.84)		dpm/sa		

9 3072158048-SU-05-16

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

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

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

9 3072158048-SU-05-16

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 00:26	**Dilution**	
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790405	**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**	7/20/2012 00:26	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790405	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-4.48U ± 3.64 (9.74)	dpm/sa	-4.48U ± 3.64 (9.74)		dpm/sa		

10 3072158049-SU-05-17

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 00:34	**Dilution**	
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790406	**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**	7/20/2012 00:34	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790406	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.26U ± 3.92 (9.73)	dpm/sa	-2.26U ± 3.92 (9.73)		dpm/sa		

11 3072158050-SU-05-18

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

11 3072158050-SU-05-18

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790407

Batch RADC/12493
HBN 91066
Instru NONE

Prep Date 7/20/2012 00:42
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790407

Instru NONE
Col ID
File

Run Date 7/20/2012 00:42
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.04U ± 4.33 (9.73)	dpm/sa	1.04U ± 4.33 (9.73)		dpm/sa		

12 3072158051-SU-05-19

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790408

Batch RADC/12493
HBN 91066
Instru NONE

Prep Date 7/20/2012 00:50
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790408

Instru NONE
Col ID
File

Run Date 7/20/2012 00:50
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.619U ± 4.14 (9.76)	dpm/sa	-0.619U ± 4.14 (9.76)		dpm/sa		

13 3072158052-SU-05-20

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

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13 3072158052-SU-05-20

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12493	**Prep Date**	7/20/2012 00:58	**Dilution**
Method	EPA 906.0M		**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790409		**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**	7/20/2012 00:58	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790409		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.54U ± 3.88 (9.73)	dpm/sa	-2.54U ± 3.88 (9.73)		dpm/sa		

14 3072158053-SU-05-21

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12493	**Prep Date**	7/20/2012 01:06	**Dilution**
Method	EPA 906.0M		**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790410		**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**	7/20/2012 01:06	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790410		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.97U ± 4.58 (9.74)	dpm/sa	2.97U ± 4.58 (9.74)		dpm/sa		

15 3072158054-SU-05-22

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

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

Quality Control Review

Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

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15 3072158054-SU-05-22

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 01:14	**Dilution**	
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790411	**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**	7/20/2012 01:14	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790411	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.617U ± 4.13 (9.74)	dpm/sa	-0.617U ± 4.13 (9.74)		dpm/sa		

16 3072158055-SU-05-23

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 01:22	**Dilution**	
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790412	**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**	7/20/2012 01:22	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790412	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.213U ± 4.25 (9.78)	dpm/sa	0.213U ± 4.25 (9.78)		dpm/sa		

17 3072158056-SU-05-24

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

17 3072158056-SU-05-24

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 01:30
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59
Schedule	2790413	**Instru**	NONE		

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

Dilution
Analyst RMK
CC OK *

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/20/2012 01:30
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790413	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-5.03U ± 3.58 (9.76)	dpm/sa	-5.03U ± 3.58 (9.76)		dpm/sa		

18 3072158057-SU-05-25

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 01:38
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59
Schedule	2790414	**Instru**	NONE		

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

Dilution
Analyst RMK
CC OK *

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/20/2012 01:38
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790414	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.888U ± 4.10 (9.74)	dpm/sa	-0.888U ± 4.10 (9.74)		dpm/sa		

19 3072158058-SU-05-26

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

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Batch	RADC/12493	HBN	91066
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

19 3072158058-SU-05-26

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 01:54	**Dilution**	
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790415	**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**	7/20/2012 01:54	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790415	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-4.63U ± 3.76 (10.1)	dpm/sa	-4.63U ± 3.76 (10.1)		dpm/sa		

20 3072158059-SU-05-27

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12493	**Prep Date**	7/20/2012 02:02	**Dilution**	
Method	EPA 906.0M	**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790416	**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**	7/20/2012 02:02	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790416	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits 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		

21 3072158060-SU-05-28

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12493	**HBN**	91066
Rule	9060 I LEB	**Status**	WP
Create Date	6/28/2012	**Analyst**	RMK

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21 3072158060-SU-05-28

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12493	**Prep Date**	7/20/2012 02:10	**Dilution**
Method	EPA 906.0M		**HBN**	91066	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790417		**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**	7/20/2012 02:10	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790417		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.99U ± 3.96 (9.75)	dpm/sa	-1.99U ± 3.96 (9.75)		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 13:51		Assigned Analyst	RMK	
Batch ID	12493		Earliest Due Date	07/04/2012 07:12	
A-code	9060 I LEB	9060W	HBN	91066	
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
	459090	BLANK	IP		QCACCOUNT	-2.10U	4.19	10.3	7/20/12 2:33
3072158	3072158041	PS	WP	6/11/2012 0:01	RTI	-1.72U	3.99	9.74	7/19/12 23:30
3072158	3072158042	PS	WP	6/11/2012 0:01	RTI	3.59U	4.73	9.90	7/19/12 23:38
3072158	3072158043	PS	WP	6/11/2012 0:01	RTI	0.214U	4.28	9.83	7/19/12 23:46
3072158	3072158044	PS	WP	6/11/2012 0:01	RTI	6.28J	4.99	9.73	7/19/12 23:54
3072158	3072158045	PS	WP	6/11/2012 0:01	RTI	0.502U	4.27	9.74	7/20/12 0:02
3072158	3072158046	PS	WP	6/11/2012 0:01	RTI	-1.45U	4.08	9.87	7/20/12 0:10
3072158	3072158047	PS	WP	6/11/2012 0:01	RTI	2.46U	4.56	9.84	7/20/12 0:18
3072158	3072158048	PS	WP	6/11/2012 0:01	RTI	-4.48U	3.64	9.74	7/20/12 0:26
3072158	3072158049	PS	WP	6/11/2012 0:01	RTI	-2.26U	3.92	9.73	7/20/12 0:34
3072158	3072158050	PS	WP	6/11/2012 0:01	RTI	1.04U	4.33	9.73	7/20/12 0:42
3072158	3072158051	PS	WP	6/11/2012 0:01	RTI	-0.619U	4.14	9.76	7/20/12 0:50
3072158	3072158052	PS	WP	6/11/2012 0:01	RTI	-2.54U	3.88	9.73	7/20/12 0:58
3072158	3072158053	PS	WP	6/11/2012 0:01	RTI	2.97U	4.58	9.74	7/20/12 1:06
3072158	3072158054	PS	WP	6/11/2012 0:01	RTI	-0.617U	4.13	9.74	7/20/12 1:14
3072158	3072158055	PS	WP	6/11/2012 0:01	RTI	0.213U	4.25	9.78	7/20/12 1:22
3072158	3072158056	PS	WP	6/11/2012 0:01	RTI	-5.03U	3.58	9.76	7/20/12 1:30
3072158	3072158057	PS	WP	6/11/2012 0:01	RTI	-0.888U	4.10	9.74	7/20/12 1:38
3072158	3072158058	PS	WP	6/11/2012 0:01	RTI	-4.63U	3.76	10.1	7/20/12 1:54
3072158	3072158059	PS	WP	6/11/2012 0:01	RTI	1.32U	4.41	9.81	7/20/12 2:02
3072158	3072158060	PS	WP	6/11/2012 0:01	RTI	-1.99U	3.96	9.75	7/20/12 2:10

7/22/12 7/23/12

LIMS Load
Printed 7/22/2012 at 12:03 PM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK			
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	7.03	
Batch ID	12493	**PrepSOP2**	n/a	**Bkg Duration**	30.0	min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	BKG071912	
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/19/2012 20:53	
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**Instrument ID:**	System #3	

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Sample	Analysis Volume (Sample)	Ref. Date	Count Duration (min)	Count Start Date/Time	Sample Gross CPM	TSIE #	Activity Report Units	TSIE Within Quench Curve
459090	1.0	7/20/12 2:33	7.0	7/20/12 2:33	6.00	335.1	dpm/S	High, Evaluate
3072158041	1.0	6/11/12 0:01	7.0	7/19/12 23:30	6.14	279.6	dpm/S	Pass
3072158042	1.0	6/11/12 0:01	7.0	7/19/12 23:38	8.86	305.2	dpm/S	Pass
3072158043	1.0	6/11/12 0:01	7.0	7/19/12 23:46	7.14	297.4	dpm/S	Pass
3072158044	1.0	6/11/12 0:01	7.0	7/19/12 23:54	10.29	273.4	dpm/S	Pass
3072158045	1.0	6/11/12 0:01	7.0	7/20/12 0:02	7.29	259.6	dpm/S	Pass
3072158046	1.0	6/11/12 0:01	7.0	7/20/12 0:10	6.29	301.3	dpm/S	Pass
3072158047	1.0	6/11/12 0:01	7.0	7/20/12 0:18	8.29	298.1	dpm/S	Pass
3072158048	1.0	6/11/12 0:01	7.0	7/20/12 0:26	4.71	280.0	dpm/S	Pass
3072158049	1.0	6/11/12 0:01	7.0	7/20/12 0:34	5.86	275.1	dpm/S	Pass
3072158050	1.0	6/11/12 0:01	7.0	7/20/12 0:42	7.57	271.6	dpm/S	Pass
3072158051	1.0	6/11/12 0:01	7.0	7/20/12 0:50	6.71	286.7	dpm/S	Pass
3072158052	1.0	6/11/12 0:01	7.0	7/20/12 0:58	5.71	267.2	dpm/S	Pass
3072158053	1.0	6/11/12 0:01	7.0	7/20/12 1:06	8.57	281.3	dpm/S	Pass
3072158054	1.0	6/11/12 0:01	7.0	7/20/12 1:14	6.71	280.1	dpm/S	Pass
3072158055	1.0	6/11/12 0:01	7.0	7/20/12 1:22	7.14	289.7	dpm/S	Pass
3072158056	1.0	6/11/12 0:01	7.0	7/20/12 1:30	4.43	284.9	dpm/S	Pass
3072158057	1.0	6/11/12 0:01	7.0	7/20/12 1:38	6.57	281.6	dpm/S	Pass
3072158058	1.0	6/11/12 0:01	7.0	7/20/12 1:54	4.71	317.8	dpm/S	High, Evaluate
3072158059	1.0	6/11/12 0:01	7.0	7/20/12 2:02	7.71	294.3	dpm/S	Pass
3072158060	1.0	6/11/12 0:01	7.0	7/20/12 2:10	6.00	283.7	dpm/S	Pass

7/22/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK
Matrix	Smear	**PrepSOP1**	0
Batch ID	12493	**PrepSOP2**	n/a
Prep Start	7/16/2012 12:00	**AnalSOP1**	0
Prep Finish	7/16/2012	**AnalSOP2**	n/a

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

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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
459090	0.4895	0.0000	1.0000	-2.104	4.183	4.191	10.311	3.751	1.046	4.183	1.00
3072158041	0.5214	0.1067	0.9941	-1.717	3.987	3.992	9.738	3.543	0.988	3.987	1.00
3072158042	0.5126	0.1067	0.9941	3.591	4.711	4.730	9.905	3.604	1.005	4.711	1.00
3072158043	0.5164	0.1067	0.9941	0.214	4.277	4.277	9.833	3.578	0.997	4.277	1.00
3072158044	0.5220	0.1068	0.9941	6.282	4.931	4.988	9.726	3.539	0.986	4.931	1.00
3072158045	0.5212	0.1068	0.9941	0.502	4.273	4.273	9.741	3.544	0.988	4.273	1.00
3072158046	0.5146	0.1068	0.9941	-1.447	4.078	4.082	9.866	3.590	1.001	4.078	1.00
3072158047	0.5161	0.1068	0.9941	2.456	4.551	4.560	9.838	3.580	0.998	4.551	1.00
3072158048	0.5213	0.1068	0.9941	-4.477	3.602	3.642	9.739	3.543	0.988	3.602	1.00
3072158049	0.5219	0.1068	0.9941	-2.255	3.911	3.920	9.728	3.540	0.987	3.911	1.00
3072158050	0.5221	0.1069	0.9941	1.041	4.332	4.334	9.725	3.538	0.986	4.332	1.00
3072158051	0.5200	0.1069	0.9941	-0.619	4.142	4.142	9.764	3.553	0.990	4.142	1.00
3072158052	0.5220	0.1069	0.9941	-2.544	3.870	3.882	9.726	3.539	0.986	3.870	1.00
3072158053	0.5211	0.1069	0.9941	2.973	4.570	4.583	9.743	3.545	0.988	4.570	1.00
3072158054	0.5213	0.1069	0.9941	-0.617	4.131	4.132	9.739	3.544	0.988	4.131	1.00
3072158055	0.5191	0.1069	0.9941	0.213	4.254	4.254	9.780	3.558	0.992	4.254	1.00
3072158056	0.5204	0.1069	0.9941	-5.026	3.528	3.579	9.756	3.550	0.990	3.528	1.00
3072158057	0.5211	0.1070	0.9941	-0.888	4.098	4.099	9.744	3.545	0.988	4.098	1.00
3072158058	0.5046	0.1070	0.9941	-4.625	3.722	3.763	10.062	3.661	1.021	3.722	1.00
3072158059	0.5176	0.1070	0.9941	1.322	4.403	4.406	9.810	3.569	0.995	4.403	1.00
3072158060	0.5207	0.1070	0.9941	-1.990	3.956	3.963	9.752	3.548	0.989	3.956	1.00

7/22/12 7/23/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK				
Date:	7/21/2012	**Method:**	EPA 906.0M		
Worklist:	12493	**SOP:**			
Matrix:	Filter	**MB Sample ID:**	459090		

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-2.1040	4.1910	10.3110	3.75100		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/20/12 15:52	7/20/12 16:00				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.937	1184.937				
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)	98.267	110.151				
1.96 Sigma Unc:	16.120	17.596				
% Recovery:	82.93%	92.96%				
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 I.D.:	LCS12493					
Duplicate Sample I.D.	LCSD12493					
Sample Result (DPM/Sample, g, F):	98.2670					
1.96 Sigma Unc:	16.1200					
ple Duplicate Result (DPM/Sample, g, F):	110.1510					
Duplicate Sample 1.96 Sigma Unc.	17.5960					
Either results below MDC?	NO					
Relative Percent Difference:	11.40%					
Assessment:	Pass					
% RPD Limit:	25.00%					

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

Sample Matrix Spike Control Assessment

Analyte:			
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:			

Comments:

7/22/12 7/23/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12493

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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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

7/23/12

Low Energy Beta CSU Derivation

CSU Analysis for Preparation

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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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	**Maximum**	**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

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%

7/23/12

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	3.77	7.03	7.03	301.65	2

BKG 071912

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		7/19/2012 20:32
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
1	7	7/19/2012 20:25	3072158021
2	15	7/19/2012 20:33	3072158022
3	23	7/19/2012 20:41	3072158023
4	31	7/19/2012 20:49	3072158024
5	39	7/19/2012 20:57	3072158025
6	47	7/19/2012 21:05	3072158026
7	55	7/19/2012 21:13	3072158027
8	63	7/19/2012 21:21	3072158028
9	71	7/19/2012 21:29	3072158029
10	79	7/19/2012 21:37	3072158030
11	87	7/19/2012 21:45	3072158031
12	95	7/19/2012 21:53	3072158032
13	104	7/19/2012 22:02	3072158033
14	112	7/19/2012 22:10	3072158034
15	120	7/19/2012 22:18	3072158035
16	128	7/19/2012 22:26	3072158036
17	136	7/19/2012 22:34	3072158037
18	144	7/19/2012 22:42	3072158038
19	152	7/19/2012 22:50	3072158039
20	160	7/19/2012 22:58	3072158040
21	168	7/19/2012 23:06	LCS
22	176	7/19/2012 23:14	LCSD
23	184	7/19/2012 23:22	459089
24	192	7/19/2012 23:30	3072158041
25	200	7/19/2012 23:38	3072158042
26	208	7/19/2012 23:46	3072158043
27	216	7/19/2012 23:54	3072158044
28	224	7/20/2012 0:02	3072158045
29	232	7/20/2012 0:10	3072158046
30	240	7/20/2012 0:18	3072158047
31	248	7/20/2012 0:26	3072158048
32	256	7/20/2012 0:34	3072158049
33	264	7/20/2012 0:42	3072158050
34	272	7/20/2012 0:50	3072158051
35	280	7/20/2012 0:58	3072158052
36	288	7/20/2012 1:06	3072158053
37	296	7/20/2012 1:14	3072158054
38	304	7/20/2012 1:22	3072158055
39	312	7/20/2012 1:30	3072158056
40	320	7/20/2012 1:38	3072158057
41	336	7/20/2012 1:54	3072158058
42	344	7/20/2012 2:02	3072158059
43	352	7/20/2012 2:10	3072158060
44	360	7/20/2012 2:18	LCS
45	367	7/20/2012 2:25	LCSD
46	375	7/20/2012 2:33	459090

Protocol #: 3 SWIPE_H3_C14 User :

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
3	1	7.00	7	3.00	7.71	7.86	269.42	3
3	2	7.00	15	3.86	7.57	7.71	248.73	4
3	3	7.00	23	3.71	7.14	6.86	261.64	5
3	4	7.00	31	3.71	6.43	6.43	263.11	2
3	5	7.00	39	6.00	9.00	9.14	267.25	1
3	6	7.00	47	3.71	5.43	5.29	265.60	4
3	7	7.00	55	5.71	8.86	8.86	277.45	4
3	8	7.00	63	2.43	6.14	6.00	275.36	4
3	9	7.00	71	2.29	4.71	4.29	279.31	6
3	10	7.00	79	5.86	10.57	10.71	272.02	2
3	11	7.00	87	2.57	6.00	5.71	266.40	3
3	12	7.00	95	3.86	7.00	7.00	278.35	3
3	13	7.00	104	3.71	7.29	7.29	282.53	2
3	14	7.00	112	3.57	6.71	6.57	287.92	3
3	15	7.00	120	4.86	7.00	7.00	269.19	2
3	16	7.00	128	3.43	6.14	6.00	283.19	3
3	17	7.00	136	3.57	7.00	7.00	303.34	2
3	18	7.00	144	2.57	5.14	5.00	294.69	3
3	19	7.00	152	4.14	8.29	8.14	292.04	2
3	20	7.00	160	5.14	7.71	7.71	276.81	2
3	21	6.83	168	621.38	626.21	644.36	284.64	0
3	22	6.96	176	598.13	603.30	630.03	321.90	0
3	23	7.00	184	3.14	6.14	5.86	321.16	3
3	24	7.00	192	2.57	6.29	6.14	279.58	3
3	25	7.00	200	5.14	9.00	8.86	305.19	2
3	26	7.00	208	3.86	7.29	7.14	297.39	2
3	27	7.00	216	5.86	10.29	10.29	273.39	1
3	28	7.00	224	4.43	7.43	7.29	259.60	2
3	29	7.00	232	3.00	6.14	6.29	301.25	2
3	30	7.00	240	4.43	8.00	8.29	298.09	2
3	31	7.00	248	2.86	5.00	4.71	279.96	3
3	32	7.00	256	3.14	6.00	5.86	275.11	3
3	33	7.00	264	4.29	7.57	7.57	271.59	2
3	34	7.00	272	2.57	6.86	6.71	286.68	3
3	35	7.00	280	3.43	5.86	5.71	267.24	4
3	36	7.00	288	4.86	8.57	8.57	281.29	2
3	37	7.00	296	4.29	6.86	6.71	280.13	1
3	38	7.00	304	4.57	7.14	7.14	289.70	3
3	39	7.00	312	1.86	4.57	4.43	284.88	4

7/22/12

Protocol #: 3 SWIPE_H3_C14 User :

P#	S#	TIME	ELTIME	CPMA	CPMB	CPMC	tSIE	LUM
3	40	7.00	320	3.86	6.71	6.57	281.59	4
3	41	7.00	336	2.71	4.71	4.71	317.77	1
3	42	7.00	344	5.00	7.86	7.71	294.32	1
3	43	7.00	352	3.14	6.14	6.00	283.71	4
3	44	7.00	360	601.57	605.43	626.57	303.51	0
3	45	6.34	367	664.35	670.19	693.38	317.93	0
3	46	7.00	375	3.29	6.14	6.00	335.13	4

CM 7/22/12

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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
MB (459089)	12492	Swipe_H3_C14	32	3	7/19/12 1500	7	NA	JLK
3072158041	12493	↓	↓	↓	↓	↓	↑	↑
42	↓	↓	39	↓	↓	↓	↓	↓
43			↓					
44								
45								
46								
47								
48								
49								
50								
51								
52								
53			↓					
54			34					
55			↓					
56								
57								
58								
59								
60	↓	↓	↓	↓	↓	↓	↓	↓
LCS								
LCSD								
MB (459090)	↓	↓	↓	↓	↓	↓	↓	↓

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

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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
LCS12489	1.0	7/20/12 14:48	7.0	7/20/12 14:48	59.71	328.5	dpm/S	High, Evaluate
LCSD12489	1.0	7/20/12 14:56	7.0	7/20/12 14:56	65.57	318.3	dpm/S	High, Evaluate
LCS12490	1.0	7/20/12 15:04	7.0	7/20/12 15:04	57.43	329.3	dpm/S	High, Evaluate
LCSD12490	1.0	7/20/12 15:12	7.0	7/20/12 15:12	59.14	327.2	dpm/S	High, Evaluate
LCS12491	1.0	7/20/12 15:20	7.0	7/20/12 15:20	55.43	309.2	dpm/S	Pass
LCSD12491	1.0	7/20/12 15:28	7.0	7/20/12 15:28	58.00	317.4	dpm/S	High, Evaluate
LCS12492	1.0	7/20/12 15:36	7.0	7/20/12 15:36	58.43	268.8	dpm/S	Pass
LCSD12492	1.0	7/20/12 15:44	7.0	7/20/12 15:44	59.86	320.7	dpm/S	High, Evaluate
LCS12493	1.0	7/20/12 15:52	7.0	7/20/12 15:52	56.29	311.8	dpm/S	Pass
LCSD12493	1.0	7/20/12 16:00	7.0	7/20/12 16:00	61.71	319.8	dpm/S	High, Evaluate
LCS12494	1.0	7/20/12 16:08	7.0	7/20/12 16:08	59.14	314.9	dpm/S	High, Evaluate
LCSD12494	1.0	7/20/12 16:16	7.0	7/20/12 16:16	58.57	328.3	dpm/S	High, Evaluate

7/22/12 7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

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

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

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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
LCS12489	0.4958	0.0000	1.0000	107.723	11.687	17.368	9.678	3.506	1.032	11.687	1.00
LCSD12489	0.5042	0.0000	1.0000	117.548	12.030	18.474	9.517	3.448	1.015	12.030	1.00
LCS12490	0.4951	0.0000	1.0000	103.270	11.483	16.840	9.692	3.511	1.034	11.483	1.00
LCSD12490	0.4970	0.0000	1.0000	106.321	11.605	17.190	9.655	3.498	1.030	11.605	1.00
LCS12491	0.5103	0.0000	1.0000	96.271	10.950	15.866	9.403	3.406	1.003	10.950	1.00
LCSD12491	0.5048	0.0000	1.0000	102.409	11.316	16.651	9.505	3.443	1.014	11.316	1.00
LCS12492	0.5221	0.0000	1.0000	99.851	10.982	16.200	9.191	3.330	0.981	10.982	1.00
LCSD12492	0.5023	0.0000	1.0000	106.619	11.549	17.178	9.552	3.461	1.019	11.549	1.00
LCS12493	0.5087	0.0000	1.0000	98.267	11.067	16.120	9.433	3.417	1.006	11.067	1.00
LCSD12493	0.5030	0.0000	1.0000	110.151	11.706	17.596	9.539	3.456	1.018	11.706	1.00
LCS12494	0.5066	0.0000	1.0000	104.297	11.384	16.862	9.471	3.431	1.010	11.384	1.00
LCSD12494	0.4960	0.0000	1.0000	105.383	11.573	17.086	9.674	3.505	1.032	11.573	1.00

7/22/12 7/23/12

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

7/23/12

Low Energy Beta CSU Derivation

CSU Analysis for Preparation

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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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	Maximum	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

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%

7/23/12

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

F##	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 14:55
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
2	7	7/20/2012 14:48	LCS12489
3	15	7/20/2012 14:56	LCSD12489
4	23	7/20/2012 15:04	LCS12490
5	31	7/20/2012 15:12	LCSD12490
6	39	7/20/2012 15:20	LCS12491
7	47	7/20/2012 15:28	LCSD12491
8	55	7/20/2012 15:36	LCS12492
9	63	7/20/2012 15:44	LCSD12492
10	71	7/20/2012 15:52	LCS12493
11	79	7/20/2012 16:00	LCSD12493
12	87	7/20/2012 16:08	LCS12494
13	95	7/20/2012 16:16	LCSD12494

7/22/12

7/23/12

Protocol #: 7 SWIPE_H3_C14 User :

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

7/22/12

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 MISSING TUBE(S)								
7	2	7.00	7	46.29	59.71	59.71	328.50	1
7	3	7.00	15	47.29	64.86	65.57	318.26	0
7	4	7.00	23	41.86	56.71	57.43	329.27	0
7	5	7.00	31	41.00	58.71	59.14	327.18	1
7	6	7.00	39	39.29	55.00	55.43	309.17	1
7	7	7.00	47	41.29	57.43	58.00	317.42	0
7	8	7.00	55	39.71	58.43	58.43	268.79	1
7	9	7.00	63	42.57	59.43	59.86	320.72	1
7	10	7.00	71	41.86	56.00	56.29	311.77	0
7	11	7.00	79	45.43	61.14	61.71	319.83	0
7	12	7.00	87	43.71	59.00	59.14	314.90	0
7	13	7.00	95	44.43	58.00	58.57	328.29	1

Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 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
30721600 18	12502	Swipe_H3_C14	9	20	7/20/12 0900	7	MA	RMK
19	↓	↓	↓	↓	↓	↓	↓	↓
20	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12502	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12502	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12476	12476	Swipe_H3_C14	18	7	7/20/12 0950	7	MA	RMK
LCSD 12476	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12477	12477	↓	↓	↓	↓	↓	↓	↓
LCSD 12477	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12478	12478	↓	↓	↓	↓	↓	↓	↓
LCSD 12478	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12479	12479	↓	↓	↓	↓	↓	↓	↓
LCSD 12479	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12480	12480	↓	6	↓	↓	↓	↓	↓
LCSD 12480	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12486	12486	↓	↓	↓	↓	↓	↓	↓
LCSD 12486	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12487	12487	↓	↓	↓	↓	↓	↓	↓
LCSD 12487	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12488	12488	↓	↓	↓	↓	↓	↓	↓
LCSD 12488	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12489	12489	Swipe_H3_C14	11	7	7/20/12 1130	7	MA	RMK
LCSD 12489	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12490	12490	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

Liquid Scintillation Runlog (R023-3 7Oct2010).XLS

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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
LCSD 12490	12490	Swipe-H3_C14	11	7	7/20/12 1130	7	NA	RMK
LCS 12491	12491	↓	↓	↓	↓	↓	↓	↓
LCSD 12491	↓							
LCS 12492	12492							
LCSD 12492	↓							
LCS 12493	12493							
LCSD 12493	↓							
LCS 12494	12494							
LCSD 12494	↓							

7/24/12

Run comments: _____

Peer Review: _____

Low Energy Beta Sample Analysis Data

7/22/12

Quality Control Review

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Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

1 459091-BLANK for HBN 91067 [RADC/1249

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12494 **Prep Date** 7/20/2012 05:37 **Dilution**
Method EPA 906.0M **HBN** 91067 **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796224 **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** 7/20/2012 05:37 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796224 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	1.88U ± 4.46 (9.77)	dpm/sa	1.88U ± 4.46 (9.77)			dpm/sa

2 3072158061-SU-05-29

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12494 **Prep Date** 7/20/2012 02:41 **Dilution**
Method EPA 906.0M **HBN** 91067 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790418 **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** 7/20/2012 02:41 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790418 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.502U ± 4.27 (9.74)	dpm/sa	0.502U ± 4.27 (9.74)			dpm/sa	

3 3072158062-SU-05-30

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

7/23/12

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

Quality Control Review

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Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

3 3072158062-SU-05-30

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 02:49	**Dilution**	
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790419	**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**	7/20/2012 02:49	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790419	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.14U ± 4.47 (9.73)	dpm/sa	2.14U ± 4.47 (9.73)		dpm/sa		

4 3072158063-SU-05-31

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 02:57	**Dilution**	
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790420	**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**	7/20/2012 02:57	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790420	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.901U ± 4.16 (9.88)	dpm/sa	-0.901U ± 4.16 (9.88)		dpm/sa		

5 3072158064-SU-05-32

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

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Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

5 3072158064-SU-05-32

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790421

Batch RADC/12494
HBN 91067
Instru NONE

Prep Date 7/20/2012 03:05
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790421

Instru NONE
Col ID
File

Run Date 7/20/2012 03:05
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.331U ± 4.21 (9.84)	dpm/sa	-0.331U ± 4.21 (9.84)		dpm/sa		

6 3072158065-SU-05-33

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790422

Batch RADC/12494
HBN 91067
Instru NONE

Prep Date 7/20/2012 03:13
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790422

Instru NONE
Col ID
File

Run Date 7/20/2012 03:13
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.72U ± 3.99 (9.73)	dpm/sa	-1.72U ± 3.99 (9.73)		dpm/sa		

7 3072158066-SU-05-34

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch RADC/12494 HBN 91067
Rule 9060 I LEB Status WP
Create Date 6/28/2012 Analyst RMK

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7 3072158066-SU-05-34

Prep Information

Procedure 9060 I LEB **Batch** RADC/12494 **Prep Date** 7/20/2012 03:21 **Dilution**
Method EPA 906.0M **HBN** 91067 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790423 **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** 7/20/2012 03:21 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790423 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.751U ± 5.02 (11.8)	dpm/sa	-0.751U ± 5.02 (11.8)		dpm/sa		

8 3072158067-SU-05-35

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12494 **Prep Date** 7/20/2012 03:29 **Dilution**
Method EPA 906.0M **HBN** 91067 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790424 **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** 7/20/2012 03:29 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790424 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-9.19U ± 3.05 (9.79)	dpm/sa	-9.19U ± 3.05 (9.79)		dpm/sa		

9 3072158068-SU-05-36

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

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Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

9 3072158068-SU-05-36

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12494	**Prep Date**	7/20/2012 03:37	**Dilution**
Method	EPA 906.0M		**HBN**	91067	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790425		**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**	7/20/2012 03:37	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790425		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.887U ± 4.09 (9.73)	dpm/sa	-0.887U ± 4.09 (9.73)		dpm/sa		

10 3072158069-SU-08-1

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12494	**Prep Date**	7/20/2012 03:45	**Dilution**
Method	EPA 906.0M		**HBN**	91067	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790426		**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**	7/20/2012 03:45	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790426		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	4.12J ± 4.77 (9.85)	dpm/sa	4.12J ± 4.77 (9.85)		dpm/sa		

11 3072158070-SU-08-2

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

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

Quality Control Review

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Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

11 3072158070-SU-08-2

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790427

Batch RADC/12494
HBN 91067
Instru NONE

Prep Date 7/20/2012 03:53
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790427

Instru NONE
Col ID
File

Run Date 7/20/2012 03:53
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.771U ± 4.30 (9.73)	dpm/sa	0.771U ± 4.30 (9.73)		dpm/sa		

12 3072158071-SU-08-3

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790428

Batch RADC/12494
HBN 91067
Instru NONE

Prep Date 7/20/2012 04:01
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

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

Analytical Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2790428

Instru NONE
Col ID
File

Run Date 7/20/2012 04:01
Hold Date 12/8/2012 23:59

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.99U ± 3.96 (9.75)	dpm/sa	-1.99U ± 3.96 (9.75)		dpm/sa		

13 3072158072-SU-08-4

Type PS
Client RTI

Matrix Wipe
WO 3072158

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch RADC/12494 HBN 91067
Rule 9060 I LEB Status WP
Create Date 6/28/2012 Analyst RMK

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13 3072158072-SU-08-4

Prep Information

Procedure 9060 I LEB **Batch** RADC/12494 **Prep Date** 7/20/2012 04:09 **Dilution**
Method EPA 906.0M **HBN** 91067 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790429 **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** 7/20/2012 04:09 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790429 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.43U ± 4.52 (9.75)	dpm/sa	2.43U ± 4.52 (9.75)		dpm/sa		

14 3072158073-SU-08-5

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12494 **Prep Date** 7/20/2012 04:17 **Dilution**
Method EPA 906.0M **HBN** 91067 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790430 **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** 7/20/2012 04:17 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790430 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.05U ± 4.36 (9.79)	dpm/sa	1.05U ± 4.36 (9.79)		dpm/sa		

15 3072158074-SU-08-6

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

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Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

15 3072158074-SU-08-6

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 04:25
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59
Schedule	2790431	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 04:25
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790431	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.72U ± 3.99 (9.74)	dpm/sa	-1.72U ± 3.99 (9.74)		dpm/sa		

16 3072158075-SU-08-7

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 04:34
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59
Schedule	2790432	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 04:34
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790432	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.32U ± 4.40 (9.79)	dpm/sa	1.32U ± 4.40 (9.79)		dpm/sa		

17 3072158076-SU-08-8

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

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Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

17 3072158076-SU-08-8

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 04:42
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59
Schedule	2790433	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 04:42
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790433	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.26U ± 3.92 (9.74)	dpm/sa	-2.26U ± 3.92 (9.74)		dpm/sa		

18 3072158077-SU-08-9

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 04:50
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59
Schedule	2790434	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 04:50
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790434	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.887U ± 4.10 (9.73)	dpm/sa	-0.887U ± 4.10 (9.73)		dpm/sa		

19 3072158078-SU-08-10

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

Batch	RADC/12494	HBN	91067
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

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19 3072158078-SU-08-10

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 04:58	**Dilution**	
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790435	**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**	7/20/2012 04:58	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790435	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	6.29J ± 4.99 (9.74)	dpm/sa	6.29J ± 4.99 (9.74)		dpm/sa		

20 3072158079-SU-08-11

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 05:06	**Dilution**	
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790436	**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**	7/20/2012 05:06	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	RMK
Schedule	2790436	**File**				**CC**	OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.87U ± 4.45 (9.75)	dpm/sa	1.87U ± 4.45 (9.75)		dpm/sa		

21 3072158080-SU-08-12

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**	

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

Quality Control Review

Batch	RADC/12494	**HBN**	91067
Rule	9060 I LEB	**Status**	WP
Create Date	6/28/2012	**Analyst**	RMK

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21 3072158080-SU-08-12

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12494	**Prep Date**	7/20/2012 05:14
Method	EPA 906.0M	**HBN**	91067	**Hold Date**	12/8/2012 23:59
Schedule	2790437	**Instru**	NONE		

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

Dilution
Analyst RMK
CC OK *

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/20/2012 05:14
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790437	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL		Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK								
LSC Low Energy Beta	OK	7.09J ± 5.09 (9.73)	dpm/sa	7.09J ± 5.09 (9.73)			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 13:52		Assigned Analyst	RMK
Batch ID	12494		Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB	9060W	HBN	91067
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
	459091	BLANK	IP		QCACCOUNT	1.88U	4.46	9.77	7/20/12 5:37
3072158	3072158061	PS	WP	6/11/2012 0:01	RTI	0.502U	4.27	9.74	7/20/12 2:41
3072158	3072158062	PS	WP	6/11/2012 0:01	RTI	2.14U	4.47	9.73	7/20/12 2:49
3072158	3072158063	PS	WP	6/11/2012 0:01	RTI	-0.901U	4.16	9.88	7/20/12 2:57
3072158	3072158064	PS	WP	6/11/2012 0:01	RTI	-0.331U	4.21	9.84	7/20/12 3:05
3072158	3072158065	PS	WP	6/11/2012 0:01	RTI	-1.72U	3.99	9.73	7/20/12 3:13
3072158	3072158066	PS	WP	6/11/2012 0:01	RTI	-0.751U	5.02	11.8	7/20/12 3:21
3072158	3072158067	PS	WP	6/11/2012 0:01	RTI	-9.19U	3.05	9.79	7/20/12 3:29
3072158	3072158068	PS	WP	6/11/2012 0:01	RTI	-0.887U	4.09	9.73	7/20/12 3:37
3072158	3072158069	PS	WP	6/11/2012 0:01	RTI	4.12J	4.77	9.85	7/20/12 3:45
3072158	3072158070	PS	WP	6/11/2012 0:01	RTI	0.771U	4.30	9.73	7/20/12 3:53
3072158	3072158071	PS	WP	6/11/2012 0:01	RTI	-1.99U	3.96	9.75	7/20/12 4:01
3072158	3072158072	PS	WP	6/11/2012 0:01	RTI	2.43U	4.52	9.75	7/20/12 4:09
3072158	3072158073	PS	WP	6/11/2012 0:01	RTI	1.05U	4.36	9.79	7/20/12 4:17
3072158	3072158074	PS	WP	6/11/2012 0:01	RTI	-1.72U	3.99	9.74	7/20/12 4:25
3072158	3072158075	PS	WP	6/11/2012 0:01	RTI	1.32U	4.40	9.79	7/20/12 4:34
3072158	3072158076	PS	WP	6/11/2012 0:01	RTI	-2.26U	3.92	9.74	7/20/12 4:42
3072158	3072158077	PS	WP	6/11/2012 0:01	RTI	-0.887U	4.10	9.73	7/20/12 4:50
3072158	3072158078	PS	WP	6/11/2012 0:01	RTI	6.29J	4.99	9.74	7/20/12 4:58
3072158	3072158079	PS	WP	6/11/2012 0:01	RTI	1.87U	4.45	9.75	7/20/12 5:06
3072158	3072158080	PS	WP	6/11/2012 0:01	RTI	7.09J	5.09	9.73	7/20/12 5:14

7/22/12 7/23/12

LIMS Load
Printed 7/22/2012 at 12:15 PM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK			
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	7.03	
Batch ID	12494	**PrepSOP2**	n/a	**Bkg Duration**	30.0	min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	BKG071912	
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/19/2012 20:53	
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**Instrument ID:**	System #3	

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Sample	Analysis Volume (Sample)	Ref. Date	Count Duration (min)	Count Start Date/Time	Sample Gross CPM	TSIE #	Activity Report Units	TSIE Within Quench Curve
459091	1.0	7/20/12 5:37	7.0	7/20/12 5:37	8.00	297.3	dpm/S	Pass
3072158061	1.0	6/11/12 0:01	7.0	7/20/12 2:41	7.29	281.7	dpm/S	Pass
3072158062	1.0	6/11/12 0:01	7.0	7/20/12 2:49	8.14	277.2	dpm/S	Pass
3072158063	1.0	6/11/12 0:01	7.0	7/20/12 2:57	6.57	302.8	dpm/S	Pass
3072158064	1.0	6/11/12 0:01	7.0	7/20/12 3:05	6.86	297.7	dpm/S	Pass
3072158065	1.0	6/11/12 0:01	7.0	7/20/12 3:13	6.14	262.0	dpm/S	Pass
3072158066	1.0	6/11/12 0:01	7.0	7/20/12 3:21	6.71	380.0	dpm/S	High, Evaluate
3072158067	1.0	6/11/12 0:01	7.0	7/20/12 3:29	2.29	291.1	dpm/S	Pass
3072158068	1.0	6/11/12 0:01	7.0	7/20/12 3:37	6.57	276.6	dpm/S	Pass
3072158069	1.0	6/11/12 0:01	7.0	7/20/12 3:45	9.14	240.8	dpm/S	Pass
3072158070	1.0	6/11/12 0:01	7.0	7/20/12 3:53	7.43	263.1	dpm/S	Pass
3072158071	1.0	6/11/12 0:01	7.0	7/20/12 4:01	6.00	255.9	dpm/S	Pass
3072158072	1.0	6/11/12 0:01	7.0	7/20/12 4:09	8.29	282.7	dpm/S	Pass
3072158073	1.0	6/11/12 0:01	7.0	7/20/12 4:17	7.57	248.7	dpm/S	Pass
3072158074	1.0	6/11/12 0:01	7.0	7/20/12 4:25	6.14	261.2	dpm/S	Pass
3072158075	1.0	6/11/12 0:01	7.0	7/20/12 4:34	7.71	291.8	dpm/S	Pass
3072158076	1.0	6/11/12 0:01	7.0	7/20/12 4:42	5.86	279.3	dpm/S	Pass
3072158077	1.0	6/11/12 0:01	7.0	7/20/12 4:50	6.57	278.3	dpm/S	Pass
3072158078	1.0	6/11/12 0:01	7.0	7/20/12 4:58	10.29	279.3	dpm/S	Pass
3072158079	1.0	6/11/12 0:01	7.0	7/20/12 5:06	8.00	282.4	dpm/S	Pass
3072158080	1.0	6/11/12 0:01	7.0	7/20/12 5:14	10.71	264.3	dpm/S	Pass

LEB Data Input
Printed 7/22/2012 at 12:15 PM

7/22/12 7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK
Matrix	Smear	**PrepSOP1**	0
Batch ID	12494	**PrepSOP2**	n/a
Prep Start	7/16/2012 12:00	**AnalSOP1**	0
Prep Finish	7/16/2012	**AnalSOP2**	n/a

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

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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
459091	0.5164	0.0000	1.0000	1.878	4.454	4.460	9.774	3.556	0.991	4.454	1.00
3072158061	0.5211	0.1071	0.9940	0.502	4.274	4.275	9.744	3.545	0.988	4.274	1.00
3072158062	0.5217	0.1071	0.9940	2.140	4.467	4.475	9.732	3.541	0.987	4.467	1.00
3072158063	0.5138	0.1071	0.9940	-0.901	4.156	4.157	9.881	3.595	1.002	4.156	1.00
3072158064	0.5162	0.1071	0.9940	-0.331	4.209	4.209	9.835	3.579	0.998	4.209	1.00
3072158065	0.5216	0.1071	0.9940	-1.717	3.985	3.991	9.734	3.542	0.987	3.985	1.00
3072158066	0.4289	0.1072	0.9940	-0.751	5.021	5.022	11.837	4.307	1.201	5.021	1.00
3072158067	0.5187	0.1072	0.9940	-9.193	2.848	3.052	9.788	3.561	0.993	2.848	1.00
3072158068	0.5218	0.1072	0.9940	-0.887	4.093	4.094	9.731	3.541	0.987	4.093	1.00
3072158069	0.5154	0.1072	0.9940	4.118	4.747	4.773	9.851	3.584	0.999	4.747	1.00
3072158070	0.5217	0.1072	0.9940	0.771	4.302	4.303	9.732	3.541	0.987	4.302	1.00
3072158071	0.5205	0.1072	0.9940	-1.991	3.958	3.965	9.754	3.549	0.989	3.958	1.00
3072158072	0.5209	0.1072	0.9940	2.434	4.509	4.518	9.748	3.547	0.989	4.509	1.00
3072158073	0.5186	0.1073	0.9940	1.048	4.362	4.363	9.791	3.562	0.993	4.362	1.00
3072158074	0.5215	0.1073	0.9940	-1.717	3.986	3.992	9.737	3.543	0.988	3.986	1.00
3072158075	0.5185	0.1073	0.9940	1.319	4.395	4.398	9.793	3.563	0.993	4.395	1.00
3072158076	0.5214	0.1073	0.9940	-2.257	3.914	3.923	9.737	3.543	0.988	3.914	1.00
3072158077	0.5216	0.1073	0.9940	-0.887	4.094	4.096	9.735	3.542	0.987	4.094	1.00
3072158078	0.5214	0.1073	0.9940	6.289	4.937	4.993	9.737	3.543	0.988	4.937	1.00
3072158079	0.5209	0.1074	0.9940	1.873	4.442	4.447	9.747	3.546	0.989	4.442	1.00
3072158080	0.5218	0.1074	0.9940	7.094	5.019	5.090	9.730	3.540	0.987	5.019	1.00

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Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/21/2012	**Method:**	EPA 906.0M
Worklist:	12494	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459091

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	1.8780	4.4600	9.7740	3.55600		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/20/12 16:08	7/20/12 16:16				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.937	1184.937				
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)	104.297	105.383				
1.96 Sigma Unc:	16.862	17.086				
% Recovery:	88.02%	88.94%				
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 I.D.:	LCS12494					
Duplicate Sample I.D	LCSD12494					
Sample Result (DPM/Sample, g, F):	104.2970					
1.96 Sigma Unc:	16.8620					
ple Duplicate Result (DPM/Sample, g, F):	105.3830					
Duplicate Sample 1.96 Sigma Unc	17.0860					
Either results below MDC?	NO					
Relative Percent Difference:	1.04%					
Assessment:	Pass					
% RPD Limit:	25.00%					

Sample Matrix Spike Control Assessment

Analyte:			
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:

7/23/12

7/22/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12494

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	**Maximum**	**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

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%

7/23/12

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	3.77	7.03	7.03	301.65	2

BKG 071912

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	3.77	7.03	7.03	301.65	2

BKG 071912

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 2:48
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
1	7	7/20/2012 2:41	3072158061
2	15	7/20/2012 2:49	3072158062
3	23	7/20/2012 2:57	3072158063
4	31	7/20/2012 3:05	3072158064
5	39	7/20/2012 3:13	3072158065
6	47	7/20/2012 3:21	3072158066
7	55	7/20/2012 3:29	3072158067
8	63	7/20/2012 3:37	3072158068
9	71	7/20/2012 3:45	3072158069
10	79	7/20/2012 3:53	3072158070
11	87	7/20/2012 4:01	3072158071
12	95	7/20/2012 4:09	3072158072
13	103	7/20/2012 4:17	3072158073
14	111	7/20/2012 4:25	3072158074
15	120	7/20/2012 4:34	3072158075
16	128	7/20/2012 4:42	3072158076
17	136	7/20/2012 4:50	3072158077
18	144	7/20/2012 4:58	3072158078
19	152	7/20/2012 5:06	3072158079
20	160	7/20/2012 5:14	3072158080
21	167	7/20/2012 5:21	LCS
22	175	7/20/2012 5:29	LCSD
23	183	7/20/2012 5:37	459091
24	191	7/20/2012 5:45	3072158081
25	200	7/20/2012 5:54	3072158082
26	208	7/20/2012 6:02	3072158083
27	216	7/20/2012 6:10	3072158084
28	224	7/20/2012 6:18	3072158085
29	232	7/20/2012 6:26	3072158086
30	240	7/20/2012 6:34	3072158087
31	248	7/20/2012 6:42	3072158088
32	256	7/20/2012 6:50	3072158089
33	264	7/20/2012 6:58	3072158090
34	272	7/20/2012 7:06	3072158091
35	280	7/20/2012 7:14	3072158092
36	288	7/20/2012 7:22	3072158093
37	297	7/20/2012 7:31	3072158094
38	305	7/20/2012 7:39	3072158095
39	313	7/20/2012 7:47	3072158096
40	321	7/20/2012 7:55	3072158097
41	329	7/20/2012 8:03	3072158098
42	337	7/20/2012 8:11	3072158099
43	345	7/20/2012 8:19	3072158100
44	352	7/20/2012 8:26	LCS
45	360	7/20/2012 8:34	LCSD
46	368	7/20/2012 8:42	459093

7/22/12

7/23/12

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	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
22	1	7.00	7	4.14	7.43	7.29	281.70	3
22	2	7.00	15	5.71	8.14	8.14	277.23	2
22	3	7.00	23	3.57	6.43	6.57	302.83	2
22	4	7.00	31	3.29	6.57	6.86	297.70	3
22	5	7.00	39	3.00	6.43	6.14	262.04	3
22	6	7.00	47	5.00	7.14	6.71	380.03	3
22	7	7.00	55	1.29	2.71	2.29	291.05	7
22	8	7.00	63	4.00	6.71	6.57	276.61	2
22	9	7.00	71	5.43	9.14	9.14	240.75	2
22	10	7.00	79	4.00	7.57	7.43	263.06	3
22	11	7.00	87	2.29	6.29	6.00	255.85	4
22	12	7.00	95	5.00	8.14	8.29	282.69	2
22	13	7.00	103	3.86	7.57	7.57	248.72	2
22	14	7.00	111	2.71	6.29	6.14	261.16	2
22	15	7.00	120	4.71	7.71	7.71	291.78	2
22	16	7.00	128	4.14	5.71	5.86	279.32	2
22	17	7.00	136	3.71	6.71	6.57	278.33	3
22	18	7.00	144	6.14	10.43	10.29	279.26	2
22	19	7.00	152	5.14	8.00	8.00	282.35	2
22	20	7.00	160	6.71	10.71	10.71	264.29	1
22	21	6.83	167	612.15	616.98	639.09	305.77	0
22	22	6.80	175	616.62	621.32	646.03	308.15	0
22	23	7.00	183	4.71	8.00	8.00	297.30	2
22	24	7.00	191	5.71	9.14	9.14	272.60	2
22	25	7.00	200	3.00	5.86	5.71	266.44	3
22	26	7.00	208	4.86	7.29	7.29	289.96	2
22	27	7.00	216	2.71	5.71	5.57	255.14	4
22	28	7.00	224	4.29	8.57	8.71	267.85	1
22	29	7.00	232	4.29	7.43	7.14	264.20	3
22	30	7.00	240	3.29	7.57	7.71	286.16	1
22	31	7.00	248	4.43	8.43	8.14	284.37	3
22	32	7.00	256	3.29	6.43	6.14	287.90	3
22	33	7.00	264	6.29	9.29	9.29	260.07	2
22	34	7.00	272	3.71	8.00	8.14	279.29	2
22	35	7.00	280	4.29	8.71	8.71	273.33	2
22	36	7.00	288	5.57	8.43	8.57	247.49	2
22	37	7.00	297	4.14	7.29	7.29	263.44	2
22	38	7.00	305	2.57	6.00	5.86	273.21	2
22	39	7.00	313	2.14	5.71	5.71	289.67	3

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P#	S#	TIME	ELTIME	CPMA	CPMB	CPMC	tSIE	LUM
22	40	7.00	321	3.14	6.86	6.57	263.51	3
22	41	7.00	329	3.57	6.57	6.57	296.54	3
22	42	7.00	337	3.43	7.14	6.71	317.11	3
22	43	7.00	345	3.14	5.71	5.57	297.92	3
22	44	6.16	352	679.71	684.90	711.36	324.98	0
22	45	6.38	360	660.97	665.67	690.13	315.87	0
22	46	7.00	368	3.29	6.29	6.29	311.15	3

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

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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
307215806 1	12494	Swipe-113.cnt	7	22	7/19/12 1500	7	NA	JLL
062								
063								
064								
065								
066								
067								
068								
069								
070								
071								
072			↓					
073			9					
074			1					
075								
076								
077								
078								
079								
080								
LCS								
LCSD								
MB (459091)		↓						
307215808 1	12496		↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

Pace Analytical

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
307215808 2	12496	Swipe-H3_C14	10	22	7/19/12 1500	7	NA	JL/L
83								
84								
85								
86								
87								
88								
89								
90								
91								
92								
93								
94			18					
95								
96								
97								
98								
99								
100								
LCS								
LCSD								
MB (459093)								
BKG	H3Cal			1	7/19/12	7	NA	
NI6320120719 NI								

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

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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
LCS12489	1.0	7/20/12 14:48	7.0	7/20/12 14:48	59.71	328.5	dpm/S	High, Evaluate
LCSD12489	1.0	7/20/12 14:56	7.0	7/20/12 14:56	65.57	318.3	dpm/S	High, Evaluate
LCS12490	1.0	7/20/12 15:04	7.0	7/20/12 15:04	57.43	329.3	dpm/S	High, Evaluate
LCSD12490	1.0	7/20/12 15:12	7.0	7/20/12 15:12	59.14	327.2	dpm/S	High, Evaluate
LCS12491	1.0	7/20/12 15:20	7.0	7/20/12 15:20	55.43	309.2	dpm/S	Pass
LCSD12491	1.0	7/20/12 15:28	7.0	7/20/12 15:28	58.00	317.4	dpm/S	High, Evaluate
LCS12492	1.0	7/20/12 15:36	7.0	7/20/12 15:36	58.43	268.8	dpm/S	Pass
LCSD12492	1.0	7/20/12 15:44	7.0	7/20/12 15:44	59.86	320.7	dpm/S	High, Evaluate
LCS12493	1.0	7/20/12 15:52	7.0	7/20/12 15:52	56.29	311.8	dpm/S	Pass
LCSD12493	1.0	7/20/12 16:00	7.0	7/20/12 16:00	61.71	319.8	dpm/S	High, Evaluate
LCS12494	1.0	7/20/12 16:08	7.0	7/20/12 16:08	59.14	314.9	dpm/S	High, Evaluate
LCSD12494	1.0	7/20/12 16:16	7.0	7/20/12 16:16	58.57	328.3	dpm/S	High, Evaluate

7/22/12 7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

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

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

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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
LCS12489	0.4958	0.0000	1.0000	107.723	11.687	17.368	9.678	3.506	1.032	11.687	1.00
LCSD12489	0.5042	0.0000	1.0000	117.548	12.030	18.474	9.517	3.448	1.015	12.030	1.00
LCS12490	0.4951	0.0000	1.0000	103.270	11.483	16.840	9.692	3.511	1.034	11.483	1.00
LCSD12490	0.4970	0.0000	1.0000	106.321	11.605	17.190	9.655	3.498	1.030	11.605	1.00
LCS12491	0.5103	0.0000	1.0000	96.271	10.950	15.866	9.403	3.406	1.003	10.950	1.00
LCSD12491	0.5048	0.0000	1.0000	102.409	11.316	16.651	9.505	3.443	1.014	11.316	1.00
LCS12492	0.5221	0.0000	1.0000	99.851	10.982	16.200	9.191	3.330	0.981	10.982	1.00
LCSD12492	0.5023	0.0000	1.0000	106.619	11.549	17.178	9.552	3.461	1.019	11.549	1.00
LCS12493	0.5087	0.0000	1.0000	98.267	11.067	16.120	9.433	3.417	1.006	11.067	1.00
LCSD12493	0.5030	0.0000	1.0000	110.151	11.706	17.596	9.539	3.456	1.018	11.706	1.00
LCS12494	0.5066	0.0000	1.0000	104.297	11.384	16.862	9.471	3.431	1.010	11.384	1.00
LCSD12494	0.4960	0.0000	1.0000	105.383	11.573	17.086	9.674	3.505	1.032	11.573	1.00

7/22/12 7/23/12

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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 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%

7/23/12

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 14:55
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
2	7	7/20/2012 14:48	LCS12489
3	15	7/20/2012 14:56	LCSD12489
4	23	7/20/2012 15:04	LCS12490
5	31	7/20/2012 15:12	LCSD12490
6	39	7/20/2012 15:20	LCS12491
7	47	7/20/2012 15:28	LCSD12491
8	55	7/20/2012 15:36	LCS12492
9	63	7/20/2012 15:44	LCSD12492
10	71	7/20/2012 15:52	LCS12493
11	79	7/20/2012 16:00	LCSD12493
12	87	7/20/2012 16:08	LCS12494
13	95	7/20/2012 16:16	LCSD12494

7/22/12

7/23/12

Protocol #: 7 SWIPE_H3_C14 User :

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

7/22/12

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 MISSING		TUBE(S)						
7	2	7.00	7	46.29	59.71	59.71	328.50	1
7	3	7.00	15	47.29	64.86	65.57	318.26	0
7	4	7.00	23	41.86	56.71	57.43	329.27	0
7	5	7.00	31	41.00	58.71	59.14	327.18	1
7	6	7.00	39	39.29	55.00	55.43	309.17	1
7	7	7.00	47	41.29	57.43	58.00	317.42	0
7	8	7.00	55	39.71	58.43	58.43	268.79	1
7	9	7.00	63	42.57	59.43	59.86	320.72	1
7	10	7.00	71	41.86	56.00	56.29	311.77	0
7	11	7.00	79	45.43	61.14	61.71	319.83	0
7	12	7.00	87	43.71	59.00	59.14	314.90	0
7	13	7.00	95	44.43	58.00	58.57	328.29	1

Severn Trent Laboratories, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 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
30721600 18	12502	Swipe_H3_C14	9	20	7/20/12 0900	7	MA	JL
19	↓	↓	↓	↓	↓	↓	↓	↓
20	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12502	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12502	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12476	12476	Swipe_H3_C14	18	7	7/20/12 0950	7	MA	RMK
LCSD 12476	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12477	12477	↓	↓	↓	↓	↓	↓	↓
LCSD 12477	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12478	12478	↓	↓	↓	↓	↓	↓	↓
LCSD 12478	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12479	12479	↓	↓	↓	↓	↓	↓	↓
LCSD 12479	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12480	12480	↓	6	↓	↓	↓	↓	↓
LCSD 12480	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12486	12486	↓	↓	↓	↓	↓	↓	↓
LCSD 12486	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12487	12487	↓	↓	↓	↓	↓	↓	↓
LCSD 12487	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12488	12488	↓	↓	↓	↓	↓	↓	↓
LCSD 12488	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12489	12489	Swipe_H3_C14	11	7	7/20/12 1130	7	MA	RMK
LCSD 12489	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12490	12490	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

Liquid Scintillation Runlog (R023-3 7Oct2010).XLS

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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
LCSD 12490	12490	Swipe-H3_C14	11	7	7/20/12 1130	7	NA	RMK
LCS 12491	12491	↓	↓	↓	↓	↓	↓	↓
LCSD 12491	↓							
LCS 12492	12492							
LCSD 12492	↓							
LCS 12493	12493							
LCSD 12493	↓							
LCS 12494	12494							
LCSD 12494	↓							

8/7/21/12

Run comments: _____

Peer Review: _____

J:\QAQC\Master\Document Management\Radiological\Liquid Scintillation Runlog (R023-3 7Oct2010).XLS

Low Energy Beta Sample Analysis Data

Needs LCS/LCSD data Sector

Quality Control Review

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Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

1 459093-BLANK for HBN 91069 [RADC/1249

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12496 **Prep Date** 7/20/2012 08:42 **Dilution**
Method EPA 906.0M **HBN** 91069 **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796234 **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** 7/20/2012 08:42 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** RMK
Schedule 2796234 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-1.45U ± 4.10 (9.91)	dpm/sa	-1.45U ± 4.10 (9.91)			dpm/sa

2 3072158081-SU-08-13

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12496 **Prep Date** 7/20/2012 05:45 **Dilution**
Method EPA 906.0M **HBN** 91069 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790438 **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** 7/20/2012 05:45 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790438 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High	
Rad Chemistry	OK								
LSC Low Energy Beta	OK	4.07J ± 4.71 (9.73)	dpm/sa	4.07J ± 4.71 (9.73)					dpm/sa

3 3072158082-SU-08-14

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

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Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

3 3072158082-SU-08-14

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 05:54
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790439	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 05:54
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790439	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.54U ± 3.88 (9.73)	dpm/sa	-2.54U ± 3.88 (9.73)		dpm/sa		

4 3072158083-SU-08-15

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 06:02
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790440	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 06:02
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790440	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.504U ± 4.29 (9.78)	dpm/sa	0.504U ± 4.29 (9.78)		dpm/sa		

5 3072158084-SU-08-16

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

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Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

5 3072158084-SU-08-16

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 06:10
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790441	**Instru**	NONE		

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

Dilution
Analyst RMK
CC OK *

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/20/2012 06:10
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790441	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.82U ± 3.86 (9.76)	dpm/sa	-2.82U ± 3.86 (9.76)		dpm/sa		

6 3072158085-SU-08-17

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 06:18
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790442	**Instru**	NONE		

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

Dilution
Analyst RMK
CC OK *

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/20/2012 06:18
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790442	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.24U ± 4.61 (9.73)	dpm/sa	3.24U ± 4.61 (9.73)		dpm/sa		

7 3072158086-SU-08-18

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

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Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

7 3072158086-SU-08-18

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 06:26
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790443	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 06:26
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790443	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.212U ± 4.23 (9.73)	dpm/sa	0.212U ± 4.23 (9.73)		dpm/sa		

8 3072158087-SU-08-19

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 06:34
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790444	**Instru**	NONE		

Dilution
Analyst RMK
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**	7/20/2012 06:34
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790444	**File**			

Dilution
Analyst RMK
CC OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	1.32U ± 4.38 (9.76)	dpm/sa	1.32U ± 4.38 (9.76)		dpm/sa		

9 3072158088-SU-08-20

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture
Location

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

Quality Control Review

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Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

9 3072158088-SU-08-20

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 06:42
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790445	**Instru**	NONE		

Dilution				
Analyst	RMK			
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**	7/20/2012 06:42
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790445	**File**			

Dilution								
Analyst	RMK							
CC	OK *							

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.15U ± 4.48 (9.75)	dpm/sa	2.15U ± 4.48 (9.75)		dpm/sa		

10 3072158089-SU-08-21

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture	
Location	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 06:50
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790446	**Instru**	NONE		

Dilution				
Analyst	RMK			
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**	7/20/2012 06:50
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790446	**File**			

Dilution								
Analyst	RMK							
CC	OK *							

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.72U ± 4.01 (9.77)	dpm/sa	-1.72U ± 4.01 (9.77)		dpm/sa		

11 3072158090-SU-08-22

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture	
Location	

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

Quality Control Review

Batch RADC/12496 HBN 91069
Rule 9060 I LEB Status WP
Create Date 6/28/2012 Analyst RMK

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11 3072158090-SU-08-22

Prep Information

Procedure 9060 I LEB **Batch** RADC/12496 **Prep Date** 7/20/2012 06:58 **Dilution**
Method EPA 906.0M **HBN** 91069 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790447 **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** 7/20/2012 06:58 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790447 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	4.36J ± 4.75 (9.74)	dpm/sa	4.36J ± 4.75 (9.74)		dpm/sa		

12 3072158091-SU-08-23

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12496 **Prep Date** 7/20/2012 07:06 **Dilution**
Method EPA 906.0M **HBN** 91069 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790448 **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** 7/20/2012 07:06 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790448 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.14U ± 4.48 (9.74)	dpm/sa	2.14U ± 4.48 (9.74)		dpm/sa		

13 3072158092-SU-08-24

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

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Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

13 3072158092-SU-08-24

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 07:14
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790449	**Instru**	NONE		

Dilution				
Analyst	RMK			
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**	7/20/2012 07:14
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790449	**File**			

Dilution								
Analyst	RMK							
CC	OK *							

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	3.24U ± 4.61 (9.73)	dpm/sa	3.24U ± 4.61 (9.73)		dpm/sa		

14 3072158093-SU-08-25

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture	
Location	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12496	**Prep Date**	7/20/2012 07:22
Method	EPA 906.0M	**HBN**	91069	**Hold Date**	12/8/2012 23:59
Schedule	2790450	**Instru**	NONE		

Dilution				
Analyst	RMK			
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**	7/20/2012 07:22
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2790450	**File**			

Dilution								
Analyst	RMK							
CC	OK *							

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	2.99U ± 4.61 (9.80)	dpm/sa	2.99U ± 4.61 (9.80)		dpm/sa		

15 3072158094-SU-08-26

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072158	**Work ID**	Fort Monmouth 1207078

% Moisture	
Location	

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

Quality Control Review

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Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

15 3072158094-SU-08-26

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12496	**Prep Date**	7/20/2012 07:31	**Dilution**
Method	EPA 906.0M		**HBN**	91069	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790451		**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**	7/20/2012 07:31	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790451		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	0.501U ± 4.27 (9.73)	dpm/sa	0.501U ± 4.27 (9.73)		dpm/sa		

16 3072158095-SU-08-27

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12496	**Prep Date**	7/20/2012 07:39	**Dilution**
Method	EPA 906.0M		**HBN**	91069	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790452		**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**	7/20/2012 07:39	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790452		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.25U ± 3.92 (9.73)	dpm/sa	-2.25U ± 3.92 (9.73)		dpm/sa		

17 3072158096-SU-08-28

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

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

Quality Control Review

Batch	RADC/12496	HBN	91069
Rule	9060 I LEB	Status	WP
Create Date	6/28/2012	Analyst	RMK

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17 3072158096-SU-08-28

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12496	**Prep Date**	7/20/2012 07:47	**Dilution**
Method	EPA 906.0M		**HBN**	91069	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790453		**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**	7/20/2012 07:47	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790453		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.56U ± 3.90 (9.78)	dpm/sa	-2.56U ± 3.90 (9.78)		dpm/sa		

18 3072158097-SU-08-29

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12496	**Prep Date**	7/20/2012 07:55	**Dilution**
Method	EPA 906.0M		**HBN**	91069	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790454		**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**	7/20/2012 07:55	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790454		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.887U ± 4.09 (9.73)	dpm/sa	-0.887U ± 4.09 (9.73)		dpm/sa		

19 3072158098-SU-08-30

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072158	**Work ID**	Fort Monmouth 1207078	**Location**

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

Quality Control Review

Batch RADC/12496 HBN 91069
Rule 9060 I LEB Status WP
Create Date 6/28/2012 Analyst RMK

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19 3072158098-SU-08-30

Prep Information

Procedure 9060 I LEB **Batch** RADC/12496 **Prep Date** 7/20/2012 08:03 **Dilution**
Method EPA 906.0M **HBN** 91069 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790455 **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** 7/20/2012 08:03 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790455 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.896U ± 4.13 (9.83)	dpm/sa	-0.896U ± 4.13 (9.83)		dpm/sa		

20 3072158099-SU-09-1

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12496 **Prep Date** 7/20/2012 08:11 **Dilution**
Method EPA 906.0M **HBN** 91069 **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790456 **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** 7/20/2012 08:11 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** RMK
Schedule 2790456 **File** **CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-0.637U ± 4.26 (10.1)	dpm/sa	-0.637U ± 4.26 (10.1)		dpm/sa		

21 3072158100-SU-09-2

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072158 **Work ID** Fort Monmouth 1207078 **Location**

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

Quality Control Review

Batch	RADC/12496	**HBN**	91069
Rule	9060 I LEB	**Status**	WP
Create Date	6/28/2012	**Analyst**	RMK

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21 3072158100-SU-09-2

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12496	**Prep Date**	7/20/2012 08:19	**Dilution**
Method	EPA 906.0M		**HBN**	91069	**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790457		**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**	7/20/2012 08:19	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** RMK
Schedule	2790457		**File**				**CC** OK *

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-2.85U ± 3.89 (9.84)	dpm/sa	-2.85U ± 3.89 (9.84)		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 13:54		Assigned Analyst	RMK
Batch ID	12496		Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB	9060W	HBN	91069
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
	459093	BLANK	IP		QCACCOUNT	-1.45U	4.10	9.91	7/20/12 8:42
3072158	3072158081	PS	WP	6/11/2012 0:01	RTI	4.07J	4.71	9.73	7/20/12 5:45
3072158	3072158082	PS	WP	6/11/2012 0:01	RTI	-2.54U	3.88	9.73	7/20/12 5:54
3072158	3072158083	PS	WP	6/11/2012 0:01	RTI	0.504U	4.29	9.78	7/20/12 6:02
3072158	3072158084	PS	WP	6/11/2012 0:01	RTI	-2.82U	3.86	9.76	7/20/12 6:10
3072158	3072158085	PS	WP	6/11/2012 0:01	RTI	3.24U	4.61	9.73	7/20/12 6:18
3072158	3072158086	PS	WP	6/11/2012 0:01	RTI	0.212U	4.23	9.73	7/20/12 6:26
3072158	3072158087	PS	WP	6/11/2012 0:01	RTI	1.32U	4.38	9.76	7/20/12 6:34
3072158	3072158088	PS	WP	6/11/2012 0:01	RTI	2.15U	4.48	9.75	7/20/12 6:42
3072158	3072158089	PS	WP	6/11/2012 0:01	RTI	-1.72U	4.01	9.77	7/20/12 6:50
3072158	3072158090	PS	WP	6/11/2012 0:01	RTI	4.36J	4.75	9.74	7/20/12 6:58
3072158	3072158091	PS	WP	6/11/2012 0:01	RTI	2.14U	4.48	9.74	7/20/12 7:06
3072158	3072158092	PS	WP	6/11/2012 0:01	RTI	3.24U	4.61	9.73	7/20/12 7:14
3072158	3072158093	PS	WP	6/11/2012 0:01	RTI	2.99U	4.61	9.80	7/20/12 7:22
3072158	3072158094	PS	WP	6/11/2012 0:01	RTI	0.501U	4.27	9.73	7/20/12 7:31
3072158	3072158095	PS	WP	6/11/2012 0:01	RTI	-2.25U	3.92	9.73	7/20/12 7:39
3072158	3072158096	PS	WP	6/11/2012 0:01	RTI	-2.56U	3.90	9.78	7/20/12 7:47
3072158	3072158097	PS	WP	6/11/2012 0:01	RTI	-0.887U	4.09	9.73	7/20/12 7:55
3072158	3072158098	PS	WP	6/11/2012 0:01	RTI	-0.896U	4.13	9.83	7/20/12 8:03
3072158	3072158099	PS	WP	6/11/2012 0:01	RTI	-0.637U	4.26	10.1	7/20/12 8:11
3072158	3072158100	PS	WP	6/11/2012 0:01	RTI	-2.85U	3.89	9.84	7/20/12 8:19

7/31/12

LIMS Load
Printed 7/22/2012 at 12:24 PM
LEB_12496_I.xls
LEB_Smear (R084-1 8Dec2011).xls

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK		
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	7.03
Batch ID	12496	**PrepSOP2**	n/a	**Bkg Duration**	30.0 min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	BKG071912
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/19/2012 20:53
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**Instrument ID:**	System #3

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Sample	Analysis Volume (Sample)	Ref. Date	Count Duration (min)	Count Start Date/Time	Sample Gross CPM	TSIE #	Activity Report Units	TSIE Within Quench Curve
459093	1.0	7/20/12 8:42	7.0	7/20/12 8:42	6.29	311.2	dpm/S	Pass
3072158081	1.0	6/11/12 0:01	7.0	7/20/12 5:45	9.14	272.6	dpm/S	Pass
3072158082	1.0	6/11/12 0:01	7.0	7/20/12 5:54	5.71	266.4	dpm/S	Pass
3072158083	1.0	6/11/12 0:01	7.0	7/20/12 6:02	7.29	290.0	dpm/S	Pass
3072158084	1.0	6/11/12 0:01	7.0	7/20/12 6:10	5.57	255.1	dpm/S	Pass
3072158085	1.0	6/11/12 0:01	7.0	7/20/12 6:18	8.71	267.9	dpm/S	Pass
3072158086	1.0	6/11/12 0:01	7.0	7/20/12 6:26	7.14	264.2	dpm/S	Pass
3072158087	1.0	6/11/12 0:01	7.0	7/20/12 6:34	7.71	286.2	dpm/S	Pass
3072158088	1.0	6/11/12 0:01	7.0	7/20/12 6:42	8.14	284.4	dpm/S	Pass
3072158089	1.0	6/11/12 0:01	7.0	7/20/12 6:50	6.14	287.9	dpm/S	Pass
3072158090	1.0	6/11/12 0:01	7.0	7/20/12 6:58	9.29	260.1	dpm/S	Pass
3072158091	1.0	6/11/12 0:01	7.0	7/20/12 7:06	8.14	279.3	dpm/S	Pass
3072158092	1.0	6/11/12 0:01	7.0	7/20/12 7:14	8.71	273.3	dpm/S	Pass
3072158093	1.0	6/11/12 0:01	7.0	7/20/12 7:22	8.57	247.5	dpm/S	Pass
3072158094	1.0	6/11/12 0:01	7.0	7/20/12 7:31	7.29	263.4	dpm/S	Pass
3072158095	1.0	6/11/12 0:01	7.0	7/20/12 7:39	5.86	273.2	dpm/S	Pass
3072158096	1.0	6/11/12 0:01	7.0	7/20/12 7:47	5.71	289.7	dpm/S	Pass
3072158097	1.0	6/11/12 0:01	7.0	7/20/12 7:55	6.57	263.5	dpm/S	Pass
3072158098	1.0	6/11/12 0:01	7.0	7/20/12 8:03	6.57	296.5	dpm/S	Pass
3072158099	1.0	6/11/12 0:01	7.0	7/20/12 8:11	6.71	317.1	dpm/S	High, Evaluate
3072158100	1.0	6/11/12 0:01	7.0	7/20/12 8:19	5.57	297.9	dpm/S	Pass

7/31/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK
Matrix	Smear	**PrepSOP1**	0
Batch ID	12496	**PrepSOP2**	n/a
Prep Start	7/16/2012 12:00	**AnalSOP1**	0
Prep Finish	7/16/2012	**AnalSOP2**	n/a

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

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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
459093	0.5091	0.0000	1.0000	-1.454	4.098	4.101	9.914	3.607	1.005	4.098	1.00
3072158081	0.5220	0.1074	0.9940	4.066	4.687	4.712	9.726	3.539	0.986	4.687	1.00
3072158082	0.5220	0.1074	0.9940	-2.544	3.871	3.883	9.727	3.539	0.987	3.871	1.00
3072158083	0.5191	0.1075	0.9940	0.504	4.291	4.291	9.782	3.559	0.992	4.291	1.00
3072158084	0.5204	0.1075	0.9940	-2.823	3.846	3.860	9.758	3.550	0.990	3.846	1.00
3072158085	0.5221	0.1075	0.9940	3.237	4.593	4.609	9.726	3.539	0.986	4.593	1.00
3072158086	0.5218	0.1075	0.9940	0.212	4.232	4.232	9.730	3.540	0.987	4.232	1.00
3072158087	0.5201	0.1075	0.9940	1.315	4.382	4.384	9.762	3.552	0.990	4.382	1.00
3072158088	0.5205	0.1075	0.9940	2.145	4.478	4.485	9.754	3.549	0.989	4.478	1.00
3072158089	0.5197	0.1076	0.9940	-1.723	4.000	4.006	9.771	3.555	0.991	4.000	1.00
3072158090	0.5213	0.1076	0.9940	4.361	4.726	4.755	9.740	3.544	0.988	4.726	1.00
3072158091	0.5214	0.1076	0.9940	2.142	4.470	4.477	9.737	3.543	0.988	4.470	1.00
3072158092	0.5220	0.1076	0.9940	3.238	4.593	4.609	9.727	3.539	0.987	4.593	1.00
3072158093	0.5181	0.1076	0.9940	2.990	4.596	4.610	9.799	3.565	0.994	4.596	1.00
3072158094	0.5217	0.1076	0.9940	0.501	4.269	4.269	9.732	3.541	0.987	4.269	1.00
3072158095	0.5220	0.1076	0.9940	-2.255	3.910	3.919	9.727	3.539	0.987	3.910	1.00
3072158096	0.5191	0.1077	0.9940	-2.558	3.892	3.904	9.780	3.559	0.992	3.892	1.00
3072158097	0.5218	0.1077	0.9940	-0.887	4.093	4.094	9.732	3.541	0.987	4.093	1.00
3072158098	0.5167	0.1077	0.9940	-0.896	4.133	4.134	9.827	3.575	0.997	4.133	1.00
3072158099	0.5051	0.1077	0.9940	-0.637	4.264	4.265	10.053	3.658	1.020	4.264	1.00
3072158100	0.5161	0.1077	0.9940	-2.846	3.877	3.892	9.838	3.579	0.998	3.877	1.00

7/31/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/31/2012	**Method:**	EPA 906.0M
Worklist:	12496	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459093

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-1.4540	4.1010	9.9140	3.60700		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/31/12 10:58	7/31/12 11:06				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.695	1184.695				
Volume Used (mL):	0.100	0.100				
Aliquot Volume (L, g, F):	1.000	1.000				
Target Conc. (DPM/Sample, g, F):	118.469	118.469				
1.96 Sigma Uncertainty (Calculated):	2.136	2.136				
Result (DPM/Sample, g, F):	110.076	102.178				
1.96 Sigma Unc:	17.833	17.051				
% Recovery:	92.92%	86.25%				
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 I.D.:	LCS12496					
Duplicate Sample I.D.	LCSD12496					
Sample Result (DPM/Sample, g, F):	110.0760					
1.96 Sigma Unc:	17.8330					
ıple Duplicate Result (DPM/Sample, g, F):	102.1780					
Duplicate Sample 1.96 Sigma Unc.	17.0510					
Either results below MDC?	NO					
Relative Percent Difference:	7.44%					
Assessment:	Pass					
% RPD Limit:	25.00%					

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

Sample Matrix Spike Control Assessment

Analyte:			
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:			

Comments:

7/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12496

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	**Maximum**	**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

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	3.77	7.03	7.03	301.65	2

BKG 071912

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 2:48
		Sample Ct Duration (min)	7.0

S#	ELTIME	Calculated Count Start Date/Time	Sample ID
1	7	7/20/2012 2:41	3072158061
2	15	7/20/2012 2:49	3072158062
3	23	7/20/2012 2:57	3072158063
4	31	7/20/2012 3:05	3072158064
5	39	7/20/2012 3:13	3072158065
6	47	7/20/2012 3:21	3072158066
7	55	7/20/2012 3:29	3072158067
8	63	7/20/2012 3:37	3072158068
9	71	7/20/2012 3:45	3072158069
10	79	7/20/2012 3:53	3072158070
11	87	7/20/2012 4:01	3072158071
12	95	7/20/2012 4:09	3072158072
13	103	7/20/2012 4:17	3072158073
14	111	7/20/2012 4:25	3072158074
15	120	7/20/2012 4:34	3072158075
16	128	7/20/2012 4:42	3072158076
17	136	7/20/2012 4:50	3072158077
18	144	7/20/2012 4:58	3072158078
19	152	7/20/2012 5:06	3072158079
20	160	7/20/2012 5:14	3072158080
21	167	7/20/2012 5:21	LCS
22	175	7/20/2012 5:29	LCSD
23	183	7/20/2012 5:37	459091
24	191	7/20/2012 5:45	3072158081
25	200	7/20/2012 5:54	3072158082
26	208	7/20/2012 6:02	3072158083
27	216	7/20/2012 6:10	3072158084
28	224	7/20/2012 6:18	3072158085
29	232	7/20/2012 6:26	3072158086
30	240	7/20/2012 6:34	3072158087
31	248	7/20/2012 6:42	3072158088
32	256	7/20/2012 6:50	3072158089
33	264	7/20/2012 6:58	3072158090
34	272	7/20/2012 7:06	3072158091
35	280	7/20/2012 7:14	3072158092
36	288	7/20/2012 7:22	3072158093
37	297	7/20/2012 7:31	3072158094
38	305	7/20/2012 7:39	3072158095
39	313	7/20/2012 7:47	3072158096
40	321	7/20/2012 7:55	3072158097
41	329	7/20/2012 8:03	3072158098
42	337	7/20/2012 8:11	3072158099
43	345	7/20/2012 8:19	3072158100
44	352	7/20/2012 8:26	LCS
45	360	7/20/2012 8:34	LCSD
46	368	7/20/2012 8:42	459093

7/31/12

Protocol #:22 SWIPE_H3_C14 User :

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
22	1	7.00	7	4.14	7.43	7.29	281.70	3
22	2	7.00	15	5.71	8.14	8.14	277.23	2
22	3	7.00	23	3.57	6.43	6.57	302.83	2
22	4	7.00	31	3.29	6.57	6.86	297.70	3
22	5	7.00	39	3.00	6.43	6.14	262.04	3
22	6	7.00	47	5.00	7.14	6.71	380.03	3
22	7	7.00	55	1.29	2.71	2.29	291.05	7
22	8	7.00	63	4.00	6.71	6.57	276.61	2
22	9	7.00	71	5.43	9.14	9.14	240.75	2
22	10	7.00	79	4.00	7.57	7.43	263.06	3
22	11	7.00	87	2.29	6.29	6.00	255.85	4
22	12	7.00	95	5.00	8.14	8.29	282.69	2
22	13	7.00	103	3.86	7.57	7.57	248.72	2
22	14	7.00	111	2.71	6.29	6.14	261.16	2
22	15	7.00	120	4.71	7.71	7.71	291.78	2
22	16	7.00	128	4.14	5.71	5.86	279.32	2
22	17	7.00	136	3.71	6.71	6.57	278.33	3
22	18	7.00	144	6.14	10.43	10.29	279.26	2
22	19	7.00	152	5.14	8.00	8.00	282.35	2
22	20	7.00	160	6.71	10.71	10.71	264.29	1
22	21	6.83	167	612.15	616.98	639.09	305.77	0
22	22	6.80	175	616.62	621.32	646.03	308.15	0
22	23	7.00	183	4.71	8.00	8.00	297.30	2
22	24	7.00	191	5.71	9.14	9.14	272.60	2
22	25	7.00	200	3.00	5.86	5.71	266.44	3
22	26	7.00	208	4.86	7.29	7.29	289.96	2
22	27	7.00	216	2.71	5.71	5.57	255.14	4
22	28	7.00	224	4.29	8.57	8.71	267.85	1
22	29	7.00	232	4.29	7.43	7.14	264.20	3
22	30	7.00	240	3.29	7.57	7.71	286.16	1
22	31	7.00	248	4.43	8.43	8.14	284.37	3
22	32	7.00	256	3.29	6.43	6.14	287.90	3
22	33	7.00	264	6.29	9.29	9.29	260.07	2
22	34	7.00	272	3.71	8.00	8.14	279.29	2
22	35	7.00	280	4.29	8.71	8.71	273.33	2
22	36	7.00	288	5.57	8.43	8.57	247.49	2
22	37	7.00	297	4.14	7.29	7.29	263.44	2
22	38	7.00	305	2.57	6.00	5.86	273.21	2
22	39	7.00	313	2.14	5.71	5.71	289.67	3

FM	SM	TIME	ELTIME	CPMA	CPMB	CPMC	tSIE	LUM
22	40	7.00	321	3.14	6.86	6.57	263.51	3
22	41	7.00	329	3.57	6.57	6.57	296.54	3
22	42	7.00	337	3.43	7.14	6.71	317.11	3
22	43	7.00	345	3.14	5.71	5.57	297.92	3
22	44	6.16	352	679.71	684.90	711.36	324.98	0
22	45	6.38	360	660.97	665.67	690.13	315.87	0
22	46	7.00	368	3.29	6.29	6.29	311.15	3

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED

H3 IPA DATA PROCESSED

BKG IPA DATA PROCESSED

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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
307215806 1	12494	Swipe-H3.CM	7	22	7/19/12 1500	7	NA	JLL
062								
063								
064								
065								
066								
067								
068								
069								
070								
071								
072			↓					
073			9					
074								
075								
076								
077								
078								
079								
080								
LCS								
LCSD								
MB (459091)								
307215806 1	12496							

Run comments: _____

Peer Review: _____

Pace Analytical Services, Inc.-Pittsurgh

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
3012138080	13496	Swipe-H3_C14	17	22	7/19/13 1500	7	N/A	JLL
83								
84								
85								
86								
87								
88								
89								
90								
91								
92								
93								
94			18					
95								
96								
97								
98								
99								
100								
LCS								
LCSD								
MB (459093)								
BKG	MB 3001			1	7/19/13	7	N/A	JLL
NIC3201307119 NI								

Run comments: ____________________

Peer Review: __________

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Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK			
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	6.14	
Batch ID	12496	**PrepSOP2**	n/a	**Bkg Duration**	7.0	min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	BKG7/31/2012	
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/31/2012 10:50	
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**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
459093	1.0	1/0/00 0:00					dpm/S	Low, Reprep
3072158081	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158082	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158083	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158084	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158085	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158086	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158087	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158088	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158089	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158090	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158091	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158092	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158093	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158094	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158095	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158096	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158097	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158098	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158099	1.0	6/11/12 0:01					dpm/S	Low, Reprep
3072158100	1.0	6/11/12 0:01					dpm/S	Low, Reprep
LCS12496	1.0	7/31/12 10:58	7.0	7/31/12 10:58	61.86	315.5	dpm/S	High, Evaluate
LCSD12496	1.0	7/31/12 11:06	7.0	7/31/12 11:06	56.29	333.8	dpm/S	High, Evaluate

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	RMK
Matrix	Smear	**PrepSOP1**	0
Batch ID	12496	**PrepSOP2**	n/a
Prep Start	7/16/2012 12:00	**AnalSOP1**	0
Prep Finish	7/16/2012	**AnalSOP2**	n/a

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

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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
459093	-0.0406	0.0000	1.0000	151.064	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158081	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158082	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158083	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158084	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158085	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158086	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158087	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158088	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158089	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158090	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158091	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158092	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158093	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158094	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158095	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158096	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158097	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158098	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158099	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
3072158100	-0.0406	-112.4463	528.0170	0.286	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.00
LCS12496	0.5062	0.0000	1.0000	110.076	12.068	17.833	9.368	4.317	1.288	12.068	1.00
LCSD12496	0.4908	0.0000	1.0000	102.178	11.926	17.051	9.662	4.453	1.328	11.926	1.00

7/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12496

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
PrepSOP2 n/a
AnalSOP1
AnalSOP2 n/a

Sigma 1.96
Zero Factor 2.71

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%

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

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

			CSU (TPU) for Analysis	10.60%
Description	**Maximum**	**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

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%

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			7/31/2012 10:57
		Sample Ct Duration (min)	7.0
S#	ELTIME	Calculated Count Start Date/Time	Sample ID
1	7	7/31/2012 10:50	BKG 7/31/2012
2	15	7/31/2012 10:58	LCS12496
3	23	7/31/2012 11:06	LCSD12496

Protocol #: 3 SWIPE_H3_C14 User :

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
3	1	7.00	7	3.29	6.14	6.14	313.68	3
3	2	7.00	15	46.71	61.86	61.86	315.52	1
3	3	7.00	23	42.14	56.00	56.29	333.81	0

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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
3122161034	N/A	N/A	7 (private)	5 (tray)	7/27/12 1030	7 N/R	N/A	[illegible]
35	↓	↓	37	↓	↓	↓	↓	↓
36	↓	↓	[illegible]	↓	↓	↓	↓	↓
37	↓	↓	↓	↓	↓	↓	↓	↓
38	↓	↓	↓	9	↓	↓	↓	↓
39	↓	↓	↓	↓	↓	↓	↓	↓
40	↓	↓	↓	↓	↓	↓	↓	↓
LD 12508	↓	↓	↓	↓	↓	↓	↓	↓
LDD 12508	↓	↓	↓	↓	↓	↓	↓	↓
MB 459107	↓	↓	↓	↓	↓	7	N	[illegible]
BKG	12496	Swipe H3C14	10	3	7/31/12 0943	7	NA	[illegible]
LCS12496	↓	↓	↓	↓	↓	↓	↓	↓
LCSD12496	↓	↓	↓	↓	↓	↓	↓	↓

Run comments: ______________________________

Peer Review: ____________

J:\QAQC\Master\Document Management\Radiological\Liquid Scintillation Runlog (R023-3 7Oct2010).XLS

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

7/20/12
7/20/12

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

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* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
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 μg/g Ni carrier.

Source Prepared by: N. Kasate
N.E. Kasate, Radiochemist

QA Approved: D. M. Montgomery
D. M. Montgomery, QA Manager

Date: 11-6-09

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Nickel-63 Efficiency Quench Curve Calibration

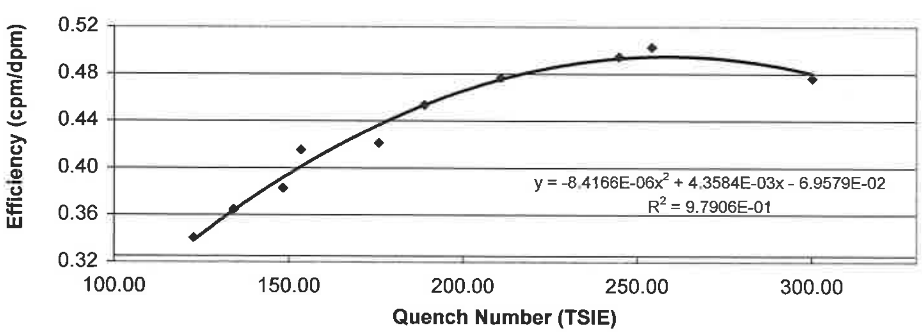
Analyst:	JLK
Calibration Date:	7/20/2012
Ni-63 Standard:	81012-493
Standard Bq on Reference Date	3456
Standard Total Mass (g)	4.99626
System ID:	System #2
Background:	7.83

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	Decay Corrected Standard dpm/g	Standard Source dpm	Region 1-160 Ni-63 ROI Standard Source cpm	Source Ct. time (min)	Source Net Counts	TSIE	Region 1-160 Ni-63 Source Efficiency (cpm/dpm)	Calculated Efficiency from Curve	% Diff from Cal	Source Acceptable (<10%)
Ni-63 20120719-N1	0.1019	11/5/2009	7/20/2012	988.38	0.99995	41500.9	4228.94	2020.85	6.00	12078.12	300.10	0.4760	0.4804	0.92%	Yes
Ni-63 20120719-N2	0.0995	11/5/2009	7/20/2012	988.38	0.99995	41500.9	4129.34	2082.61	6.00	12448.68	254.20	0.5024	0.4945	-1.59%	Yes
Ni-63 20120719-N3	0.0998	11/5/2009	7/20/2012	988.38	0.99995	41500.9	4141.79	2055.91	6.00	12288.48	244.90	0.4945	0.4930	-0.30%	Yes
Ni-63 20120719-N4	0.1040	11/5/2009	7/20/2012	988.38	0.99995	41500.9	4316.10	2065.34	6.00	12345.06	210.90	0.4767	0.4752	-0.31%	Yes
Ni-63 20120719-N5	0.1014	11/5/2009	7/20/2012	988.38	0.99995	41500.9	4208.19	1915.89	6.00	11448.36	188.90	0.4534	0.4534	-0.01%	Yes
Ni-63 20120719-N6	0.1015	11/5/2009	7/20/2012	988.38	0.99995	41500.9	4212.34	1781.94	7.00	12418.77	175.80	0.4212	0.4365	3.64%	Yes
Ni-63 20120719-N7	0.2060	11/5/2009	7/20/2012	988.38	0.99995	41500.9	8549.19	3557.22	3.00	10648.17	153.50	0.4152	0.4011	-3.38%	Yes
Ni-63 20120719-N8	0.2034	11/5/2009	7/20/2012	988.38	0.99995	41500.9	8441.29	3239.40	4.00	12926.28	148.30	0.3828	0.3917	2.31%	Yes
Ni-63 20120719-N9	0.2044	11/5/2009	7/20/2012	988.38	0.99995	41500.9	8482.79	3100.91	4.00	12372.32	134.20	0.3646	0.3637	-0.24%	Yes
Ni-63 20120719-N10	0.2036	11/5/2009	7/20/2012	988.42	0.99995	41500.9	8449.59	2889.22	4.00	11525.56	122.70	0.3410	0.3385	-0.74%	Yes

Ni-63 Efficiency vs. Quench Calibration
System #2 Region 1.0-160.0
7/20/2012



C	-8.4166E-06
D	4.3584E-03
E	-6.9579E-02

7/20/12
7/20/12

Printed 7/20/2012 at 11:26 AM

Ni63 quench cal 20120719 SYS2
P:\QA Folders\Calibrations\Ni59 and Ni63 Cals\Ni63 quench cal 20120719 SYS2

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 Repeat Sample Count: 1
#Vials/Sample: 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 Luminescence Correction: n/a
Colored Samples: n/a Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

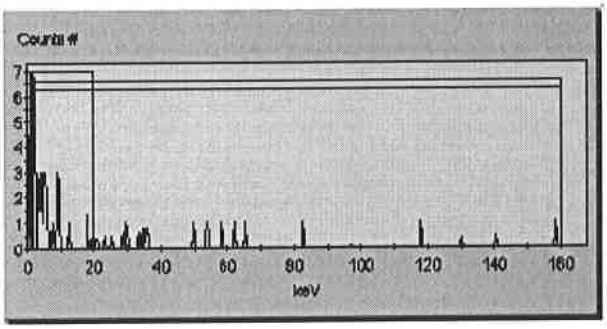
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 15.92 Date Processed: 7/19/12 11:40:58 AM

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

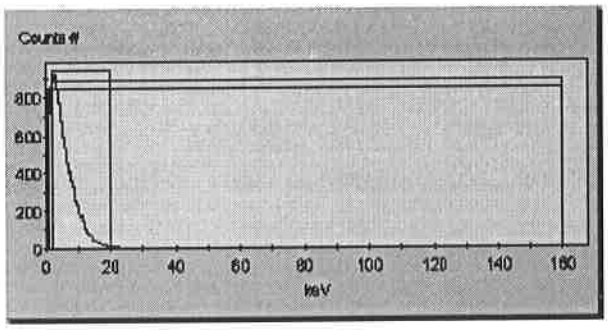
S#	PID	SMPL_ID / TIME	C.T. / LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
			BKG	8 7/20/12	4.34	317.6	6.45	7.83	
1	5	8:59:56 AM	8						

SpectraView Block Data



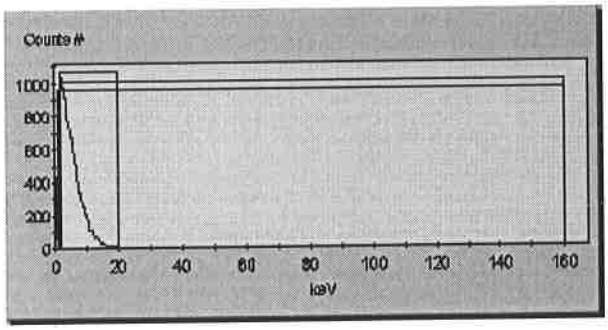
	NI63-20120719-N1	6 7/20/12	1763.93	300.1	1771.83	2020.85		
2	5 9:08:46 AM	0						

SpectraView Block Data



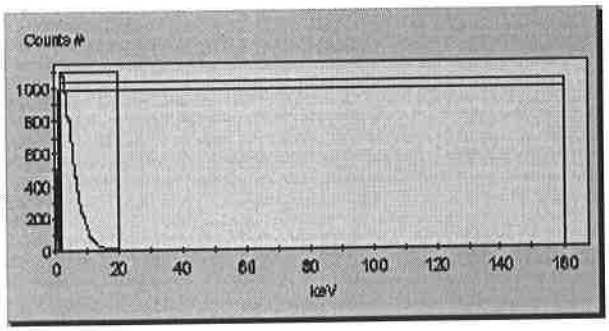
	NI63-20120179-N2	6 7/20/12	1813.72	254.2	1818.36	2082.61		
3	5 9:15:40 AM	0						

SpectraView Block Data



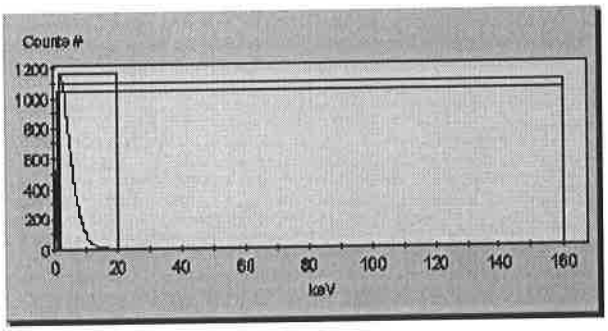
NI63-20120719-N3 6 7/20/12 1748.50 244.9 1754.08 2055.91
4 5 9:22:22 AM 0

SpectraView Block Data



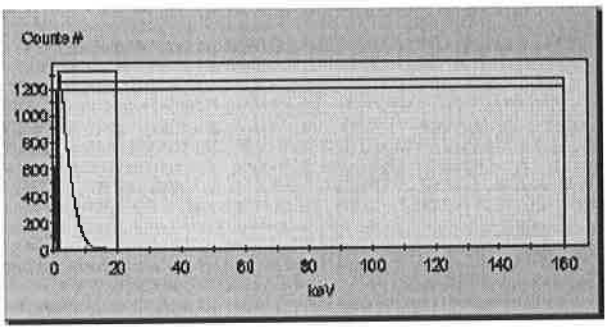
NI63-20120719-N4 6 7/20/12 1753.03 210.9 1756.32 2065.34
5 5 9:29:11 AM 0

SpectraView Block Data



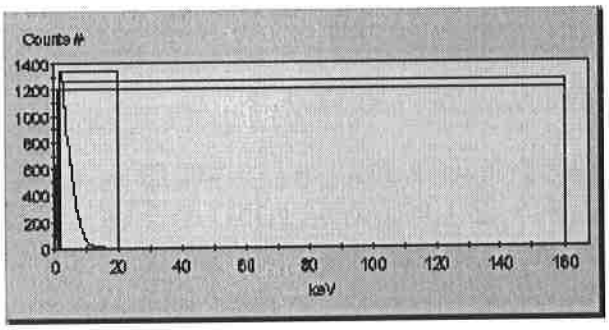
NI63-20120719-N5 6 7/20/12 1573.37 188.9 1575.74 1915.89
6 5 9:35:58 AM 0

SpectraView Block Data



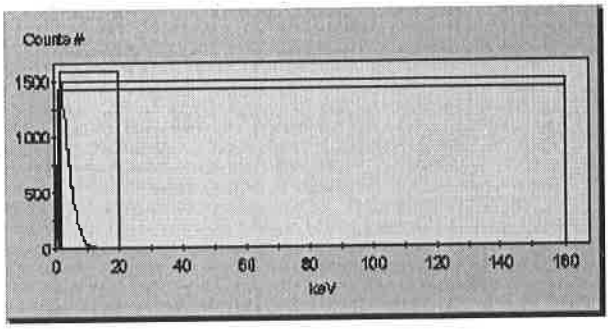
NI63-20120719-N6 7 7/20/12 1456.33 175.8 1458.71 1781.94
7 5 9:43:13 AM 0

SpectraView Block Data



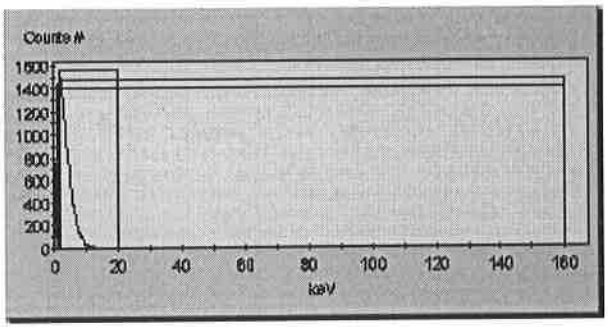
NI63-20120719-N7 3 7/20/12 2818.32 153.5 2821.87 3557.22
8 5 9:50:58 AM 0

SpectraView Block Data



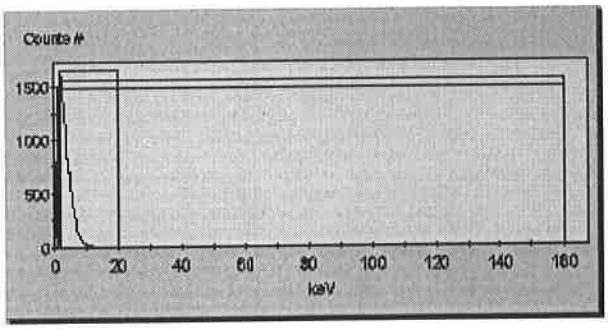
NI63-20120719-N8 4 7/20/12 2526.96 148.3 2529.45 3239.40
9 5 9:55:12 AM 0

SpectraView Block Data



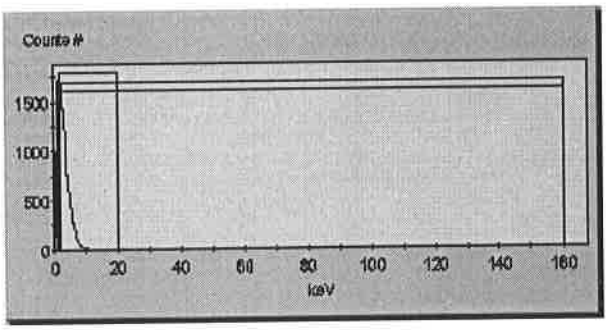
NI63-20120719-N9 4 7/20/12 2389.66 134.2 2392.64 3100.91
10 5 9:59:47 AM 0

SpectraView Block Data



NI63-20120719-N10 4 7/20/12 2122.40 122.7 2124.50 2889.22
11 5 10:04:33 AM 0

SpectraView Block Data



Pace Analytical

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
3KG	N Cal	Supe H3/C14	5	1	7/20/12 0845	8	7/20/12 0900	
N1 6320120719 N1								
N2								
N3								
N4								
N5								
N6								
N7								
N8								
N9								
N10								
3072 158038		Supe H3/C14	12	8	7/20/12 0945	12	NA	
39								
40								
LCS								
LCSD								
BKG								

Run comments: _____

Peer Review: _____

Nickel-63 Efficiency Quench Curve Calibration

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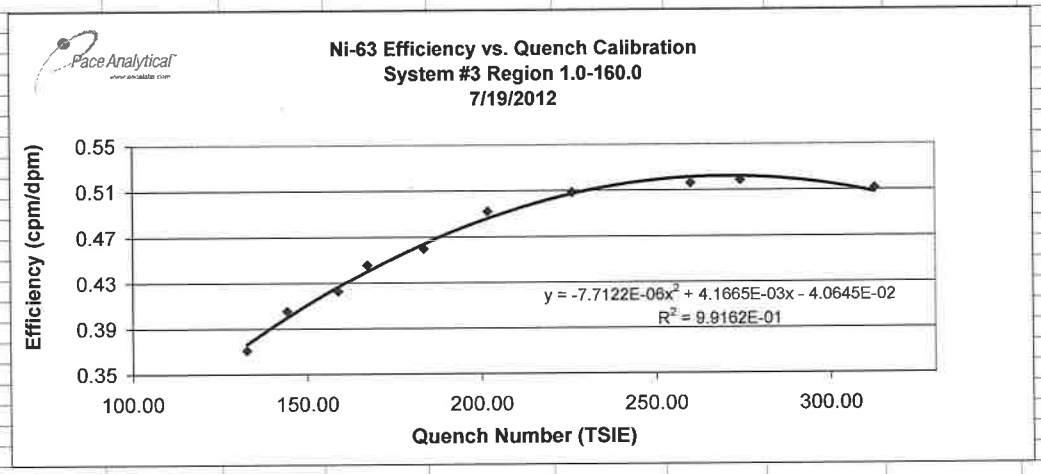
Analyst:	JLK	Detector System Settings	
Calibration Date:	7/19/2012	Count Mode:	Low Level
Ni-63 Standard:	81012-493	Background Subtract:	Off
Standard Bq on Reference Date	3456	Low Level Count Mode:	On
Standard Total Mass (g)	4.99626	Luminescence Correction:	On
System ID:	System #3	Region:	1.0-160.0
Background:	8.00		

Source	Standard Mass	Standard Ref Date	Count Date	Decay Days	Standard Decay Factor	Decay Corrected Standard dpm/g	Standard Source dpm	Region 1-160 Ni-63 ROI Standard Source cpm	Source Ct. time (min)	Source Net Counts	TSIE	Region 1-160 Ni-63 Source Efficiency (cpm/dpm)	Calculated Efficiency from Curve	% Diff from Cal	Source Acceptable (<10%)
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



C	-7.7122E-06
D	4.1665E-03
E	-4.0645E-02

7/7/2012
OK 7/30/12

Protocol #: 1 SWIPE_H3_C14 User :

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	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

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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
N163 20120719 N2	N.63Cal	Sample H3C14	5	1	7/19/12 1330	7	n/a	
N3								
N4								
N5								
N6								
N7								
N8								
N9								
N10								
MB		Sample H3C14	27	45	7/20/12 0900			
30 72159041								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52			23					
53								
54								

Run comments: _____

Peer Review: _____

Standards

ANALYTICS

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

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

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

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 µg/g Ni carrier.

P O NUMBER PI-4864, Item 2

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: 7-22-05

Rcd 8-16-05

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www.pacelabs.com

Radioactive Standards Dilution Logbook

09-009 N:63 Spike Solution

Parent source: 09-008
Parent Conc: 12334.51 dpm/g
Ref date: 4/5/2005 12:00 EST

Explication: ND

$$\frac{25.26\,g \left(\frac{12334.51\ dpm}{g} \right)}{250.0\,ml} = 1246.3\ \frac{dpm}{ml}$$

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

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Radioactive Standards Dilution Logbook

09-008 Ni-63 Spike "A" Solution

Parent Source: Analytics 71157A-493
Parent Cnc.: 10610 DPS (Bq)
Parent Ref date: 4/5/2005 12:00 EST
NO EXP ASSIGNED

5.0210 g	10610 DPS	60 dps/dpm = 12334.51 dpm/g
5.08501 g	50.9616 g	

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 µCi QA
Date 04/05/05 12:00 EST Exp. XXXXXX
PO # PI-4864, Item 2
5.08501 g 0.1M HCl solution
CAUTION RADIOACTIVE MATERIAL