Pace Analytical™
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RTI Laboratories, Inc.

Client Ref.: Fort Monmouth 1207076

Pace-Pittsburgh Project No. 3072156

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 3072156

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 3072156 with corresponding samples IDs of 3072156001 through 3072156100. 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.

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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
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(724)850-5600

July 31, 2012

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

RE: Project: Fort Monmonth 1207076
Pace Project No.: 3072156

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 1207076
Pace Project No.: 3072156

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 1207076
Pace Project No.: 3072156

Lab ID	Sample ID	Matrix	Date Collected	Date Received
3072156001	SU-07-32	Wipe	06/11/12 00:01	06/25/12 10:15
3072156002	SU-07-33	Wipe	06/11/12 00:01	06/25/12 10:15
3072156003	SU-07-34	Wipe	06/11/12 00:01	06/25/12 10:15
3072156004	SU-07-35	Wipe	06/11/12 00:01	06/25/12 10:15
3072156005	SU-07-35D	Wipe	06/11/12 00:01	06/25/12 10:15
3072156006	SU-07-36	Wipe	06/11/12 00:01	06/25/12 10:15
3072156007	SU-07-37	Wipe	06/11/12 00:01	06/25/12 10:15
3072156008	SU-07-38	Wipe	06/11/12 00:01	06/25/12 10:15
3072156009	SU-07-39	Wipe	06/11/12 00:01	06/25/12 10:15
3072156010	SU-07-40	Wipe	06/11/12 00:01	06/25/12 10:15
3072156011	SU-07-41	Wipe	06/11/12 00:01	06/25/12 10:15
3072156012	SU-07-42	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156021	SU-12-2	Wipe	06/11/12 00:01	06/25/12 10:15
3072156022	SU-12-3	Wipe	06/11/12 00:01	06/25/12 10:15
3072156023	SU-12-4	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156033	SU-12-13	Wipe	06/11/12 00:01	06/25/12 10:15
3072156034	SU-12-14	Wipe	06/11/12 00:01	06/25/12 10:15
3072156035	SU-12-15	Wipe	06/11/12 00:01	06/25/12 10:15
3072156036	SU-12-15D	Wipe	06/11/12 00:01	06/25/12 10:15
3072156037	SU-12-16	Wipe	06/11/12 00:01	06/25/12 10:15

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SAMPLE SUMMARY

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Lab ID	Sample ID	Matrix	Date Collected	Date Received
3072156038	SU-12-17	Wipe	06/11/12 00:01	06/25/12 10:15
3072156039	SU-12-18	Wipe	06/11/12 00:01	06/25/12 10:15
3072156040	SU-12-19	Wipe	06/11/12 00:01	06/25/12 10:15
3072156041	SU-12-20	Wipe	06/11/12 00:01	06/25/12 10:15
3072156042	SU-12-21	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156044	SU-12-23	Wipe	06/11/12 00:01	06/25/12 10:15
3072156045	SU-12-24	Wipe	06/11/12 00:01	06/25/12 10:15
3072156046	SU-12-24D	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156062	SU-13-7	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156066	SU-13-11	Wipe	06/11/12 00:01	06/25/12 10:15
3072156067	SU-13-11D	Wipe	06/11/12 00:01	06/25/12 10:15
3072156068	SU-13-12	Wipe	06/11/12 00:01	06/25/12 10:15
3072156069	SU-13-13	Wipe	06/11/12 00:01	06/25/12 10:15
3072156070	SU-13-14	Wipe	06/11/12 00:01	06/25/12 10:15
3072156071	SU-13-15	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156074	SU-13-18	Wipe	06/11/12 00:01	06/25/12 10:15

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SAMPLE SUMMARY

Project: Fort Monmonth 1207076
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Lab ID	Sample ID	Matrix	Date Collected	Date Received
3072156075	SU-13-19	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156083	SU-13-27	Wipe	06/11/12 00:01	06/25/12 10:15
3072156084	SU-13-27D	Wipe	06/11/12 00:01	06/25/12 10:15
3072156085	SU-13-28	Wipe	06/11/12 00:01	06/25/12 10:15
3072156086	SU-13-29	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156091	SU-13-34	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156093	SU-13-35D	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156096	SU-13-38	Wipe	06/11/12 00:01	06/25/12 10:15
3072156097	SU-13-39	Wipe	06/11/12 00:01	06/25/12 10:15
3072156098	SU-13-40	Wipe	06/11/12 00:01	06/25/12 10:15
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3072156100	SU-10-2	Wipe	06/11/12 00:01	06/25/12 10:15

Pace Analytical Services, Inc.
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Greensburg, PA 15601
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SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3072156001	SU-07-32	EPA 906.0M	MBT	1	PASI-PA
3072156002	SU-07-33	EPA 906.0M	MBT	1	PASI-PA
3072156003	SU-07-34	EPA 906.0M	MBT	1	PASI-PA
3072156004	SU-07-35	EPA 906.0M	MBT	1	PASI-PA
3072156005	SU-07-35D	EPA 906.0M	MBT	1	PASI-PA
3072156006	SU-07-36	EPA 906.0M	MBT	1	PASI-PA
3072156007	SU-07-37	EPA 906.0M	MBT	1	PASI-PA
3072156008	SU-07-38	EPA 906.0M	MBT	1	PASI-PA
3072156009	SU-07-39	EPA 906.0M	MBT	1	PASI-PA
3072156010	SU-07-40	EPA 906.0M	MBT	1	PASI-PA
3072156011	SU-07-41	EPA 906.0M	MBT	1	PASI-PA
3072156012	SU-07-42	EPA 906.0M	MBT	1	PASI-PA
3072156013	SU-07-43	EPA 906.0M	MBT	1	PASI-PA
3072156014	SU-07-44	EPA 906.0M	MBT	1	PASI-PA
3072156015	SU-07-45	EPA 906.0M	MBT	1	PASI-PA
3072156016	SU-07-46	EPA 906.0M	MBT	1	PASI-PA
3072156017	SU-07-47	EPA 906.0M	MBT	1	PASI-PA
3072156018	SU-07-48	EPA 906.0M	MBT	1	PASI-PA
3072156019	SU-07-49	EPA 906.0M	MBT	1	PASI-PA
3072156020	SU-12-1	EPA 906.0M	MBT	1	PASI-PA
3072156021	SU-12-2	EPA 906.0M	MBT	1	PASI-PA
3072156022	SU-12-3	EPA 906.0M	MBT	1	PASI-PA
3072156023	SU-12-4	EPA 906.0M	MBT	1	PASI-PA
3072156024	SU-12-5	EPA 906.0M	MBT	1	PASI-PA
3072156025	SU-12-5D	EPA 906.0M	MBT	1	PASI-PA
3072156026	SU-12-6	EPA 906.0M	MBT	1	PASI-PA
3072156027	SU-12-7	EPA 906.0M	MBT	1	PASI-PA
3072156028	SU-12-8	EPA 906.0M	MBT	1	PASI-PA
3072156029	SU-12-9	EPA 906.0M	MBT	1	PASI-PA
3072156030	SU-12-10	EPA 906.0M	MBT	1	PASI-PA
3072156031	SU-12-11	EPA 906.0M	MBT	1	PASI-PA
3072156032	SU-12-12	EPA 906.0M	MBT	1	PASI-PA
3072156033	SU-12-13	EPA 906.0M	MBT	1	PASI-PA
3072156034	SU-12-14	EPA 906.0M	MBT	1	PASI-PA
3072156035	SU-12-15	EPA 906.0M	MBT	1	PASI-PA
3072156036	SU-12-15D	EPA 906.0M	MBT	1	PASI-PA
3072156037	SU-12-16	EPA 906.0M	MBT	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3072156038	SU-12-17	EPA 906.0M	MBT	1	PASI-PA
3072156039	SU-12-18	EPA 906.0M	MBT	1	PASI-PA
3072156040	SU-12-19	EPA 906.0M	MBT	1	PASI-PA
3072156041	SU-12-20	EPA 906.0M	MBT	1	PASI-PA
3072156042	SU-12-21	EPA 906.0M	MBT	1	PASI-PA
3072156043	SU-12-22	EPA 906.0M	MBT	1	PASI-PA
3072156044	SU-12-23	EPA 906.0M	MBT	1	PASI-PA
3072156045	SU-12-24	EPA 906.0M	MBT	1	PASI-PA
3072156046	SU-12-24D	EPA 906.0M	MBT	1	PASI-PA
3072156047	SU-12-25	EPA 906.0M	MBT	1	PASI-PA
3072156048	SU-12-26	EPA 906.0M	MBT	1	PASI-PA
3072156049	SU-12-27	EPA 906.0M	MBT	1	PASI-PA
3072156050	SU-12-28	EPA 906.0M	MBT	1	PASI-PA
3072156051	SU-12-29	EPA 906.0M	MBT	1	PASI-PA
3072156052	SU-12-30	EPA 906.0M	MBT	1	PASI-PA
3072156053	SU-12-31	EPA 906.0M	MBT	1	PASI-PA
3072156054	SU-12-32	EPA 906.0M	MBT	1	PASI-PA
3072156055	SU-13-1	EPA 906.0M	MBT	1	PASI-PA
3072156056	SU-13-2	EPA 906.0M	MBT	1	PASI-PA
3072156057	SU-13-3	EPA 906.0M	MBT	1	PASI-PA
3072156058	SU-13-4	EPA 906.0M	MBT	1	PASI-PA
3072156059	SU-13-4D	EPA 906.0M	MBT	1	PASI-PA
3072156060	SU-13-5	EPA 906.0M	MBT	1	PASI-PA
3072156061	SU-13-6	EPA 906.0M	MBT	1	PASI-PA
3072156062	SU-13-7	EPA 906.0M	MBT	1	PASI-PA
3072156063	SU-13-8	EPA 906.0M	MBT	1	PASI-PA
3072156064	SU-13-9	EPA 906.0M	MBT	1	PASI-PA
3072156065	SU-13-10	EPA 906.0M	MBT	1	PASI-PA
3072156066	SU-13-11	EPA 906.0M	MBT	1	PASI-PA
3072156067	SU-13-11D	EPA 906.0M	MBT	1	PASI-PA
3072156068	SU-13-12	EPA 906.0M	MBT	1	PASI-PA
3072156069	SU-13-13	EPA 906.0M	MBT	1	PASI-PA
3072156070	SU-13-14	EPA 906.0M	MBT	1	PASI-PA
3072156071	SU-13-15	EPA 906.0M	MBT	1	PASI-PA
3072156072	SU-13-16	EPA 906.0M	MBT	1	PASI-PA
3072156073	SU-13-17	EPA 906.0M	MBT	1	PASI-PA
3072156074	SU-13-18	EPA 906.0M	MBT	1	PASI-PA

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SAMPLE ANALYTE COUNT

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3072156075	SU-13-19	EPA 906.0M	MBT	1	PASI-PA
3072156076	SU-13-20	EPA 906.0M	MBT	1	PASI-PA
3072156077	SU-13-21	EPA 906.0M	MBT	1	PASI-PA
3072156078	SU-13-22	EPA 906.0M	MBT	1	PASI-PA
3072156079	SU-13-23	EPA 906.0M	MBT	1	PASI-PA
3072156080	SU-13-24	EPA 906.0M	MBT	1	PASI-PA
3072156081	SU-13-25	EPA 906.0M	MBT	1	PASI-PA
3072156082	SU-13-26	EPA 906.0M	MBT	1	PASI-PA
3072156083	SU-13-27	EPA 906.0M	MBT	1	PASI-PA
3072156084	SU-13-27D	EPA 906.0M	MBT	1	PASI-PA
3072156085	SU-13-28	EPA 906.0M	MBT	1	PASI-PA
3072156086	SU-13-29	EPA 906.0M	MBT	1	PASI-PA
3072156087	SU-13-30	EPA 906.0M	MBT	1	PASI-PA
3072156088	SU-13-31	EPA 906.0M	MBT	1	PASI-PA
3072156089	SU-13-32	EPA 906.0M	MBT	1	PASI-PA
3072156090	SU-13-33	EPA 906.0M	MBT	1	PASI-PA
3072156091	SU-13-34	EPA 906.0M	MBT	1	PASI-PA
3072156092	SU-13-35	EPA 906.0M	MBT	1	PASI-PA
3072156093	SU-13-35D	EPA 906.0M	MBT	1	PASI-PA
3072156094	SU-13-36	EPA 906.0M	MBT	1	PASI-PA
3072156095	SU-13-37	EPA 906.0M	MBT	1	PASI-PA
3072156096	SU-13-38	EPA 906.0M	MBT	1	PASI-PA
3072156097	SU-13-39	EPA 906.0M	MBT	1	PASI-PA
3072156098	SU-13-40	EPA 906.0M	MBT	1	PASI-PA
3072156099	SU-10-1	EPA 906.0M	MBT	1	PASI-PA
3072156100	SU-10-2	EPA 906.0M	MBT	1	PASI-PA

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-07-32 **Lab ID: 3072156001** 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	**-10.9U ± 3.98 (8.99)**	dpm/sample	07/17/12 02:34		

Sample: SU-07-33 **Lab ID: 3072156002** 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	**-7.75U ± 4.13 (9.11)**	dpm/sample	07/17/12 02:50		

Sample: SU-07-34 **Lab ID: 3072156003** 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	**-9.47U ± 4.00 (8.96)**	dpm/sample	07/17/12 03:06		

Sample: SU-07-35 **Lab ID: 3072156004** 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	**-7.18U ± 4.08 (8.96)**	dpm/sample	07/17/12 03:22		

Sample: SU-07-35D **Lab ID: 3072156005** 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	**-10.5U ± 3.98 (8.97)**	dpm/sample	07/17/12 03:38		

Sample: SU-07-36 **Lab ID: 3072156006** 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	**-9.38U ± 4.02 (8.98)**	dpm/sample	07/17/12 03:54		

Sample: SU-07-37 **Lab ID: 3072156007** 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	**-10.5U ± 3.97 (8.96)**	dpm/sample	07/17/12 04:10		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-07-38 **Lab ID: 3072156008** 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	**-7.18U ± 4.08 (8.96)**	dpm/sample	07/17/12 04:26		

Sample: SU-07-39 **Lab ID: 3072156009** 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	**-9.96U ± 4.06 (9.12)**	dpm/sample	07/17/12 04:42		

Sample: SU-07-40 **Lab ID: 3072156010** 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	**-7.97U ± 4.05 (8.96)**	dpm/sample	07/17/12 04:58		

Sample: SU-07-41 **Lab ID: 3072156011** 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	**-10.7U ± 3.98 (8.99)**	dpm/sample	07/17/12 05:14		

Sample: SU-07-42 **Lab ID: 3072156012** 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	**-8.13U ± 4.08 (9.02)**	dpm/sample	07/17/12 05:30		

Sample: SU-07-43 **Lab ID: 3072156013** 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	**-10.2U ± 4.00 (8.99)**	dpm/sample	07/17/12 05:46		

Sample: SU-07-44 **Lab ID: 3072156014** 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	**-1.57U ± 4.38 (9.57)**	dpm/sample	07/21/12 23:17		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Sample: SU-07-45 **Lab ID: 3072156015** 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	**-8.18U ± 4.06 (8.99)**	dpm/sample	07/17/12 06:25		

Sample: SU-07-46 **Lab ID: 3072156016** 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	**-7.69U ± 4.06 (8.96)**	dpm/sample	07/17/12 06:41		

Sample: SU-07-47 **Lab ID: 3072156017** 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	**-3.20U ± 3.85 (8.72)**	dpm/sample	07/21/12 23:30		

Sample: SU-07-48 **Lab ID: 3072156018** 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	**-8.26U ± 4.05 (8.98)**	dpm/sample	07/17/12 07:21		

Sample: SU-07-49 **Lab ID: 3072156019** 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	**-3.46U ± 4.25 (8.96)**	dpm/sample	07/17/12 07:37		

Sample: SU-12-1 **Lab ID: 3072156020** 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	**-5.84U ± 4.27 (9.23)**	dpm/sample	07/17/12 07:53		

Sample: SU-12-2 **Lab ID: 3072156021** 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	**-8.72U ± 4.03 (8.97)**	dpm/sample	07/17/12 08:57		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Sample: SU-12-3 **Lab ID: 3072156022** 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	**-9.78U ± 3.99 (8.96)**	dpm/sample	07/17/12 09:13		

Sample: SU-12-4 **Lab ID: 3072156023** 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	**-10.5U ± 4.16 (9.36)**	dpm/sample	07/17/12 09:28		

Sample: SU-12-5 **Lab ID: 3072156024** 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	**-6.73U ± 4.10 (8.96)**	dpm/sample	07/17/12 09:44		

Sample: SU-12-5D **Lab ID: 3072156025** 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	**-11.7U ± 4.08 (9.25)**	dpm/sample	07/17/12 10:00		

Sample: SU-12-6 **Lab ID: 3072156026** 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	**-8.70U ± 4.05 (9.00)**	dpm/sample	07/17/12 10:16		

Sample: SU-12-7 **Lab ID: 3072156027** 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	**-6.63U ± 4.11 (8.97)**	dpm/sample	07/17/12 10:32		

Sample: SU-12-8 **Lab ID: 3072156028** 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	**-8.54U ± 4.18 (9.27)**	dpm/sample	07/17/12 10:47		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-12-9 **Lab ID: 3072156029** 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	**-8.69U ± 4.32 (9.57)**	dpm/sample	07/17/12 11:03		

Sample: SU-12-10 **Lab ID: 3072156030** 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	**-9.66U ± 3.99 (8.96)**	dpm/sample	07/17/12 11:19		

Sample: SU-12-11 **Lab ID: 3072156031** 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	**-10.4U ± 3.98 (8.97)**	dpm/sample	07/17/12 11:35		

Sample: SU-12-12 **Lab ID: 3072156032** 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	**-7.98U ± 4.08 (9.01)**	dpm/sample	07/17/12 11:51		

Sample: SU-12-13 **Lab ID: 3072156033** 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	**-7.30U ± 4.08 (8.96)**	dpm/sample	07/17/12 12:07		

Sample: SU-12-14 **Lab ID: 3072156034** 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	**-8.90U ± 4.09 (9.10)**	dpm/sample	07/17/12 12:22		

Sample: SU-12-15 **Lab ID: 3072156035** 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	**-9.73U ± 4.03 (9.04)**	dpm/sample	07/17/12 12:38		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Sample: SU-12-15D **Lab ID: 3072156036** 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	**-9.79U ± 4.02 (9.02)**	dpm/sample	07/17/12 12:54		

Sample: SU-12-16 **Lab ID: 3072156037** 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	**-7.52U ± 4.07 (8.96)**	dpm/sample	07/17/12 13:10		

Sample: SU-12-17 **Lab ID: 3072156038** 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	**3.68U ± 5.55 (11.1)**	dpm/sample	07/21/12 23:42		

Sample: SU-12-18 **Lab ID: 3072156039** 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	**2.33U ± 4.13 (8.34)**	dpm/sample	07/21/12 23:55		

Sample: SU-12-19 **Lab ID: 3072156040** 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	**-10.9U ± 4.14 (9.33)**	dpm/sample	07/17/12 14:33		

Sample: SU-12-20 **Lab ID: 3072156041** 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	**-6.53U ± 3.84 (7.79)**	dpm/sample	07/17/12 16:16		

Sample: SU-12-21 **Lab ID: 3072156042** 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	**-7.21U ± 3.79 (7.73)**	dpm/sample	07/17/12 16:37		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-12-22 **Lab ID: 3072156043** 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	**-7.40U ± 3.79 (7.73)**	dpm/sample	07/17/12 16:58		

Sample: SU-12-23 **Lab ID: 3072156044** 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	**-8.31U ± 3.78 (7.77)**	dpm/sample	07/17/12 17:19		

Sample: SU-12-24 **Lab ID: 3072156045** 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	**-6.64U ± 4.02 (8.15)**	dpm/sample	07/17/12 17:40		

Sample: SU-12-24D **Lab ID: 3072156046** 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	**-7.73U ± 3.77 (7.71)**	dpm/sample	07/17/12 18:01		

Sample: SU-12-25 **Lab ID: 3072156047** 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	**-9.43U ± 3.81 (7.86)**	dpm/sample	07/17/12 18:22		

Sample: SU-12-26 **Lab ID: 3072156048** 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	**-5.79U ± 3.82 (7.71)**	dpm/sample	07/17/12 18:43		

Sample: SU-12-27 **Lab ID: 3072156049** 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	**-6.57U ± 5.21 (10.4)**	dpm/sample	07/17/12 19:04		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-12-28 **Lab ID: 3072156050** 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	**-7.75U ± 3.77 (7.72)**	dpm/sample	07/17/12 19:25		

Sample: SU-12-29 **Lab ID: 3072156051** 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	**-7.81U ± 3.96 (8.10)**	dpm/sample	07/17/12 19:46		

Sample: SU-12-30 **Lab ID: 3072156052** 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	**-10.9U ± 4.02 (8.31)**	dpm/sample	07/17/12 20:07		

Sample: SU-12-31 **Lab ID: 3072156053** 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	**-11.1U ± 3.95 (8.19)**	dpm/sample	07/17/12 20:28		

Sample: SU-12-32 **Lab ID: 3072156054** 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	**-7.33U ± 3.78 (7.72)**	dpm/sample	07/17/12 20:49		

Sample: SU-13-1 **Lab ID: 3072156055** 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	**-10.0U ± 3.73 (7.72)**	dpm/sample	07/17/12 21:10		

Sample: SU-13-2 **Lab ID: 3072156056** 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	**-8.34U ± 3.82 (7.83)**	dpm/sample	07/17/12 21:31		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Sample: SU-13-3 **Lab ID: 3072156057** 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	**-11.5U ± 3.72 (7.73)**	dpm/sample	07/17/12 21:52		

Sample: SU-13-4 **Lab ID: 3072156058** 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	**-12.2U ± 3.71 (7.71)**	dpm/sample	07/17/12 22:13		

Sample: SU-13-4D **Lab ID: 3072156059** 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	**-7.26U ± 3.81 (7.78)**	dpm/sample	07/17/12 22:35		

Sample: SU-13-5 **Lab ID: 3072156060** 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	**-10.0U ± 3.73 (7.71)**	dpm/sample	07/17/12 22:56		

Sample: SU-13-6 **Lab ID: 3072156061** 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	**-10.1U ± 3.73 (7.71)**	dpm/sample	07/18/12 01:54		

Sample: SU-13-7 **Lab ID: 3072156062** 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	**-8.28U ± 3.77 (7.74)**	dpm/sample	07/18/12 02:15		

Sample: SU-13-8 **Lab ID: 3072156063** 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	**-11.0U ± 3.72 (7.72)**	dpm/sample	07/18/12 02:36		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Sample: SU-13-9 **Lab ID: 3072156064** 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	**-8.17U ± 3.77 (7.73)**	dpm/sample	07/18/12 02:57		

Sample: SU-13-10 **Lab ID: 3072156065** 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	**-8.85U ± 3.76 (7.73)**	dpm/sample	07/18/12 03:18		

Sample: SU-13-11 **Lab ID: 3072156066** 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	**-10.2U ± 3.77 (7.81)**	dpm/sample	07/18/12 03:39		

Sample: SU-13-11D **Lab ID: 3072156067** 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	**-8.81U ± 3.78 (7.77)**	dpm/sample	07/18/12 04:00		

Sample: SU-13-12 **Lab ID: 3072156068** 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	**-7.90U ± 3.80 (7.79)**	dpm/sample	07/18/12 04:21		

Sample: SU-13-13 **Lab ID: 3072156069** 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	**-4.94U ± 3.53 (8.31)**	dpm/sample	07/22/12 00:21		

Sample: SU-13-14 **Lab ID: 3072156070** 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	**-8.69U ± 3.75 (7.72)**	dpm/sample	07/18/12 09:01		

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ANALYTICAL RESULTS

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

Sample: SU-13-15 **Lab ID: 3072156071** 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	**-6.87U ± 3.84 (7.81)**	dpm/sample	07/18/12 09:22		

Sample: SU-13-16 **Lab ID: 3072156072** 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	**-9.21U ± 3.74 (7.71)**	dpm/sample	07/18/12 09:43		

Sample: SU-13-17 **Lab ID: 3072156073** 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	**-7.47U ± 3.78 (7.72)**	dpm/sample	07/18/12 10:04		

Sample: SU-13-18 **Lab ID: 3072156074** 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	**-5.82U ± 3.88 (7.83)**	dpm/sample	07/18/12 10:25		

Sample: SU-13-19 **Lab ID: 3072156075** 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	**-9.43U ± 3.74 (7.71)**	dpm/sample	07/18/12 10:46		

Sample: SU-13-20 **Lab ID: 3072156076** 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	**-8.62U ± 3.76 (7.73)**	dpm/sample	07/18/12 11:07		

Sample: SU-13-21 **Lab ID: 3072156077** 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	**-8.81U ± 3.77 (7.75)**	dpm/sample	07/18/12 11:28		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-13-22 **Lab ID: 3072156078** 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	**-7.63U ± 3.78 (7.74)**	dpm/sample	07/18/12 11:49		

Sample: SU-13-23 **Lab ID: 3072156079** 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	**-8.99U ± 3.75 (7.72)**	dpm/sample	07/18/12 12:10		

Sample: SU-13-24 **Lab ID: 3072156080** 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	**-9.16U ± 3.75 (7.72)**	dpm/sample	07/18/12 12:31		

Sample: SU-13-25 **Lab ID: 3072156081** 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	**-11.3U ± 3.72 (7.72)**	dpm/sample	07/18/12 13:54		

Sample: SU-13-26 **Lab ID: 3072156082** 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	**-10.4U ± 3.72 (7.72)**	dpm/sample	07/18/12 14:15		

Sample: SU-13-27 **Lab ID: 3072156083** 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	**-6.11U ± 3.82 (7.73)**	dpm/sample	07/18/12 14:36		

Sample: SU-13-27D **Lab ID: 3072156084** 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	**-8.01U ± 3.85 (7.89)**	dpm/sample	07/18/12 14:57		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-13-28 **Lab ID: 3072156085** 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	**-6.96U ± 3.79 (7.72)**	dpm/sample	07/18/12 15:18		

Sample: SU-13-29 **Lab ID: 3072156086** 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	**-8.18U ± 3.76 (7.72)**	dpm/sample	07/18/12 15:39		

Sample: SU-13-30 **Lab ID: 3072156087** 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	**-9.03U ± 3.74 (7.71)**	dpm/sample	07/18/12 16:00		

Sample: SU-13-31 **Lab ID: 3072156088** 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	**-7.09U ± 3.79 (7.73)**	dpm/sample	07/18/12 16:21		

Sample: SU-13-32 **Lab ID: 3072156089** 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	**-10.7U ± 3.73 (7.74)**	dpm/sample	07/18/12 16:42		

Sample: SU-13-33 **Lab ID: 3072156090** 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	**-9.72U ± 3.73 (7.71)**	dpm/sample	07/18/12 17:02		

Sample: SU-13-34 **Lab ID: 3072156091** 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	**-9.80U ± 3.73 (7.71)**	dpm/sample	07/18/12 17:23		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-13-35 **Lab ID: 3072156092** 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 ± 3.74 (7.71)**	dpm/sample	07/18/12 17:44		

Sample: SU-13-35D **Lab ID: 3072156093** 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	**-8.19U ± 3.83 (7.84)**	dpm/sample	07/18/12 18:05		

Sample: SU-13-36 **Lab ID: 3072156094** 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	**-7.72U ± 3.81 (7.79)**	dpm/sample	07/18/12 18:26		

Sample: SU-13-37 **Lab ID: 3072156095** 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	**-5.34U ± 3.94 (7.91)**	dpm/sample	07/18/12 18:47		

Sample: SU-13-38 **Lab ID: 3072156096** 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	**-7.65U ± 3.77 (7.71)**	dpm/sample	07/18/12 19:08		

Sample: SU-13-39 **Lab ID: 3072156097** 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	**-8.28U ± 3.84 (7.88)**	dpm/sample	07/18/12 19:29		

Sample: SU-13-40 **Lab ID: 3072156098** 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	**-7.79U ± 3.77 (7.72)**	dpm/sample	07/18/12 19:50		

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ANALYTICAL RESULTS

Project: Fort Monmonth 1207076
Pace Project No.: 3072156

Sample: SU-10-1 **Lab ID: 3072156099** 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	**-7.16U ± 3.78 (7.71)**	dpm/sample	07/18/12 20:11		

Sample: SU-10-2 **Lab ID: 3072156100** 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	**-8.12U ± 3.77 (7.74)**	dpm/sample	07/18/12 20:32		

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QUALITY CONTROL DATA

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

QC Batch: RADC/12481 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072156001, 3072156002, 3072156003, 3072156004, 3072156005, 3072156006, 3072156007, 3072156008, 3072156009, 3072156010, 3072156011, 3072156012, 3072156013, 3072156014, 3072156015, 3072156016, 3072156017, 3072156018, 3072156019, 3072156020

METHOD BLANK: 459066 Matrix: Impact Plate
Associated Lab Samples: 3072156001, 3072156002, 3072156003, 3072156004, 3072156005, 3072156006, 3072156007, 3072156008, 3072156009, 3072156010, 3072156011, 3072156012, 3072156013, 3072156014, 3072156015, 3072156016, 3072156017, 3072156018, 3072156019, 3072156020

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-10.4U ± 4.31 (9.66)	dpm/sample	07/17/12 02:18	

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QUALITY CONTROL DATA

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

QC Batch: RADC/12482 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072156021, 3072156022, 3072156023, 3072156024, 3072156025, 3072156026, 3072156027, 3072156028, 3072156029, 3072156030, 3072156031, 3072156032, 3072156033, 3072156034, 3072156035, 3072156036, 3072156037, 3072156038, 3072156039, 3072156040

METHOD BLANK: 459067 Matrix: Impact Plate
Associated Lab Samples: 3072156021, 3072156022, 3072156023, 3072156024, 3072156025, 3072156026, 3072156027, 3072156028, 3072156029, 3072156030, 3072156031, 3072156032, 3072156033, 3072156034, 3072156035, 3072156036, 3072156037, 3072156038, 3072156039, 3072156040

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-7.39U ± 4.15 (9.12)	dpm/sample	07/17/12 08:41	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

QC Batch: RADC/12483 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072156041, 3072156042, 3072156043, 3072156044, 3072156045, 3072156046, 3072156047, 3072156048, 3072156049, 3072156050, 3072156051, 3072156052, 3072156053, 3072156054, 3072156055, 3072156056, 3072156057, 3072156058, 3072156059, 3072156060

METHOD BLANK: 459068 Matrix: Impact Plate
Associated Lab Samples: 3072156041, 3072156042, 3072156043, 3072156044, 3072156045, 3072156046, 3072156047, 3072156048, 3072156049, 3072156050, 3072156051, 3072156052, 3072156053, 3072156054, 3072156055, 3072156056, 3072156057, 3072156058, 3072156059, 3072156060

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-6.03U ± 3.95 (7.98)	dpm/sample	07/17/12 15:54	

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

QUALITY CONTROL DATA

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

QC Batch: RADC/12484 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072156061, 3072156062, 3072156063, 3072156064, 3072156065, 3072156066, 3072156067, 3072156068, 3072156069, 3072156070, 3072156071, 3072156072, 3072156073, 3072156074, 3072156075, 3072156076, 3072156077, 3072156078, 3072156079, 3072156080

METHOD BLANK: 459070 Matrix: Impact Plate
Associated Lab Samples: 3072156061, 3072156062, 3072156063, 3072156064, 3072156065, 3072156066, 3072156067, 3072156068, 3072156069, 3072156070, 3072156071, 3072156072, 3072156073, 3072156074, 3072156075, 3072156076, 3072156077, 3072156078, 3072156079, 3072156080

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-11.2U ± 3.86 (8.00)	dpm/sample	07/18/12 01:33	

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Greensburg, PA 15601
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QUALITY CONTROL DATA

Project: Fort Monmouth 1207076
Pace Project No.: 3072156

QC Batch: RADC/12485 Analysis Method: EPA 906.0M
QC Batch Method: EPA 906.0M Analysis Description: 906.0 LSC Low Energy Beta
Associated Lab Samples: 3072156081, 3072156082, 3072156083, 3072156084, 3072156085, 3072156086, 3072156087, 3072156088, 3072156089, 3072156090, 3072156091, 3072156092, 3072156093, 3072156094, 3072156095, 3072156096, 3072156097, 3072156098, 3072156099, 3072156100

METHOD BLANK: 459072 Matrix: Impact Plate
Associated Lab Samples: 3072156081, 3072156082, 3072156083, 3072156084, 3072156085, 3072156086, 3072156087, 3072156088, 3072156089, 3072156090, 3072156091, 3072156092, 3072156093, 3072156094, 3072156095, 3072156096, 3072156097, 3072156098, 3072156099, 3072156100

Parameter	Act ± Unc (MDC)	Units	Analyzed	Qualifiers
LSC Low Energy Beta	-8.86U ± 3.93 (8.08)	dpm/sample	07/18/12 13:33	

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 1207076
Pace Project No.: 3072156

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: 3072156

Chain of Custody
And
Sample Receiving Conditions Upon Receipt Form

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CHAIN-OF-CUSTODY / Analytical Request Document

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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

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / , -)
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PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COLLECTED: COMPOSITE START TIME	COLLECTED: COMPOSITE END/GRAB DATE	COLLECTED: COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	Preservatives: H_2SO_4	Preservatives: HNO_3	Preservatives: HCl	Preservatives: NaOH	Preservatives: $Na_2S_2O_3$	Preservatives: Methanol	Preservatives: Other	Requested Analysis Filtered (Y/N) Y/N	Analysis Test: Gross Low Energy Beta Analysis	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D. 30721R6
88	SU-07-21	WP	G	NA	NA	06/11/12		NA	1	X								N	X		
89	SU-07-22	WP	G	NA	NA	06/11/12		NA	1	X									X		
90	SU-07-23	WP	G	NA	NA	06/11/12		NA	1	X									X		
91	SU-07-23D	WP	G	NA	NA	06/11/12		NA	1	X									X		
92	SU-07-24	WP	G	NA	NA	06/11/12		NA	1	X									X		
93	SU-07-25	WP	G	NA	NA	06/11/12		NA	1	X									X		
94	SU-07-26	WP	G	NA	NA	06/11/12		NA	1	X									X		
95	SU-07-27	WP	G	NA	NA	06/11/12		NA	1	X									X		
96	SU-07-28	WP	G	NA	NA	06/11/12		NA	1	X									X		
97	SU-07-29	WP	G	NA	NA	06/11/12		NA	1	X									X		
98	SU-07-30	WP	G	NA	NA	06/11/12		NA	1	X									X		
99	SU-07-31	WP	G	NA	NA	06/11/12		NA	1	X									X		
100	SU-07-31D	WP	G	NA	NA	06/11/12		NA	1	X									X		
101	SU-07-32	WP	G	NA	NA	06/11/12		NA	1	X									X		001
102	SU-07-33	WP	G	NA	NA	06/11/12		NA	1	X									X		002
103	SU-07-34	WP	G	NA	NA	06/11/12		NA	1	X									X		003
104	SU-07-35	WP	G	NA	NA	06/11/12		NA	1	X									X		004
105	SU-07-35D	WP	G	NA	NA	06/11/12		NA	1	X									X		005
106	SU-07-36	WP	G	NA	NA	06/11/12		NA	1	X									X		006
107	SU-07-37	WP	G	NA	NA	06/11/12		NA	1	X									X		007
108	SU-07-38	WP	G	NA	NA	06/11/12		NA	1	X									X		008
109	SU-07-39	WP	G	NA	NA	06/11/12		NA	1	X									X		009

6/25/12 1015

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Section A Required Client Information:

Company:	US Army Corps of Engineers
Address:	10 South Howard Street
	Baltimore, MD
Email To:	david.j.watters@usace.army.mil
Phone: 443-253-0916	Fax: none
Requested Due Date/TAT:	ASAP

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: NJ

Section D Required Client Information

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DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
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	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED 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)	3072156 Pace Project No./ Lab I.D.
110	SU-07-40	WP	G	NA	NA	06/11/12		NA	1	X									X		010
111	SU-07-41	WP	G	NA	NA	06/11/12		NA	1	X									X		011
112	SU-07-42	WP	G	NA	NA	06/11/12		NA	1	X									X		012
113	SU-07-43	WP	G	NA	NA	06/11/12		NA	1	X									X		013
114	SU-07-44	WP	G	NA	NA	06/11/12		NA	1	X									X		014
115	SU-07-45	WP	G	NA	NA	06/11/12		NA	1	X									X		015
116	SU-07-46	WP	G	NA	NA	06/11/12		NA	1	X									X		016
117	SU-07-47	WP	G	NA	NA	06/11/12		NA	1	X									X		017
118	SU-07-48	WP	G	NA	NA	06/11/12		NA	1	X									X		018
119	SU-07-49	WP	G	NA	NA	06/11/12		NA	1	X									X		019
120	SU-12-1	WP	G	NA	NA	06/11/12		NA	1	X									X		020
121	SU-12-2	WP	G	NA	NA	06/11/12		NA	1	X									X		021
122	SU-12-3	WP	G	NA	NA	06/11/12		NA	1	X									X		022
123	SU-12-4	WP	G	NA	NA	06/11/12		NA	1	X									X		023
124	SU-12-5	WP	G	NA	NA	06/11/12		NA	1	X									X		024
125	SU-12-5D	WP	G	NA	NA	06/11/12		NA	1	X									X		025
126	SU-12-6	WP	G	NA	NA	06/11/12		NA	1	X									X		026
127	SU-12-7	WP	G	NA	NA	06/11/12		NA	1	X									X		027
128	SU-12-8	WP	G	NA	NA	06/11/12		NA	1	X									X		028
129	SU-12-9	WP	G	NA	NA	06/11/12		NA	1	X									X		029
130	SU-12-10	WP	G	NA	NA	06/11/12		NA	1	X									X		030
131	SU-12-11	WP	G	NA	NA	06/11/12		NA	1	X									X		031

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 7 of 38

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	US Army Corps of Engineers	Report To:	David Watters	Attention:	
Address:	10 South Howard Street	Copy To:	Alan Warminski		
	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

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132	SU-12-12	WP	G	NA	NA	06/11/12		NA	1	X									X		032
133	SU-12-13	WP	G	NA	NA	06/11/12		NA	1	X									X		033
134	SU-12-14	WP	G	NA	NA	06/11/12		NA	1	X									X		034
135	SU-12-15	WP	G	NA	NA	06/11/12		NA	1	X									X		035
136	SU-12-15D	WP	G	NA	NA	06/11/12		NA	1	X									X		036
137	SU-12-16	WP	G	NA	NA	06/11/12		NA	1	X									X		037
138	SU-12-17	WP	G	NA	NA	06/11/12		NA	1	X									X		038
139	SU-12-18	WP	G	NA	NA	06/11/12		NA	1	X									X		039
140	SU-12-19	WP	G	NA	NA	06/11/12		NA	1	X									X		040
141	SU-12-20	WP	G	NA	NA	06/11/12		NA	1	X									X		041
142	SU-12-21	WP	G	NA	NA	06/11/12		NA	1	X									X		042
143	SU-12-22	WP	G	NA	NA	06/11/12		NA	1	X									X		043
144	SU-12-23	WP	G	NA	NA	06/11/12		NA	1	X									X		044
145	SU-12-24	WP	G	NA	NA	06/11/12		NA	1	X									X		045
146	SU-12-24D	WP	G	NA	NA	06/11/12		NA	1	X									X		046
147	SU-12-25	WP	G	NA	NA	06/11/12		NA	1	X									X		047
148	SU-12-26	WP	G	NA	NA	06/11/12		NA	1	X									X		048
149	SU-12-27	WP	G	NA	NA	06/11/12		NA	1	X									X		049
150	SU-12-28	WP	G	NA	NA	06/11/12		NA	1	X									X		050
151	SU-12-29	WP	G	NA	NA	06/11/12		NA	1	X									X		051
152	SU-12-30	WP	G	NA	NA	06/11/12		NA	1	X									X		052
153	SU-12-31	WP	G	NA	NA	06/11/12		NA	1	X									X		053

6/25/12 1015

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Section B Required Project Information:

Report To:	David Watters
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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

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154	SU-12-32	WP	G	NA	NA	06/11/12		NA	1	X							N	X			054
155	SU-13-1	WP	G	NA	NA	06/11/12		NA	1	X								X			055
156	SU-13-2	WP	G	NA	NA	06/11/12		NA	1	X								X			056
157	SU-13-3	WP	G	NA	NA	06/11/12		NA	1	X								X			057
158	SU-13-4	WP	G	NA	NA	06/11/12		NA	1	X								X			058
159	SU-13-4D	WP	G	NA	NA	06/11/12		NA	1	X								X			059
160	SU-13-5	WP	G	NA	NA	06/11/12		NA	1	X								X			060
161	SU-13-6	WP	G	NA	NA	06/11/12		NA	1	X								X			061
162	SU-13-7	WP	G	NA	NA	06/11/12		NA	1	X								X			062
163	SU-13-8	WP	G	NA	NA	06/11/12		NA	1	X								X			063
164	SU-13-9	WP	G	NA	NA	06/11/12		NA	1	X								X			064
165	SU-13-10	WP	G	NA	NA	06/11/12		NA	1	X								X			065
166	SU-13-11	WP	G	NA	NA	06/11/12		NA	1	X								X			066
167	SU-13-11D	WP	G	NA	NA	06/11/12		NA	1	X								X			067
168	SU-13-12	WP	G	NA	NA	06/11/12		NA	1	X								X			068
169	SU-13-13	WP	G	NA	NA	06/11/12		NA	1	X								X			069
170	SU-13-14	WP	G	NA	NA	06/11/12		NA	1	X								X			070
171	SU-13-15	WP	G	NA	NA	06/11/12		NA	1	X								X			071
172	SU-13-16	WP	G	NA	NA	06/11/12		NA	1	X								X			072
173	SU-13-17	WP	G	NA	NA	06/11/12		NA	1	X								X			073
174	SU-13-18	WP	G	NA	NA	06/11/12		NA	1	X								X			074
175	SU-13-19	WP	G	NA	NA	06/11/12		NA	1	X								X			075

6/25/12 1015

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

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☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
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Requested Analysis Filtered (Y/N)

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176	SU-13-20	WP	G	NA	NA	06/11/12		NA	1	X							X			076
177	SU-13-21	WP	G	NA	NA	06/11/12		NA	1	X							X			077
178	SU-13-22	WP	G	NA	NA	06/11/12		NA	1	X							X			078
179	SU-13-23	WP	G	NA	NA	06/11/12		NA	1	X							X			079
180	SU-13-24	WP	G	NA	NA	06/11/12		NA	1	X							X			080
181	SU-13-25	WP	G	NA	NA	06/11/12		NA	1	X							X			081
182	SU-13-26	WP	G	NA	NA	06/11/12		NA	1	X							X			082
183	SU-13-27	WP	G	NA	NA	06/11/12		NA	1	X							X			083
184	SU-13-27D	WP	G	NA	NA	06/11/12		NA	1	X							X			084
185	SU-13-28	WP	G	NA	NA	06/11/12		NA	1	X							X			085
186	SU-13-29	WP	G	NA	NA	06/11/12		NA	1	X							X			086
187	SU-13-30	WP	G	NA	NA	06/11/12		NA	1	X							X			087
188	SU-13-31	WP	G	NA	NA	06/11/12		NA	1	X							X			088
189	SU-13-32	WP	G	NA	NA	06/11/12		NA	1	X							X			089
190	SU-13-33	WP	G	NA	NA	06/11/12		NA	1	X							X			090
191	SU-13-34	WP	G	NA	NA	06/11/12		NA	1	X							X			091
192	SU-13-35	WP	G	NA	NA	06/11/12		NA	1	X							X			092
193	SU-13-35D	WP	G	NA	NA	06/11/12		NA	1	X							X			093
194	SU-13-36	WP	G	NA	NA	06/11/12		NA	1	X							X			094
195	SU-13-37	WP	G	NA	NA	06/11/12		NA	1	X							X			095
196	SU-13-38	WP	G	NA	NA	06/11/12		NA	1	X							X			096
197	SU-13-39	WP	G	NA	NA	06/11/12		NA	1	X							X			097

6/25/12

6/25/12 1615

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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:

Company:	US Army Corps of Engineers
Address:	10 South Howard Street
	Baltimore, MD
Email To:	david.j.watters@usace.army.mil
Phone: 443-253-0916	Fax: none
Requested Due Date/TAT:	ASAP

Section B Required Project Information:

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

Section C Invoice Information:

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

REGULATORY AGENCY

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

Site Location STATE: NJ

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

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	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED 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		3572156
198	SU-13-40	WP	G	NA	NA	06/11/12		NA	1	X									X		098
199	SU-10-1	WP	G	NA	NA	06/11/12		NA	1	X									X		099
200	SU-10-2	WP	G	NA	NA	06/11/12		NA	1	X									X		100
201	SU-10-3	WP	G	NA	NA	06/11/12		NA	1	X									X		
202	SU-10-4	WP	G	NA	NA	06/11/12		NA	1	X									X		
203	SU-10-5	WP	G	NA	NA	06/11/12		NA	1	X									X		
204	SU-10-6	WP	G	NA	NA	06/11/12		NA	1	X									X		
205	SU-10-7	WP	G	NA	NA	06/11/12		NA	1	X									X		
206	SU-10-8	WP	G	NA	NA	06/11/12		NA	1	X									X		
207	SU-10-9	WP	G	NA	NA	06/11/12		NA	1	X									X		
208	SU-10-10	WP	G	NA	NA	06/11/12		NA	1	X									X		
209	SU-10-11	WP	G	NA	NA	06/11/12		NA	1	X									X		
210	SU-10-12	WP	G	NA	NA	06/11/12		NA	1	X									X		
211	SU-10-12D	WP	G	NA	NA	06/11/12		NA	1	X									X		
212	SU-10-13	WP	G	NA	NA	06/11/12		NA	1	X									X		
213	SU-10-14	WP	G	NA	NA	06/11/12		NA	1	X									X		
214	SU-10-15	WP	G	NA	NA	06/11/12		NA	1	X									X		
215	SU-10-16	WP	G	NA	NA	06/11/12		NA	1	X									X		
216	SU-10-17	WP	G	NA	NA	06/11/12		NA	1	X									X		
217	SU-10-18	WP	G	NA	NA	06/11/12		NA	1	X									X		
218	SU-10-19	WP	G	NA	NA	06/11/12		NA	1	X									X		
219	SU-10-20	WP	G	NA	NA	06/11/12		NA	1	X									X		

6/25/22 1015

Sample Condition Upon Receipt

Pace Analytical

Client Name: RTI Project # 30772156

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

Optional
Proj. Due Date:
Proj. Name:

Tracking #: 8259 2865 3784

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: KM 6/25/12

Temp should be above freezing to 6°C Comments:

Chain of Custody Present:	☑Yes	☐No	☐N/A
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A
Chain of Custody Relinquished:	☐Yes	☑No	☐N/A
Sampler Name & Signature on COC:	☐Yes	☑No	☐N/A
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A
Short Hold Time Analysis (<72hr):	☐Yes	☑No	☐N/A
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A
Sufficient Volume:	☑Yes	☐No	☐N/A
Correct Containers Used:	☑Yes	☐No	☐N/A
-Pace Containers Used:	☑Yes	☐No	☐N/A
Containers Intact:	☑Yes	☐No	☐N/A
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A
Sample Labels match COC:	☑Yes	☐No	☐N/A
-Includes date/time/ID/Analysis Matrix: WP			
All containers needing preservation have been checked.	☐Yes	☐No	☑N/A
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	
Samples checked for dechlorination:	☐Yes	☐No	☑N/A
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☑N/A
Trip Blank Present:	☐Yes	☐No	☑N/A
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A
Pace Trip Blank Lot # (if purchased):			

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
Initial when completed KM Lot # of added preservative
14.
15.
16.

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Carina Santo **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)

Pace Analytical

Project Number: 3072156

Client Name: RTI

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

SCURF Back (C016-4 15May2012).xls

Low Energy Beta Sample Analysis Data

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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2 459066-BLANK for HBN 91052 [RADC/1248

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12481 **Prep Date** 7/17/2012 02:18 **Dilution**
Method EPA 906.0M **HBN** 91052 **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2851765 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 02:18 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2851765 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-10.4U ± 4.31 (9.66)	dpm/sa	-10.4U ± 4.31 (9.66)			dpm/sa

4 3072156001-SU-07-32

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmouth 1207076 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12481 **Prep Date** 7/17/2012 02:34 **Dilution**
Method EPA 906.0M **HBN** 91052 **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2859735 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 02:34 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2859735 **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	-10.9U ± 3.98 (8.99)	dpm/sa	-10.9U ± 3.98 (8.99)					dpm/sa

6 3072156002-SU-07-33

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmouth 1207076 **Location**

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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6 3072156002-SU-07-33

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 02:50	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859736	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 02:50	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859736	**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	-7.75U ± 4.13 (9.11)	dpm/sa	-7.75U ± 4.13 (9.11)		dpm/sa		

8 3072156003-SU-07-34

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 03:06	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859737	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 03:06	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859737	**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	-9.47U ± 4.00 (8.96)	dpm/sa	-9.47U ± 4.00 (8.96)		dpm/sa		

10 3072156004-SU-07-35

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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10 3072156004-SU-07-35

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12481	**Prep Date**	7/17/2012 03:22	**Dilution**
Method	EPA 906.0M		**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859747		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 03:22	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859747		**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	-7.18U ± 4.08 (8.96)	dpm/sa	-7.18U ± 4.08 (8.96)		dpm/sa		

12 3072156005-SU-07-35D

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12481	**Prep Date**	7/17/2012 03:38	**Dilution**
Method	EPA 906.0M		**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859748		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 03:38	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859748		**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	-10.5U ± 3.98 (8.97)	dpm/sa	-10.5U ± 3.98 (8.97)		dpm/sa		

14 3072156006-SU-07-36

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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14 3072156006-SU-07-36

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 03:54	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859798	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 03:54	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859798	**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	-9.38U ± 4.02 (8.98)	dpm/sa	-9.38U ± 4.02 (8.98)		dpm/sa		

15 3072156007-SU-07-37

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 04:10	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859800	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 04:10	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859800	**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	-10.5U ± 3.97 (8.96)	dpm/sa	-10.5U ± 3.97 (8.96)		dpm/sa		

17 3072156008-SU-07-38

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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17 3072156008-SU-07-38

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 04:26	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859801	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 04:26	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859801	**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	-7.18U ± 4.08 (8.96)	dpm/sa	-7.18U ± 4.08 (8.96)		dpm/sa		

19 3072156009-SU-07-39

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 04:42	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859802	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 04:42	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859802	**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	-9.96U ± 4.06 (9.12)	dpm/sa	-9.96U ± 4.06 (9.12)		dpm/sa		

21 3072156010-SU-07-40

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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21 3072156010-SU-07-40

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 04:58	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859807	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 04:58	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859807	**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	-7.97U ± 4.05 (8.96)	dpm/sa	-7.97U ± 4.05 (8.96)		dpm/sa		

23 3072156011-SU-07-41

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 05:14	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859809	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 05:14	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859809	**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	-10.7U ± 3.98 (8.99)	dpm/sa	-10.7U ± 3.98 (8.99)		dpm/sa		

25 3072156012-SU-07-42

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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25 3072156012-SU-07-42

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 05:30	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859810	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 05:30	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859810	**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	-8.13U ± 4.08 (9.02)	dpm/sa	-8.13U ± 4.08 (9.02)		dpm/sa		

27 3072156013-SU-07-43

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 05:46	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859840	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 05:46	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859840	**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	-10.2U ± 4.00 (8.99)	dpm/sa	-10.2U ± 4.00 (8.99)		dpm/sa		

29 3072156014-SU-07-44

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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29 3072156014-SU-07-44

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2789974

Batch RADC/12481
HBN 91052
Instru NONE

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

Dilution
Analyst MBT
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 2789974

Instru NONE
Col ID
File

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

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-1.57U ± 4.38 (9.57)	dpm/sa	-1.57U ± 4.38 (9.57)		dpm/sa		

30 3072156015-SU-07-45

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2859845

Batch RADC/12481
HBN 91052
Instru NONE

Prep Date 7/17/2012 06:25
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2859845

Instru NONE
Col ID
File

Run Date 7/17/2012 06:25
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-8.18U ± 4.06 (8.99)	dpm/sa	-8.18U ± 4.06 (8.99)		dpm/sa		

32 3072156016-SU-07-46

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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32 3072156016-SU-07-46

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 06:41	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859841	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 06:41	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859841	**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	-7.69U ± 4.06 (8.96)	dpm/sa	-7.69U ± 4.06 (8.96)		dpm/sa		

34 3072156017-SU-07-47

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/21/2012 23:30	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2789977	**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**	7/21/2012 23:30	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2789977	**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	-3.20U ± 3.85 (8.72)	dpm/sa	-3.20U ± 3.85 (8.72)		dpm/sa		

35 3072156018-SU-07-48

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

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Batch	RADC/12481	HBN	91052
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

35 3072156018-SU-07-48

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 07:21	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859842	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 07:21	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859842	**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	-8.26U ± 4.05 (8.98)	dpm/sa	-8.26U ± 4.05 (8.98)		dpm/sa		

37 3072156019-SU-07-49

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 07:37	**Dilution**	
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859843	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 07:37	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859843	**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	-3.46U ± 4.25 (8.96)	dpm/sa	-3.46U ± 4.25 (8.96)		dpm/sa		

39 3072156020-SU-12-1

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12481	**HBN**	91052
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

39 3072156020-SU-12-1

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12481	**Prep Date**	7/17/2012 07:53
Method	EPA 906.0M	**HBN**	91052	**Hold Date**	12/8/2012 23:59
Schedule	2859844	**Instru**	NONE		

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

Dilution
Analyst MBT
CC OK F

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 07:53
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2859844	**File**			

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL		Req. Limits Low	Req. Limits High
Rad Chemistry	OK								
LSC Low Energy Beta	OK	-5.84U ± 4.27 (9.23)	dpm/sa	-5.84U ± 4.27 (9.23)			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 13:46		Assigned Analyst	MBT
Batch ID	12481		Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB	9060W	HBN	91052
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
	459066	BLANK	IP		QCACCOUNT	-10.4U	4.31	9.66	7/17/12 2:18
3072156	3072156001	PS	WP	6/11/2012 0:01	RTI	-10.9U	3.98	8.99	7/17/12 2:34
3072156	3072156002	PS	WP	6/11/2012 0:01	RTI	-7.75U	4.13	9.11	7/17/12 2:50
3072156	3072156003	PS	WP	6/11/2012 0:01	RTI	-9.47U	4.00	8.96	7/17/12 3:06
3072156	3072156004	PS	WP	6/11/2012 0:01	RTI	-7.18U	4.08	8.96	7/17/12 3:22
3072156	3072156005	PS	WP	6/11/2012 0:01	RTI	-10.5U	3.98	8.97	7/17/12 3:38
3072156	3072156006	PS	WP	6/11/2012 0:01	RTI	-9.38U	4.02	8.98	7/17/12 3:54
3072156	3072156007	PS	WP	6/11/2012 0:01	RTI	-10.5U	3.97	8.96	7/17/12 4:10
3072156	3072156008	PS	WP	6/11/2012 0:01	RTI	-7.18U	4.08	8.96	7/17/12 4:26
3072156	3072156009	PS	WP	6/11/2012 0:01	RTI	-9.96U	4.06	9.12	7/17/12 4:42
3072156	3072156010	PS	WP	6/11/2012 0:01	RTI	-7.97U	4.05	8.96	7/17/12 4:58
3072156	3072156011	PS	WP	6/11/2012 0:01	RTI	-10.7U	3.98	8.99	7/17/12 5:14
3072156	3072156012	PS	WP	6/11/2012 0:01	RTI	-8.13U	4.08	9.02	7/17/12 5:30
3072156	3072156013	PS	WP	6/11/2012 0:01	RTI	-10.2U	4.00	8.99	7/17/12 5:46
3072156	3072156014	PS	WP	6/11/2012 0:01	RTI		0.0408	#NUM!	
3072156	3072156015	PS	WP	6/11/2012 0:01	RTI	-8.18U	4.06	8.99	7/17/12 6:25
3072156	3072156016	PS	WP	6/11/2012 0:01	RTI	-7.69U	4.06	8.96	7/17/12 6:41
3072156	3072156017	PS	WP	6/11/2012 0:01	RTI		0.0408	#NUM!	
3072156	3072156018	PS	WP	6/11/2012 0:01	RTI	-8.26U	4.05	8.98	7/17/12 7:21
3072156	3072156019	PS	WP	6/11/2012 0:01	RTI	-3.46U	4.25	8.96	7/17/12 7:37
3072156	3072156020	PS	WP	6/11/2012 0:01	RTI	-5.84U	4.27	9.23	7/17/12 7:53

7/23/12 7/23/12

LIMS Load
Printed 7/22/2012 at 10:11 AM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
Matrix Smear
Batch ID 12481
Prep Start 7/16/2012 12:00
Prep Finish 7/16/2012
Act. Rpt Units dpm

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

Bkg CPM 12.38
Bkg Duration 30.0 min
Bkg Ref bkg071712
Bkg Ct Date/Time: 7/17/2012 15:21
Instrument ID: System #2

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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
459066	1.0	7/17/12 2:18	15.0	7/17/12 2:18	7.62	326.7	dpm/S	High, Evaluate
3072156001	1.0	6/11/12 0:01	15.0	7/17/12 2:34	7.03	275.0	dpm/S	Pass
3072156002	1.0	6/11/12 0:01	15.0	7/17/12 2:50	8.63	290.1	dpm/S	Pass
3072156003	1.0	6/11/12 0:01	15.0	7/17/12 3:06	7.72	262.2	dpm/S	Pass
3072156004	1.0	6/11/12 0:01	15.0	7/17/12 3:22	8.85	260.8	dpm/S	Pass
3072156005	1.0	6/11/12 0:01	15.0	7/17/12 3:38	7.21	268.8	dpm/S	Pass
3072156006	1.0	6/11/12 0:01	15.0	7/17/12 3:54	7.78	272.1	dpm/S	Pass
3072156007	1.0	6/11/12 0:01	15.0	7/17/12 4:10	7.21	255.7	dpm/S	Pass
3072156008	1.0	6/11/12 0:01	15.0	7/17/12 4:26	8.85	260.9	dpm/S	Pass
3072156009	1.0	6/11/12 0:01	15.0	7/17/12 4:42	7.57	291.6	dpm/S	Pass
3072156010	1.0	6/11/12 0:01	15.0	7/17/12 4:58	8.46	262.0	dpm/S	Pass
3072156011	1.0	6/11/12 0:01	15.0	7/17/12 5:14	7.12	243.3	dpm/S	Pass
3072156012	1.0	6/11/12 0:01	15.0	7/17/12 5:30	8.41	279.2	dpm/S	Pass
3072156013	1.0	6/11/12 0:01	15.0	7/17/12 5:46	7.40	274.4	dpm/S	Pass
3072156014	1.0	6/11/12 0:01	15.0				dpm/S	Low, Reprep
3072156015	1.0	6/11/12 0:01	15.0	7/17/12 6:25	8.37	273.2	dpm/S	Pass
3072156016	1.0	6/11/12 0:01	15.0	7/17/12 6:41	8.60	256.1	dpm/S	Pass
3072156017	1.0	6/11/12 0:01	15.0				dpm/S	Low, Reprep
3072156018	1.0	6/11/12 0:01	15.0	7/17/12 7:21	8.33	246.4	dpm/S	Pass
3072156019	1.0	6/11/12 0:01	15.0	7/17/12 7:37	10.68	260.6	dpm/S	Pass
3072156020	1.0	6/11/12 0:01	15.0	7/17/12 7:53	9.59	217.3	dpm/S	Pass

7/17/23/12

7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12481	**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
459066	0.4560	0.0000	1.0000	-10.439	4.124	4.308	9.661	4.026	0.578	4.124	1.00
3072156001	0.4925	0.0989	0.9945	-10.924	3.757	3.976	8.994	3.748	0.538	3.757	1.00
3072156002	0.4865	0.0989	0.9945	-7.751	4.027	4.132	9.105	3.795	0.545	4.027	1.00
3072156003	0.4946	0.0989	0.9945	-9.475	3.837	4.000	8.956	3.733	0.536	3.837	1.00
3072156004	0.4946	0.0989	0.9945	-7.176	3.990	4.081	8.955	3.732	0.536	3.990	1.00
3072156005	0.4938	0.0990	0.9945	-10.527	3.772	3.976	8.970	3.738	0.536	3.772	1.00
3072156006	0.4932	0.0990	0.9945	-9.379	3.856	4.015	8.981	3.743	0.537	3.856	1.00
3072156007	0.4946	0.0990	0.9945	-10.511	3.766	3.970	8.956	3.733	0.536	3.766	1.00
3072156008	0.4946	0.0991	0.9945	-7.176	3.990	4.081	8.955	3.732	0.536	3.990	1.00
3072156009	0.4857	0.0991	0.9945	-9.959	3.887	4.064	9.121	3.801	0.545	3.887	1.00
3072156010	0.4946	0.0991	0.9945	-7.970	3.938	4.051	8.956	3.733	0.536	3.938	1.00
3072156011	0.4926	0.0992	0.9945	-10.737	3.769	3.980	8.992	3.748	0.538	3.769	1.00
3072156012	0.4912	0.0992	0.9945	-8.127	3.959	4.076	9.018	3.758	0.539	3.959	1.00
3072156013	0.4926	0.0992	0.9945	-10.165	3.808	3.996	8.991	3.747	0.538	3.808	1.00
3072156014	-0.0696	-112.4463	528.0170	0.337	-0.034	0.041	-0.120	-0.050	-0.007	-0.007	1.00
3072156015	0.4929	0.0993	0.9945	-8.180	3.939	4.058	8.986	3.745	0.537	3.939	1.00
3072156016	0.4946	0.0993	0.9945	-7.685	3.957	4.062	8.956	3.733	0.536	3.957	1.00
3072156017	-0.0696	-112.4463	528.0170	0.337	-0.034	0.041	-0.120	-0.050	-0.007	-0.007	1.00
3072156018	0.4933	0.0994	0.9945	-8.255	3.931	4.052	8.979	3.742	0.537	3.931	1.00
3072156019	0.4946	0.0994	0.9945	-3.456	4.226	4.246	8.955	3.732	0.536	4.226	1.00
3072156020	0.4801	0.0995	0.9945	-5.844	4.211	4.268	9.227	3.845	0.552	4.211	1.00

7/23/12 7/23/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/30/2012	**Method:**	EPA 906.0M
Worklist:	12481	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459066

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-10.4390	4.3080	9.6610	4.02600		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/21/12 13:56	7/21/12 14:03				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.917	1184.917				
Volume Used (mL):	0.100	0.100				
Aliquot Volume (L, g, F):	1.000	1.000				
Target Conc. (DPM/Sample, g, F):	118.492	118.492				
1.96 Sigma Uncertainty (Calculated):	2.137	2.137				
Result (DPM/Sample, g, F):	107.761	99.373				
1.96 Sigma Unc:	18.527	17.378				
% Recovery:	90.94%	83.86%				
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.:	LCS12481					
Duplicate Sample I.D.	LCSD12481					
Sample Result (DPM/Sample, g, F):	107.7610					
1.96 Sigma Unc:	18.5270					
nple Duplicate Result (DPM/Sample, g, F):	99.3730					
Duplicate Sample 1.96 Sigma Unc.	17.3780					
Either results below MDC?	NO					
Relative Percent Difference:	8.10%					
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:

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Test: Low Energy Beta
Matrix: Smear
Batch ID: 12481

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%

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\20120717_1521.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

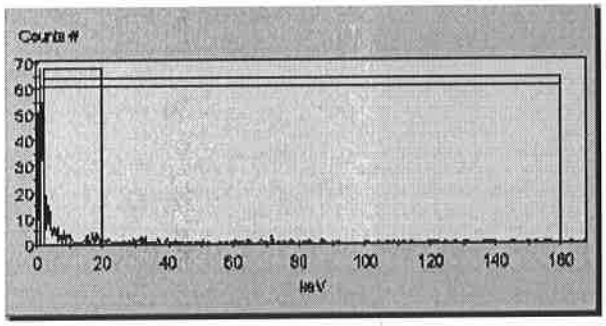
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM

14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM
3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: 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 LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
		BKG 071712	30	7/17/12	5.04	273.6	8.41	12.38	W
1	16	3:21:58 PM	33						

SpectraView Block Data



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_H3_C14_B
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\20120717_0218.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\12480.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14_B.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): 15.00
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	2.00
B	2.0	160.0	0.00
C	1.0	160.0	0.00

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				

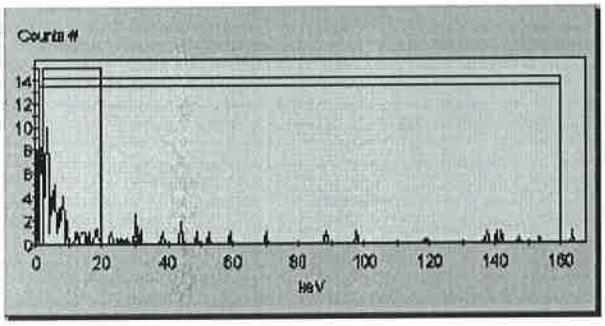
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM
14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM

3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

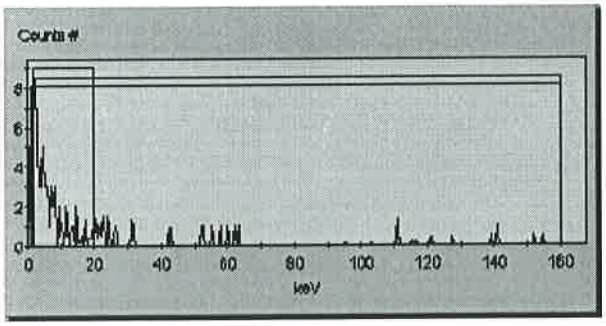
S#	PID	SMPL_ID / TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	26	459060 2:18:41 AM	~~BKG~~ 13	15	7/17/12	4.61	326.7	6.22	7.62	

SpectraView Block Data



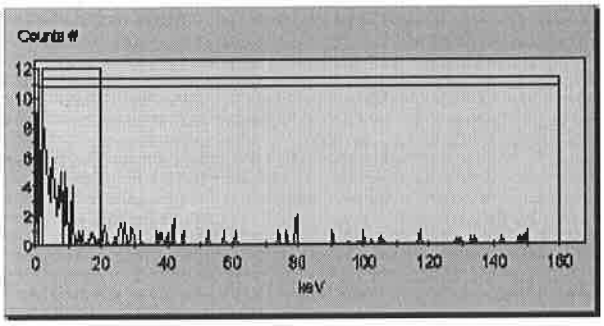
S#	PID	SMPL_ID / TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
2	26	3072156001 2:34:39 AM	7	15	7/17/12	4.69	275.0	6.42	7.03	

SpectraView Block Data



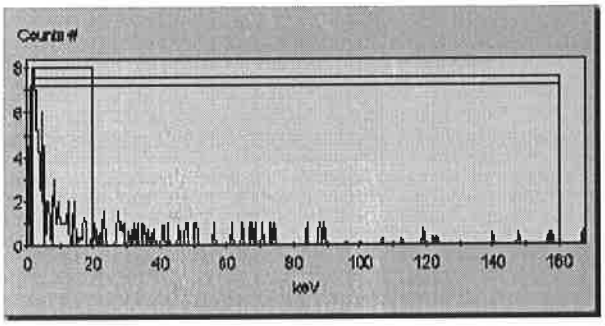
S#	PID	SMPL_ID / TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
3	26	3072156002 2:50:37 AM	5	15	7/17/12	5.36	290.1	7.70	8.63	

SpectraView Block Data



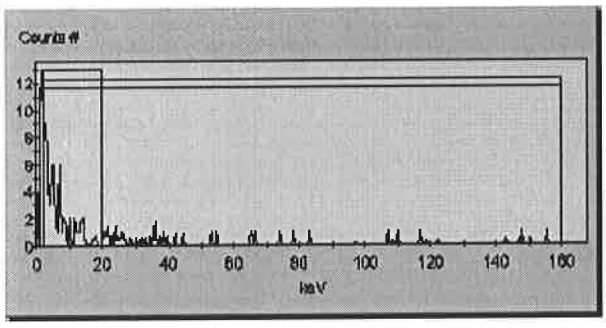
3072156003 15 7/17/12 4.38 262.2 6.98 7.72
4 26 3:06:34 AM 7

SpectraView Block Data



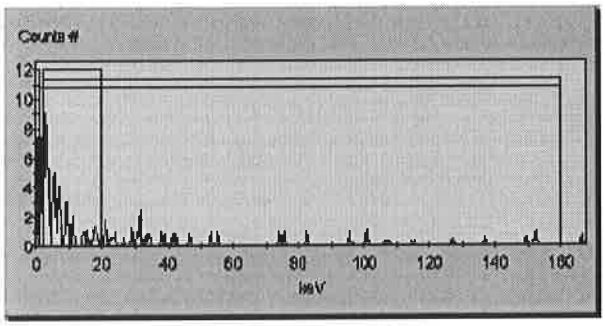
3072156004 15 7/17/12 5.20 260.8 7.58 8.85
5 26 3:22:32 AM 6

SpectraView Block Data



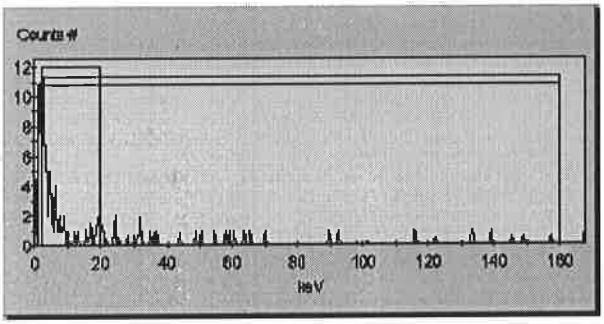
3072156005 15 7/17/12 4.05 268.8 6.01 7.21
6 26 3:38:30 AM 6

SpectraView Block Data



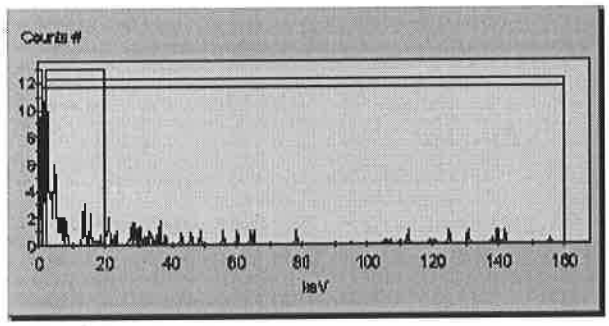
3072156006 15 7/17/12 4.75 272.1 6.85 7.78
7 26 3:54:27 AM 7

SpectraView Block Data



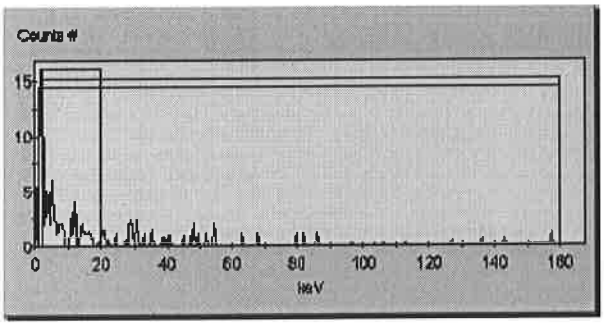
3072156007 15 7/17/12 3.33 255.7 5.67 7.21
8 26 4:10:24 AM 6

SpectraView Block Data



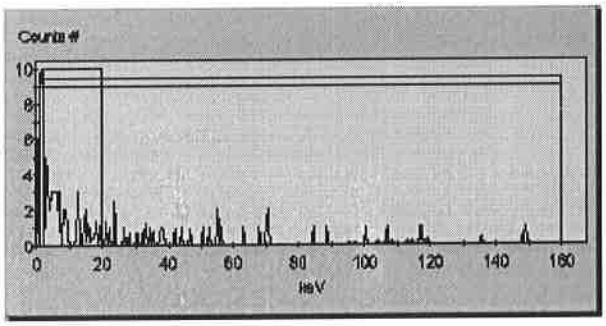
3072156008 15 7/17/12 4.65 260.9 7.25 8.85
9 26 4:26:21 AM 7

SpectraView Block Data



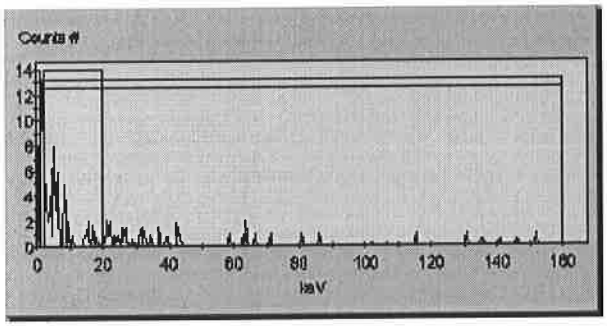
3072156009 15 7/17/12 3.79 291.6 6.30 7.57
10 26 4:42:18 AM 5

SpectraView Block Data



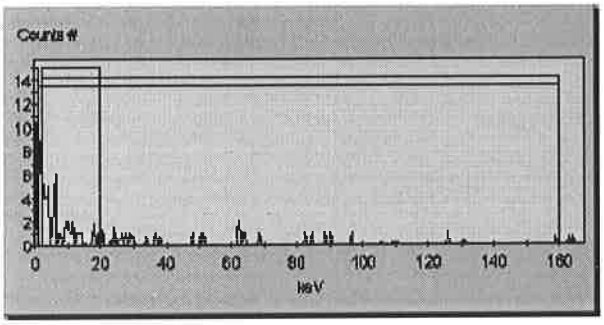
3072156010 15 7/17/12 3.98 262.0 6.66 8.46
11 26 4:58:14 AM 5

SpectraView Block Data



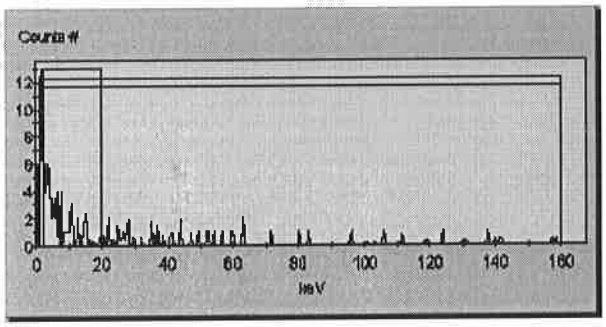
3072156011 15 7/17/12 3.63 243.3 5.65 7.12
12 26 5:14:11 AM 7

SpectraView Block Data



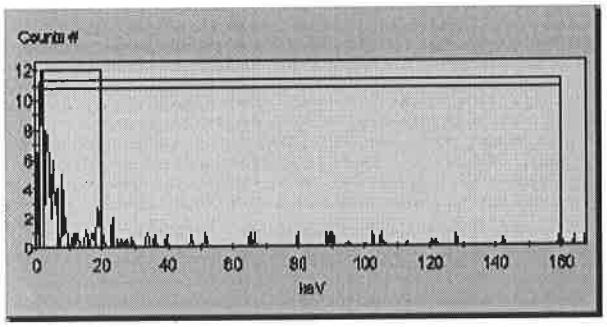
3072156012 15 7/17/12 3.91 279.2 6.81 8.41
13 14 5:30:14 AM 7

SpectraView Block Data



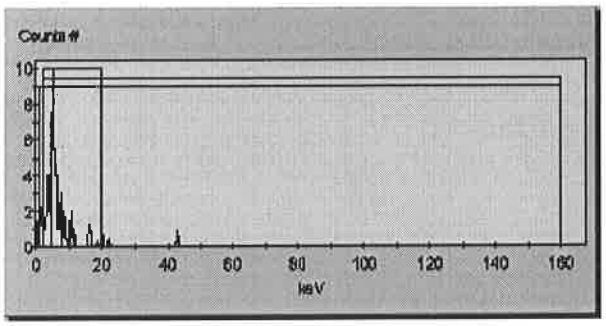
3072156013 15 7/17/12 4.52 274.4 6.00 7.40
14 14 5:46:12 AM 6

SpectraView Block Data



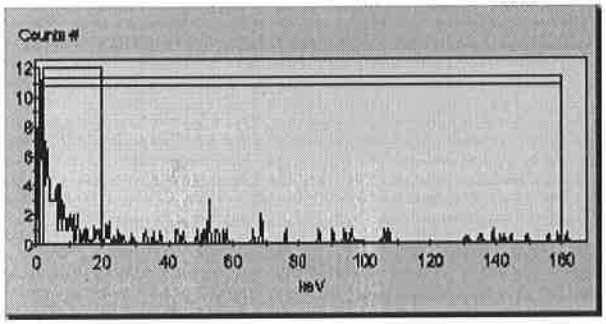
3072156014 15 7/17/12 2.84 13.6 3.00 3.33
15 14 6:09:58 AM 0

SpectraView Block Data



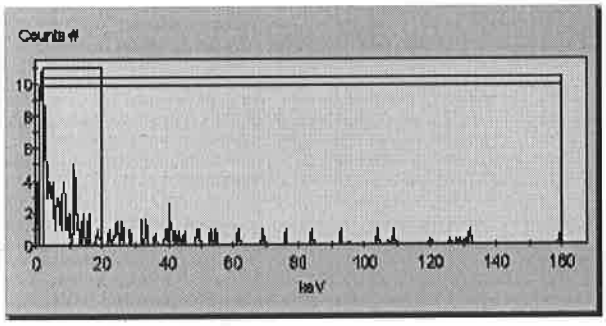
3072156015 15 7/17/12 4.23 273.2 6.83 8.37
16 14 6:25:41 AM 5

SpectraView Block Data



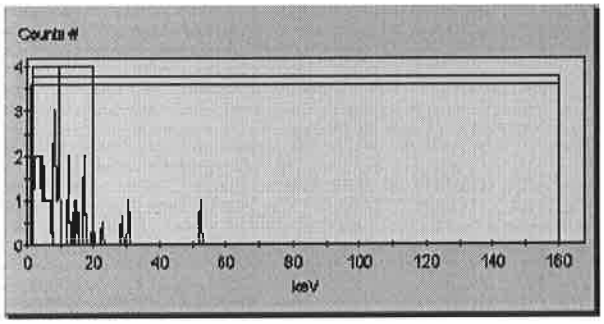
3072156016 15 7/17/12 5.08 256.1 7.53 8.60
17 14 6:41:38 AM 5

SpectraView Block Data



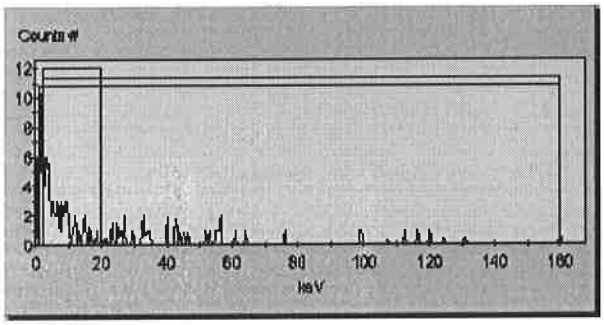
3072156017 15 7/17/12 2.17 12.4 2.41 2.41
18 14 7:05:22 AM 0

SpectraView Block Data



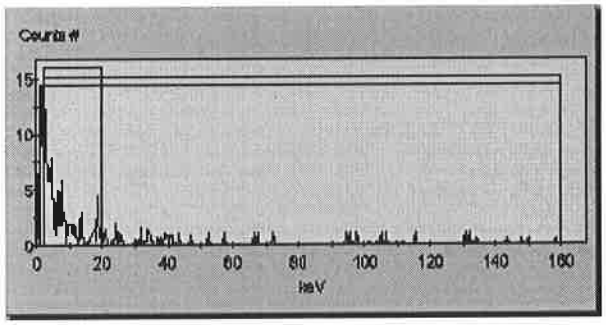
3072156018 15 7/17/12 4.73 246.4 7.33 8.33
19 14 7:21:04 AM 5

SpectraView Block Data



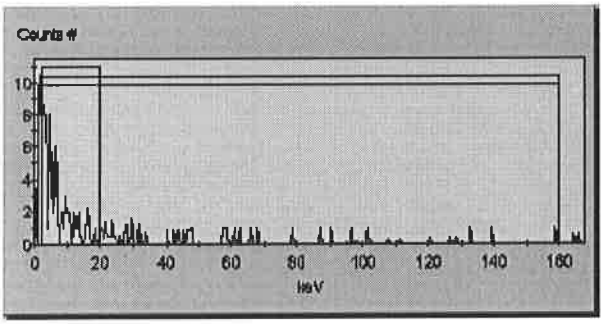
3072156019 15 7/17/12 6.89 260.6 9.41 10.68
20 14 7:37:32 AM 6

SpectraView Block Data



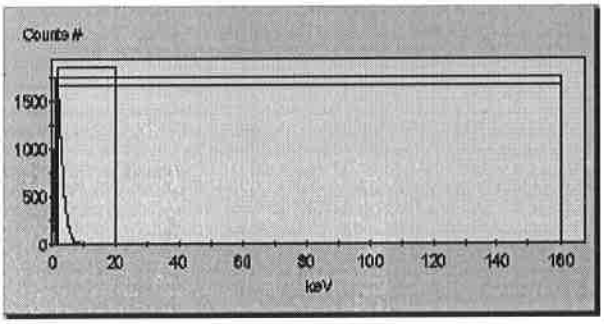
3072156020 15 7/17/12 5.97 217.3 8.66 9.59
21 14 7:53:30 AM 3

SpectraView Block Data



		LCS1	15	7/17/12		423.73	316.5	425.81	647.48
22	14	8:09:23 AM	0						

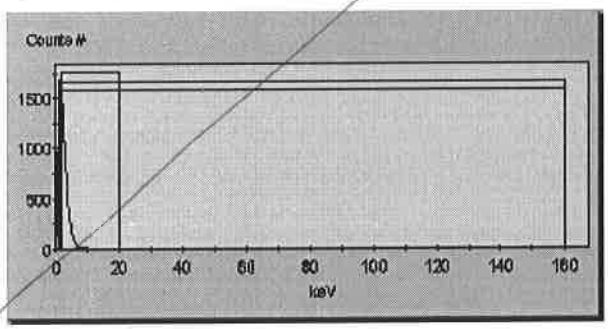
SpectraView Block Data



NOT used 7/31/12

		LCS2	15	7/17/12		392.52	303.4	394.11	609.91
23	14	8:25:20 AM	0						

SpectraView Block Data

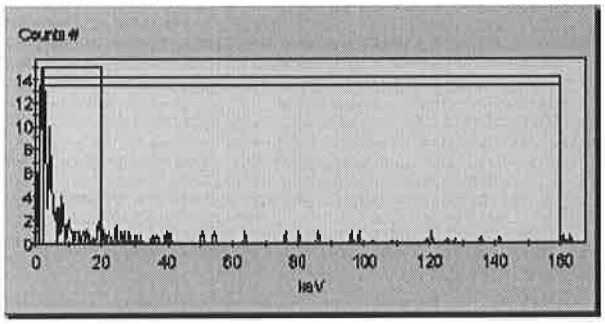


459067

		~~BKG~~	15	7/17/12		5.47	296.3	7.41	8.81
24	14	8:41:18 AM	7						

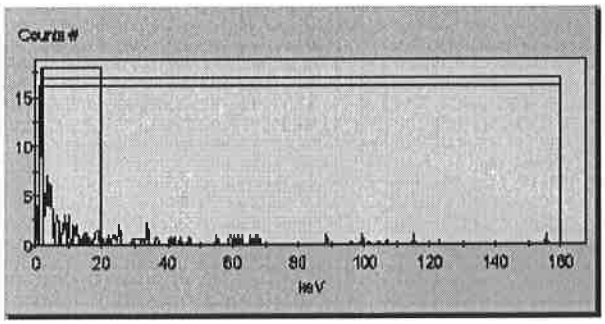
7/31/12

SpectraView Block Data



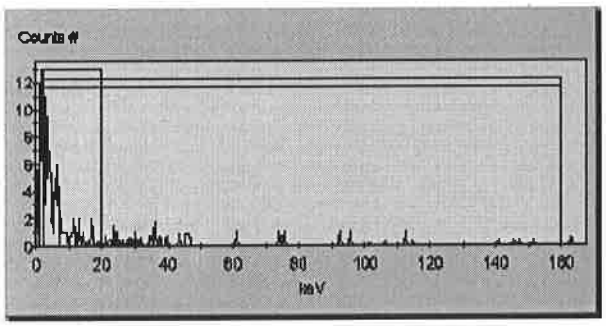
3072156021 15 7/17/12 4.22 247.8 6.50 8.10
25 13 8:57:21 AM 5

SpectraView Block Data



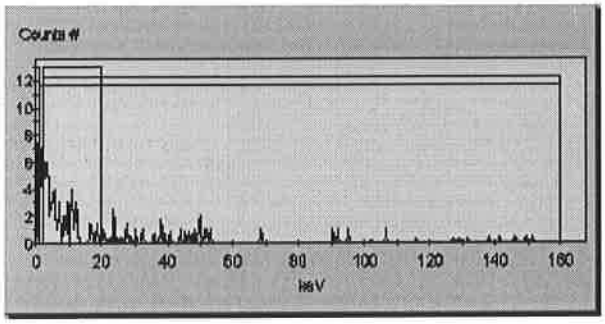
3072156022 15 7/17/12 4.39 258.6 6.10 7.57
26 13 9:13:08 AM 3

SpectraView Block Data



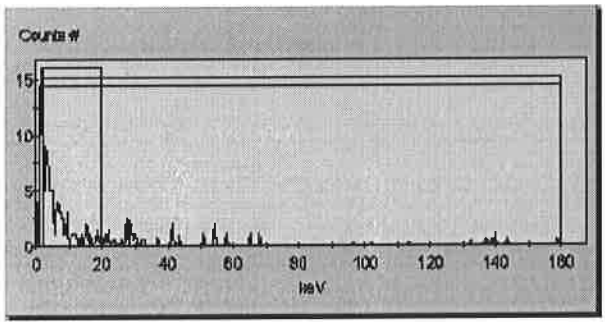
3072156023 15 7/17/12 4.06 208.2 6.24 7.44
27 13 9:28:58 AM 5

SpectraView Block Data



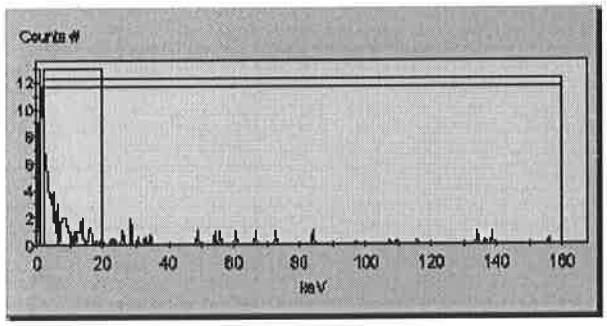
3072156024 15 7/17/12 5.47 255.1 7.54 9.07
28 13 9:44:45 AM 4

SpectraView Block Data



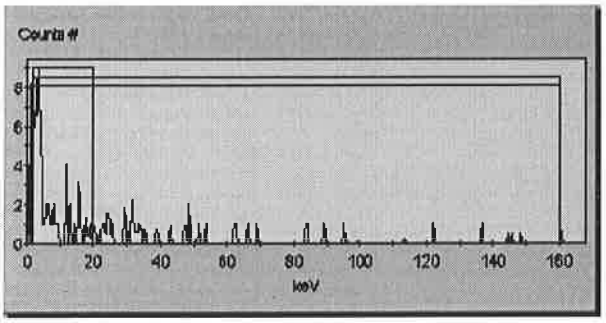
3072156025 15 7/17/12 4.09 302.5 5.23 6.83
29 13 10:00:32 AM 4

SpectraView Block Data



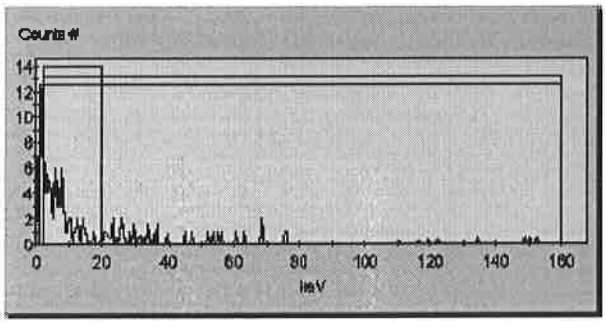
3072156026 15 7/17/12 4.44 275.9 7.12 8.12
30 13 10:16:21 AM 5

SpectraView Block Data



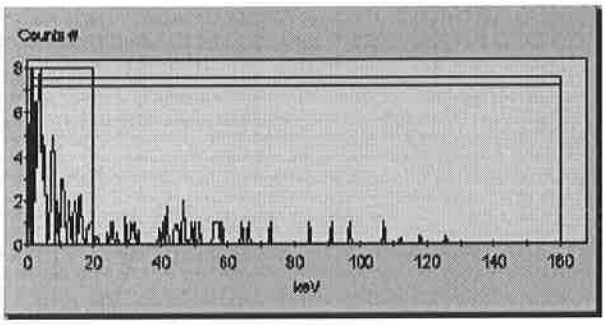
3072156027 15 7/17/12 5.66 267.1 7.98 9.12
31 13 10:32:09 AM 4

SpectraView Block Data



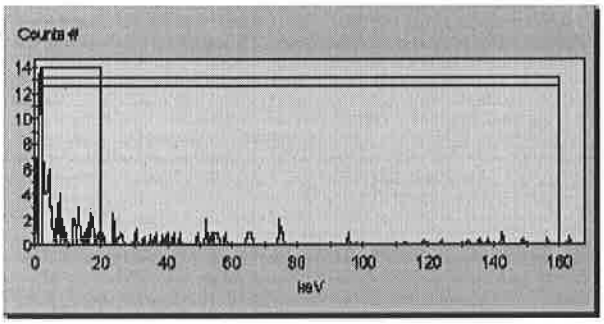
3072156028 15 7/17/12 5.22 214.2 7.46 8.32
32 13 10:47:55 AM 3

SpectraView Block Data



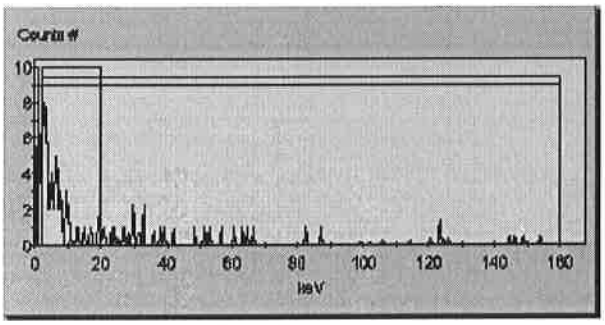
3072156029 15 7/17/12 4.25 197.7 6.64 8.38
33 13 11:03:43 AM 5

SpectraView Block Data



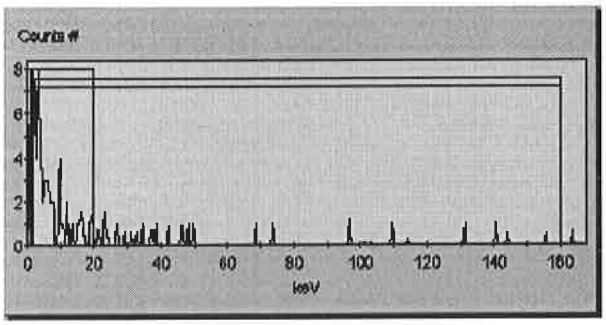
3072156030 15 7/17/12 4.44 257.9 6.63 7.63
34 13 11:19:29 AM 5

SpectraView Block Data



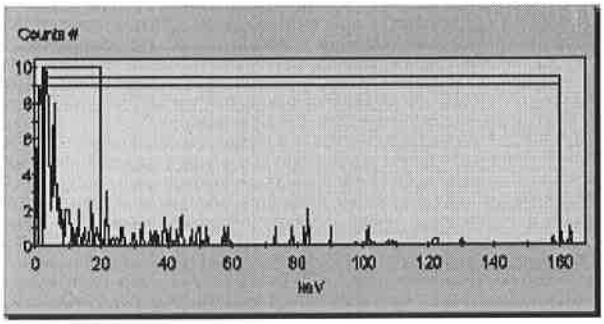
3072156031 15 7/17/12 4.62 248.4 6.18 7.25
35 13 11:35:17 AM 4

SpectraView Block Data



3072156032 15 7/17/12 5.06 239.6 7.42 8.48
36 13 11:51:06 AM 4

SpectraView Block Data



			3072156033	15	7/17/12	4.50	260.8	7.79	8.79
37	7	12:07:01 PM	4						
			3072156034	15	7/17/12	4.44	228.8	6.53	8.07
38	7	12:22:50 PM	5						
			3072156035	15	7/17/12	4.43	282.9	6.11	7.64
39	7	12:38:39 PM	5						
			3072156036	15	7/17/12	4.27	279.1	6.47	7.60
40	7	12:54:30 PM	5						
			3072156037	15	7/17/12	5.07	261.8	7.21	8.68
41	7	1:10:20 PM	4						
			3072156038	15	7/17/12	4.83	144.2	7.34	8.34
42	7	1:26:14 PM	5						
Missing vial 43.									
			3072156040	15	7/17/12	4.13	210.2	6.04	7.24
44	7	2:33:43 PM	4						
			LCS3	15	7/17/12	373.22	292.1	376.09	609.89
45	7	2:49:37 PM	0						
			LCS4	15	7/17/12	393.34	314.3	396.26	621.19
46	7	3:05:34 PM	0						

Pace Analytical

Pace Analytical Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156039	12481	SuperH3C14E	7	12	NA	30	NA	MBJ
↓ 40	↓	↓	↓	↓	↓	↓	↓	↓
BKG 12644	12644	Rn222.15c	4	29	7-16-12 8:05	30	N/A	LAL
464733 MB								
07014 LCS1								
3073242001								
3073242001B								
07044CS3								
~~BKG~~ MB 459066	12481	SuperH3C14	26	8	7/16/12 2130	15	NA	RMK
3072156001								
002								
003								
004								
005								
006								
007								
008								
009								
010								
011								
012				14				
013								
014								
015	↓	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

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Pace Analytical Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156016	12481	Simple H3 C14	14	8	7/16/12 2130	15	NA	RMK
017								
018								
019								
020								
LCS								
LCSD								
~~BLG~~MB 459067	12482							
3072156021			13					
022								
023								
024								
025								
026								
027								
028								
029								
030								
031								
032								
033			7					
034								
035								
036								

Run comments: _____

Peer Review: _____

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Creation Date	06/28/2012 13:46		Assigned Analyst	MBT	
Batch ID	12481		Earliest Due Date	07/04/2012 07:12	
A-code	9060 I LEB	9060W	HBN	91052	
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
3072156	3072156014	PS	WP	6/11/2012 0:01	RTI	-1.57U	4.38	9.57	7/21/12 23:17
3072156	3072156017	PS	WP	6/11/2012 0:01	RTI	-3.20U	3.85	8.72	7/21/12 23:30

7/31/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT			
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	8.26	
Batch ID	12481	**PrepSOP2**	n/a	**Bkg Duration**	30.0	min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	bkg 7/21	
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/21/2012 16:46	
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**Instrument ID:**	System #2	

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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
3072156014	1.0	6/11/12 0:01	12.0	7/21/12 23:17	7.59	346.9	dpm/S	High, Evaluate
3072156017	1.0	6/11/12 0:01	12.0	7/21/12 23:30	6.76	311.6	dpm/S	High, Evaluate

7/31/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12481	**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
3072156014	0.4295	0.1122	0.9938	-1.570	4.375	4.379	9.568	3.795	0.745	4.375	1.00
3072156017	0.4713	0.1122	0.9938	-3.203	3.832	3.851	8.719	3.458	0.679	3.832	1.00

7/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12481

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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

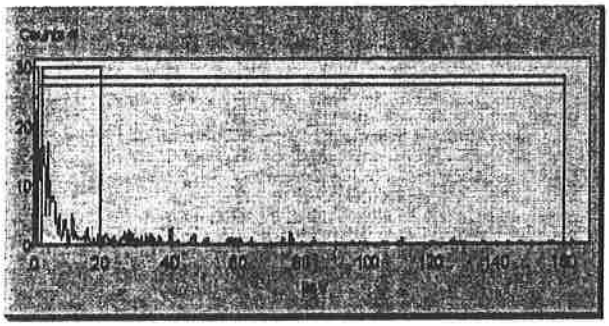
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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
1	10	BKG 7/21/2012 4:46:13 PM	30 15	7/21/12	4.92	291.6	6.89	8.26	

SpectraView Block Data



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_D
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\20120721_2316.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\12481.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H-3_C-14_D.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): 12.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

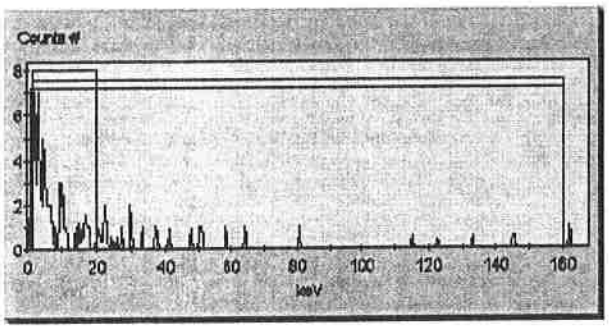
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

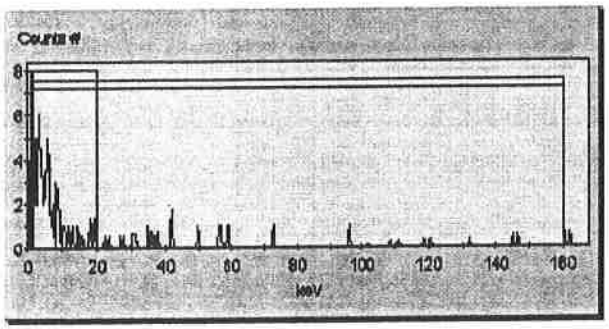
S#	PID	SMPL_ID TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	26	3072156014 11:17:27 PM	5	12	7/21/12	4.84	346.9	6.76	7.59	

SpectraView Block Data



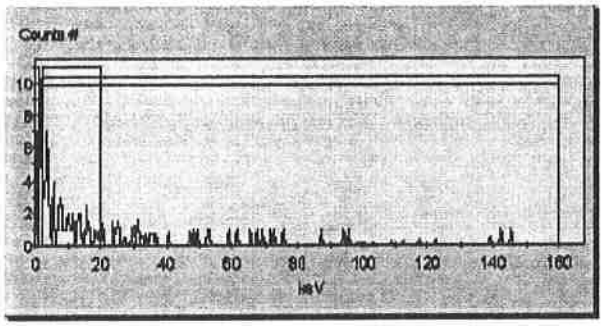
S#	PID	SMPL_ID TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
2	26	3072156017 11:30:10 PM	6	12	7/21/12	4.44	311.6	5.93	6.76	

SpectraView Block Data



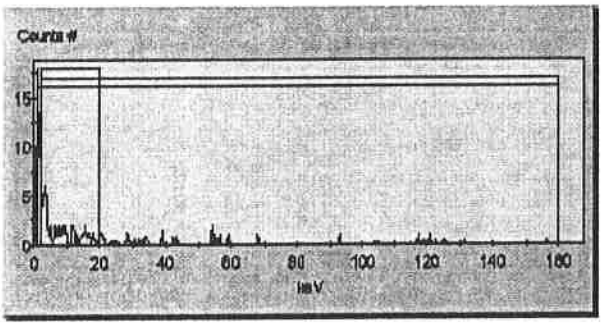
S#	PID	SMPL_ID TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
3	26	3072156038 11:42:55 PM	2	12	7/21/12	4.71	137.0	7.86	9.61	

SpectraView Block Data



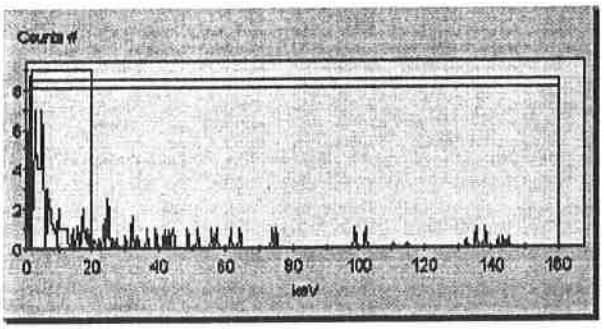
3072156039 12 7/21/12 4.68 244.3 6.90 9.40
4 26 11:55:39 PM 4

SpectraView Block Data



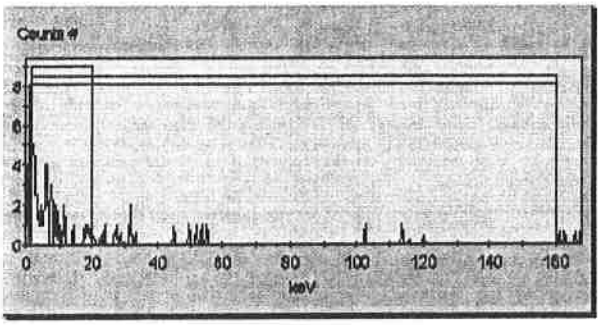
3072156049 12 7/22/12 5.09 130.9 7.65 9.06
5 26 12:08:24 AM 4

SpectraView Block Data



3072156069 12 7/22/12 3.75 254.6 5.00 5.83
6 26 12:21:09 AM 7

SpectraView Block Data


Counts #
8
6
4
2
0
0
20
40
60
80
100
120
140
160
keV

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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
307211e1040	N/A	Simple H3C14	9	12	7/20/12 1500	~~13~~ 12	N/A	QA
LCS						OK 7/21/12		
LCSD								
BLG 7/21/12		Simple H3C14E	10	3	7/21/12 1355	30		
307215e0C14		Simple HC14D	26	19		12		
17								
33								
34								
49								
69								QA
LCS 12481		Simple H3C14B	17	5	7/21/12 1355	6		
LCSD 12481								
LCS 12482								
LCSD 12482								
LCS 12483								
LCSD 12483								
LCS 12484								
LCSD 12484								
LCS 12485								
LCSD 12485								
LCS 12497								
LCSD 12497								

Run comments:

Peer Review: 7/24

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 8.26
Bkg Duration 30.0 min
Bkg Ref BKG7/21/2012
Bkg Ct Date/Time: 7/21/2012 16:46
Instrument ID: System #2

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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	6.0				dpm/S	Low, Reprep
LCS12481	1.0	7/21/12 13:56	6.0	7/21/12 13:56	58.29	319.0	dpm/S	High, Evaluate
LCSD12481	1.0	7/21/12 14:03	6.0	7/21/12 14:03	55.60	305.5	dpm/S	High, Evaluate
LCS12482	1.0	7/21/12 14:10	6.0	7/21/12 14:10	59.00	254.8	dpm/S	Pass
LCSD12482	1.0	7/21/12 14:17	6.0	7/21/12 14:17	54.73	307.6	dpm/S	High, Evaluate
LCS12483	1.0	7/21/12 14:23	6.0	7/21/12 14:23	60.56	288.2	dpm/S	Pass
LCSD12483	1.0	7/21/12 14:30	6.0	7/21/12 14:30	56.15	301.0	dpm/S	High, Evaluate
LCS12484	1.0	7/21/12 14:37	6.0	7/21/12 14:37	56.94	319.9	dpm/S	High, Evaluate
LCSD12484	1.0	7/21/12 14:44	6.0	7/21/12 14:44	59.13	309.0	dpm/S	High, Evaluate
LCSD12485	1.0	7/21/12 14:58	6.0	7/21/12 14:53	54.06	312.4	dpm/S	High, Evaluate
LCS12497	1.0	7/21/12 15:05	6.0	7/21/12 15:00	58.81	311.4	dpm/S	High, Evaluate
LCSD12497	1.0	7/21/12 15:12	6.0	7/21/12 15:07	62.56	310.8	dpm/S	High, Evaluate
LCS12485	1.0	7/28/12 15:29	12.0	7/28/12 15:29	51.27	299.3	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	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	-0.0696	0.0000	1.0000	118.714	-14.781	16.497	-84.905	-30.480	-8.466	-8.466	1.00
LCS12481	0.4643	0.0000	1.0000	107.761	13.344	18.527	12.724	4.568	1.269	13.344	1.00
LCSD12481	0.4764	0.0000	1.0000	99.373	12.709	17.378	12.401	4.452	1.237	12.709	1.00
LCS12482	0.4945	0.0000	1.0000	102.607	12.602	17.566	11.946	4.289	1.191	12.602	1.00
LCSD12482	0.4747	0.0000	1.0000	97.892	12.657	17.220	12.445	4.468	1.241	12.657	1.00
LCS12483	0.4874	0.0000	1.0000	107.296	12.948	18.205	12.120	4.351	1.209	12.948	1.00
LCSD12483	0.4797	0.0000	1.0000	99.823	12.681	17.394	12.314	4.421	1.228	12.681	1.00
LCS12484	0.4634	0.0000	1.0000	105.061	13.219	18.214	12.750	4.577	1.271	13.219	1.00
LCSD12484	0.4735	0.0000	1.0000	107.425	13.174	18.377	12.475	4.478	1.244	13.174	1.00
LCSD12485	0.4706	0.0000	1.0000	97.327	12.692	17.200	12.554	4.507	1.252	12.692	1.00
LCS12497	0.4715	0.0000	1.0000	107.218	13.197	18.376	12.530	4.498	1.249	13.197	1.00
LCSD12497	0.4720	0.0000	1.0000	115.043	13.585	19.309	12.516	4.493	1.248	13.585	1.00
LCS12485	0.4809	0.0000	1.0000	89.431	8.691	13.759	8.491	3.368	0.662	8.691	1.00

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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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

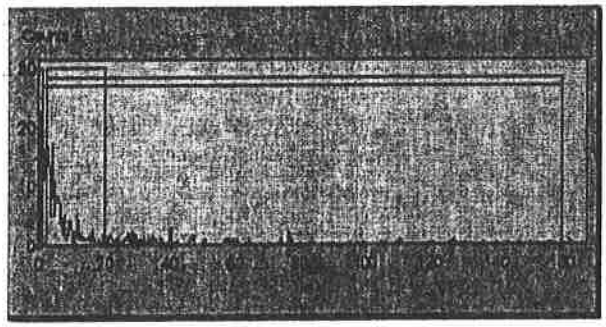
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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
1	BKG 10	7/21/2012 4:46:13 PM	30 15	7/21/12	4.92	291.6	6.89	8.26	

SpectraView Block Data



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_H3_C14_B
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\20120721_1356.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\12480.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14_B.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): 6.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

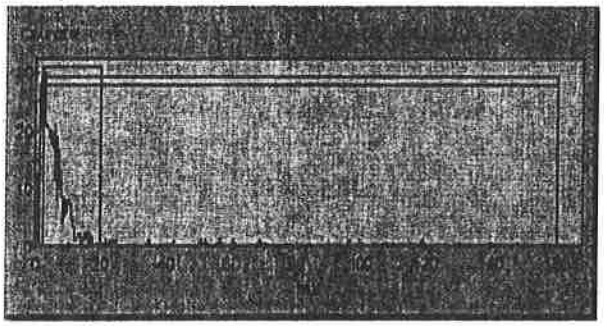
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 15.53 Date Processed: 7/20/12 8:36:50 PM
14C Chi Square: 11.84 Date Processed: 7/20/12 8:36:50 PM

3H E^2/B (1-18.6 keV): 311.34 Date Processed: 7/20/12 8:36:50 PM
14C E^2/B (4-156 keV): 556.50 Date Processed: 7/20/12 8:36:50 PM
3H Efficiency (0-18.6 keV): 61.98 Date Processed: 7/20/12 8:36:50 PM
14C Efficiency (0-156 keV): 94.97 Date Processed: 7/20/12 8:36:50 PM
IPA Background Date Processed: 7/20/12 8:36:50 PM
3H Background CPM (0-18.6 keV): 12.27 Date Processed: 7/20/12 8:36:50 PM
14C Background CPM (0-156 keV): 20.03 Date Processed: 7/20/12 8:36:50 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/20/12 8:36:50 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

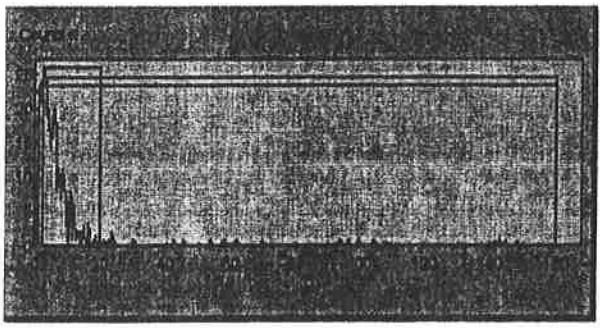
S#	PID	SMPL_ID TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	17	LCS12481 1:56:51 PM	1	6	7/21/12	47.38	319.0	49.79	58.29	

SpectraView Block Data



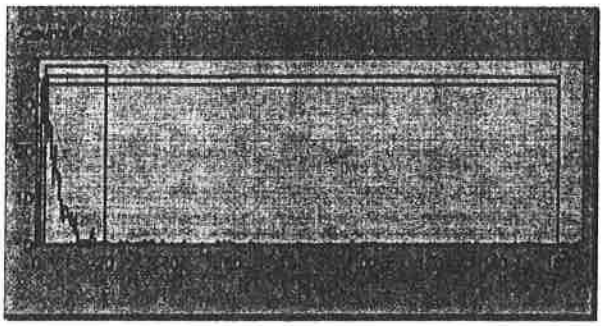
2	17	LCSD12481 2:03:37 PM	1	6	7/21/12	46.04	305.5	49.27	55.60	

SpectraView Block Data



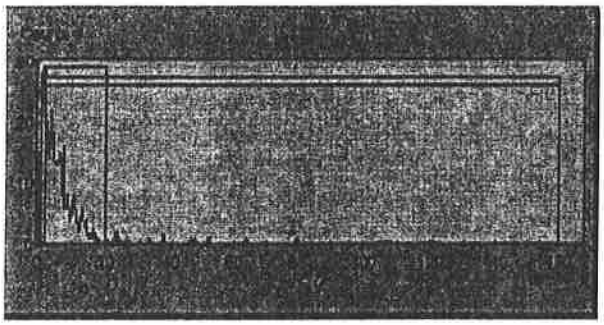
3	17	LCS12482 2:10:23 PM	1	6	7/21/12	48.40	254.8	51.17	59.00	

SpectraView Block Data



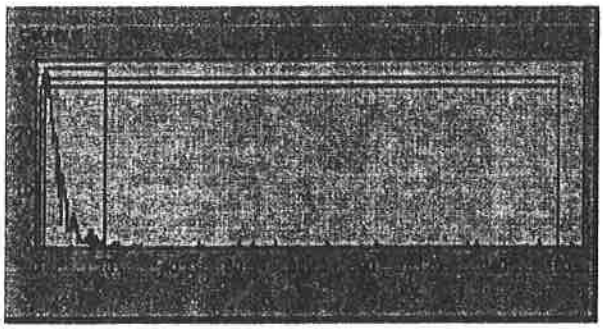
LCSD12482 6 7/21/12 43.13 307.6 45.73 54.73
4 17 2:17:08 PM 1

SpectraView Block Data



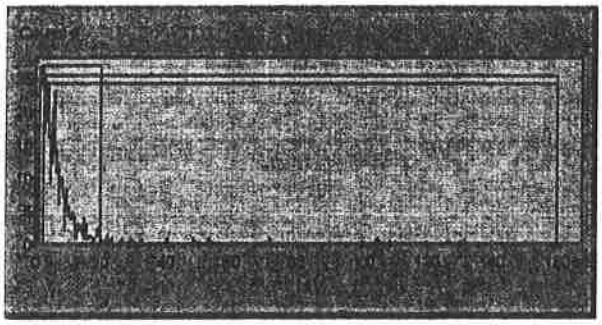
LCS12483 6 7/21/12 49.79 288.2 52.06 60.56
5 17 2:23:53 PM 1

SpectraView Block Data



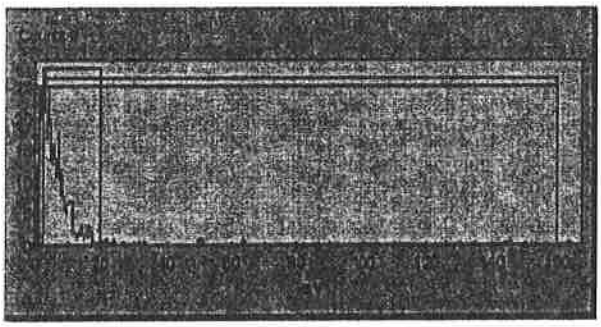
LCSD12483 6 7/21/12 45.19 301.0 47.31 56.15
6 17 2:30:38 PM 1

SpectraView Block Data



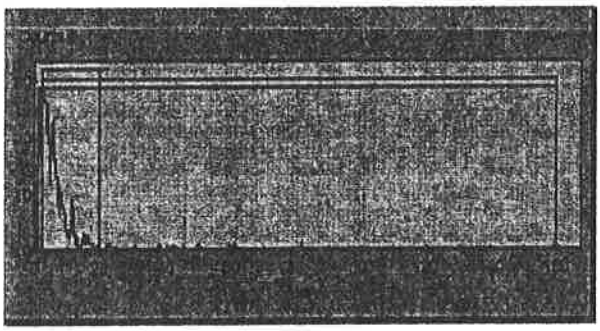
LCS12484 6 7/21/12 48.35 319.9 50.27 56.94
7 17 2:37:23 PM 1

SpectraView Block Data



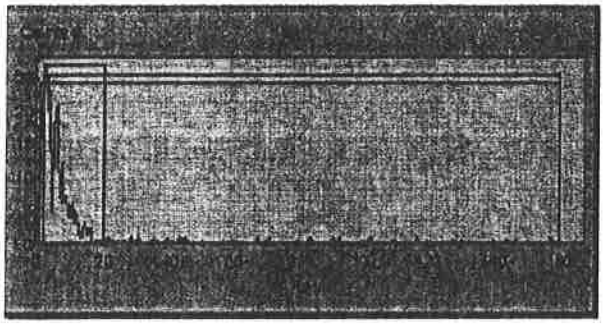
LCSD12484 6 7/21/12 51.38 309.0 53.46 59.13
8 17 2:44:09 PM 1

SpectraView Block Data



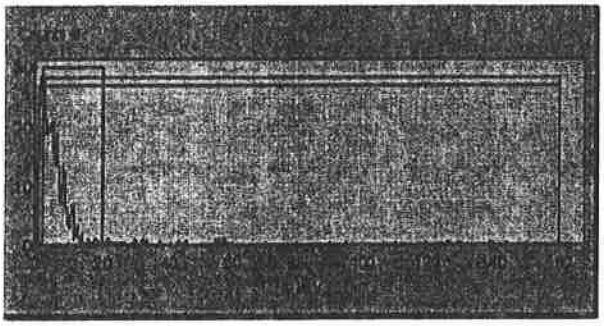
Missing vial 9.
LCSD12485 6 7/21/12 45.33 312.4 48.73 54.06
10 17 2:53:58 PM 2

SpectraView Block Data



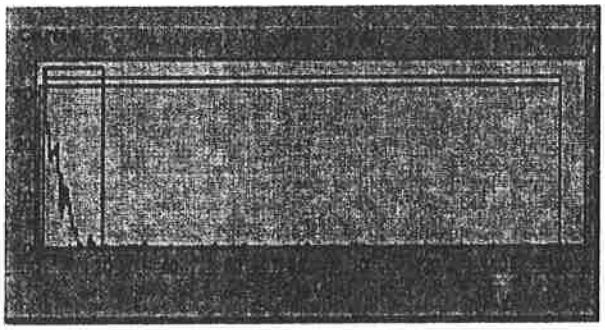
LCS12497 6 7/21/12 48.38 311.4 50.98 58.81
11 17 3:00:44 PM 1

SpectraView Block Data



LCSD12497 6 7/21/12 51.69 310.8 53.23 62.56
12 17 3:07:29 PM 1

SpectraView Block Data



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_H3_C14
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\20120728_1515.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\12476.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14.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): 12.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

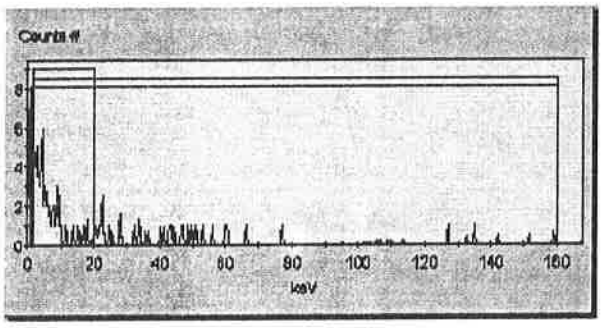
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.77 Date Processed: 7/28/12 3:15:37 PM
14C Chi Square: 19.53 Date Processed: 7/28/12 3:15:37 PM

3H E^2/B (1-18.6 keV): 309.97 Date Processed: 7/28/12 3:15:37 PM
14C E^2/B (4-156 keV): 578.03 Date Processed: 7/28/12 3:15:37 PM
3H Efficiency (0-18.6 keV): 62.71 Date Processed: 7/28/12 3:15:37 PM
14C Efficiency (0-156 keV): 95.37 Date Processed: 7/28/12 3:15:36 PM
IPA Background Date Processed: 7/28/12 3:15:37 PM
3H Background CPM (0-18.6 keV): 12.62 Date Processed: 7/28/12 3:15:37 PM
14C Background CPM (0-156 keV): 19.20 Date Processed: 7/28/12 3:15:37 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/28/12 3:15:37 PM: 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	TIME	SMPL_ID LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
			BKG	12	7/28/12	4.47	319.7	7.39	8.47	
1	6	3:16:11 PM	5							

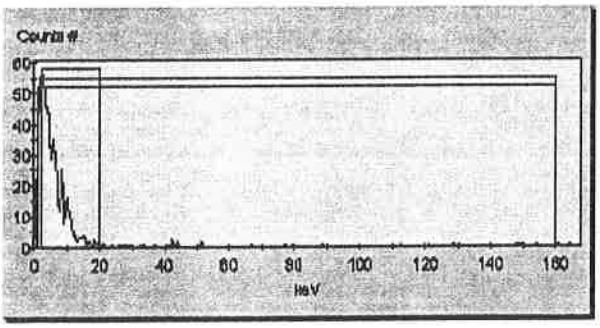
SpectraView Block Data



13485

S#	PID	TIME	SMPL_ID LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
			LCS	12	7/28/12	49.13	299.3	51.27	58.19	
2	6	3:29:02 PM	1							

SpectraView Block Data



7/31/12

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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
30[illegible]1040	NA	SuperH3C14	9	13	7/20/12 1500	~~13~~ 12 Oh 7/20/12	NA	[illegible]
LCS								
LCSD								
BLK 7/21/12		SuperH3C14E	10	3	7/21/12 1355	36		
3071[illegible]C14		SuperH3C14D	26	19		12		
17								
38								
39								
49								
69								
LCS 12481		SuperH3C14B	17	5	7/21/12 1355	6		[illegible]
LCSD 12481								
LCS 12482								
LCSD 12482								
LCS 12483								
LCSD 12483								
LCS 12484								
LCSD 12484								
LCS 12485								
LCSD 12485								
LCS 12497								
LCSD 12497								

Run comments:

Peer Review: [illegible] 9/24/12

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

Pace Analytical

Pace Analytical Services, Inc.-Pittsurgh

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
3073069008	12701	Pu241 CHRH Bkg	16	6	7 26-12 15:20	120	N/A	CAL
LCS12701	↓	↓	↓	↓	↓	↓	↓	↓
LCSD12701	↓	↓	↓	↓	↓	↓	↓	↓
BKG	N/A	Super-H3 ...	6	2	7/27/12 1030	12	N/A	Q
LW 13485	↓	↓	↓	↓	↓	↓	↓	↓

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/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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2 459067-BLANK for HBN 91053 [RADC/1248

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12482 **Prep Date** 7/17/2012 08:41 **Dilution**
Method EPA 906.0M **HBN** 91053 **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2859902 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 08:41 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2859902 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-7.39U ± 4.15 (9.12)	dpm/sa	-7.39U ± 4.15 (9.12)		dpm/sa	

4 3072156021-SU-12-2

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmonth 1207076 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12482 **Prep Date** 7/17/2012 08:57 **Dilution**
Method EPA 906.0M **HBN** 91053 **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2859907 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 08:57 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2859907 **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	-8.72U ± 4.03 (8.97)	dpm/sa	-8.72U ± 4.03 (8.97)		dpm/sa		

6 3072156022-SU-12-3

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmonth 1207076 **Location**

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

Quality Control Review

Batch	RADC/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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6 3072156022-SU-12-3

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2859916

Batch RADC/12482
HBN 91053
Instru NONE

Prep Date 7/17/2012 09:13
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2859916

Instru NONE
Col ID
File

Run Date 7/17/2012 09:13
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-9.78U ± 3.99 (8.96)	dpm/sa	-9.78U ± 3.99 (8.96)		dpm/sa		

8 3072156023-SU-12-4

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2859921

Batch RADC/12482
HBN 91053
Instru NONE

Prep Date 7/17/2012 09:28
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2859921

Instru NONE
Col ID
File

Run Date 7/17/2012 09:28
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-10.5U ± 4.16 (9.36)	dpm/sa	-10.5U ± 4.16 (9.36)		dpm/sa		

10 3072156024-SU-12-5

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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10 3072156024-SU-12-5

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/17/2012 09:44	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859925	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 09:44	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859925	**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	-6.73U ± 4.10 (8.96)	dpm/sa	-6.73U ± 4.10 (8.96)		dpm/sa		

12 3072156025-SU-12-5D

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/17/2012 10:00	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859926	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 10:00	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859926	**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	-11.7U ± 4.08 (9.25)	dpm/sa	-11.7U ± 4.08 (9.25)		dpm/sa		

14 3072156026-SU-12-6

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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14 3072156026-SU-12-6

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/17/2012 10:16	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859927	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 10:16	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859927	**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	-8.70U ± 4.05 (9.00)	dpm/sa	-8.70U ± 4.05 (9.00)		dpm/sa		

16 3072156027-SU-12-7

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/17/2012 10:32	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859928	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 10:32	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859928	**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	-6.63U ± 4.11 (8.97)	dpm/sa	-6.63U ± 4.11 (8.97)		dpm/sa		

18 3072156028-SU-12-8

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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18 3072156028-SU-12-8

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12482	**Prep Date**	7/17/2012 10:47	**Dilution**
Method	EPA 906.0M		**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859929		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 10:47	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859929		**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	-8.54U ± 4.18 (9.27)	dpm/sa	-8.54U ± 4.18 (9.27)		dpm/sa		

20 3072156029-SU-12-9

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12482	**Prep Date**	7/17/2012 11:03	**Dilution**
Method	EPA 906.0M		**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859930		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 11:03	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859930		**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	-8.69U ± 4.32 (9.57)	dpm/sa	-8.69U ± 4.32 (9.57)		dpm/sa		

22 3072156030-SU-12-10

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12482	**HBN**	91053
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

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22 3072156030-SU-12-10

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12482	**Prep Date**	7/17/2012 11:19	**Dilution**
Method	EPA 906.0M		**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859931		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 11:19	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859931		**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	-9.66U ± 3.99 (8.96)	dpm/sa	-9.66U ± 3.99 (8.96)		dpm/sa		

24 3072156031-SU-12-11

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12482	**Prep Date**	7/17/2012 11:35	**Dilution**
Method	EPA 906.0M		**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859932		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 11:35	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859932		**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	-10.4U ± 3.98 (8.97)	dpm/sa	-10.4U ± 3.98 (8.97)		dpm/sa		

26 3072156032-SU-12-12

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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26 3072156032-SU-12-12

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2859933

Batch RADC/12482
HBN 91053
Instru NONE

Prep Date 7/17/2012 11:51
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2859933

Instru NONE
Col ID
File

Run Date 7/17/2012 11:51
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.98U ± 4.08 (9.01)	dpm/sa	-7.98U ± 4.08 (9.01)		dpm/sa		

28 3072156033-SU-12-13

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2859934

Batch RADC/12482
HBN 91053
Instru NONE

Prep Date 7/17/2012 12:07
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2859934

Instru NONE
Col ID
File

Run Date 7/17/2012 12:07
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.30U ± 4.08 (8.96)	dpm/sa	-7.30U ± 4.08 (8.96)		dpm/sa		

30 3072156034-SU-12-14

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12482	**HBN**	91053
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

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30 3072156034-SU-12-14

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12482	**Prep Date**	7/17/2012 12:22	**Dilution**
Method	EPA 906.0M		**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859935		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 12:22	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859935		**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	-8.90U ± 4.09 (9.10)	dpm/sa	-8.90U ± 4.09 (9.10)		dpm/sa		

32 3072156035-SU-12-15

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12482	**Prep Date**	7/17/2012 12:38	**Dilution**
Method	EPA 906.0M		**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859936		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 12:38	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859936		**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	-9.73U ± 4.03 (9.04)	dpm/sa	-9.73U ± 4.03 (9.04)		dpm/sa		

34 3072156036-SU-12-15D

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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34 3072156036-SU-12-15D

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/17/2012 12:54	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859937	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 12:54	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859937	**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	-9.79U ± 4.02 (9.02)	dpm/sa	-9.79U ± 4.02 (9.02)		dpm/sa		

36 3072156037-SU-12-16

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/17/2012 13:10	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859938	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 13:10	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2859938	**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	-7.52U ± 4.07 (8.96)	dpm/sa	-7.52U ± 4.07 (8.96)		dpm/sa		

38 3072156038-SU-12-17

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12482	HBN	91053
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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38 3072156038-SU-12-17

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/21/2012 23:42	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2851277	**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**	7/21/2012 23:42	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2851277	**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	3.68U ± 5.55 (11.1)	dpm/sa	3.68U ± 5.55 (11.1)		dpm/sa		

39 3072156039-SU-12-18

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12482	**Prep Date**	7/21/2012 23:55	**Dilution**	
Method	EPA 906.0M	**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2789999	**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**	7/21/2012 23:55	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2789999	**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	2.33U ± 4.13 (8.34)	dpm/sa	2.33U ± 4.13 (8.34)		dpm/sa		

41 3072156040-SU-12-19

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12482	**HBN**	91053
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

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41 3072156040-SU-12-19

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12482	**Prep Date**	7/17/2012 14:33	**Dilution**
Method	EPA 906.0M		**HBN**	91053	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859940		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 14:33	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2859940		**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	-10.9U ± 4.14 (9.33)	dpm/sa	-10.9U ± 4.14 (9.33)			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 13:46	Assigned Analyst	MBT
Batch ID	12482	Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB 9060W	HBN	91053
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
	459067	BLANK	IP		QCACCOUNT	-7.39U	4.15	9.12	7/17/12 8:41
3072156	3072156021	PS	WP	6/11/2012 0:01	RTI	-8.72U	4.03	8.97	7/17/12 8:57
3072156	3072156022	PS	WP	6/11/2012 0:01	RTI	-9.78U	3.99	8.96	7/17/12 9:13
3072156	3072156023	PS	WP	6/11/2012 0:01	RTI	-10.5U	4.16	9.36	7/17/12 9:28
3072156	3072156024	PS	WP	6/11/2012 0:01	RTI	-6.73U	4.10	8.96	7/17/12 9:44
3072156	3072156025	PS	WP	6/11/2012 0:01	RTI	-11.7U	4.08	9.25	7/17/12 10:00
3072156	3072156026	PS	WP	6/11/2012 0:01	RTI	-8.70U	4.05	9.00	7/17/12 10:16
3072156	3072156027	PS	WP	6/11/2012 0:01	RTI	-6.63U	4.11	8.97	7/17/12 10:32
3072156	3072156028	PS	WP	6/11/2012 0:01	RTI	-8.54U	4.18	9.27	7/17/12 10:47
3072156	3072156029	PS	WP	6/11/2012 0:01	RTI	-8.69U	4.32	9.57	7/17/12 11:03
3072156	3072156030	PS	WP	6/11/2012 0:01	RTI	-9.66U	3.99	8.96	7/17/12 11:19
3072156	3072156031	PS	WP	6/11/2012 0:01	RTI	-10.4U	3.98	8.97	7/17/12 11:35
3072156	3072156032	PS	WP	6/11/2012 0:01	RTI	-7.98U	4.08	9.01	7/17/12 11:51
3072156	3072156033	PS	WP	6/11/2012 0:01	RTI	-7.30U	4.08	8.96	7/17/12 12:07
3072156	3072156034	PS	WP	6/11/2012 0:01	RTI	-8.90U	4.09	9.10	7/17/12 12:22
3072156	3072156035	PS	WP	6/11/2012 0:01	RTI	-9.73U	4.03	9.04	7/17/12 12:38
3072156	3072156036	PS	WP	6/11/2012 0:01	RTI	-9.79U	4.02	9.02	7/17/12 12:54
3072156	3072156037	PS	WP	6/11/2012 0:01	RTI	-7.52U	4.07	8.96	7/17/12 13:10
3072156	3072156038	PS	WP	6/11/2012 0:01	RTI	~~-10.6U~~	~~5.21~~	~~11.5~~	7/17/12 13:26
3072156	3072156039	PS	WP	6/11/2012 0:01	RTI		0.0408	#NUM!	
3072156	3072156040	PS	WP	6/11/2012 0:01	RTI	-10.9U	4.14	9.33	7/17/12 14:33

7/23/12

7/23/12

LIMS Load
Printed 7/22/2012 at 10:11 AM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
Matrix Smear
Batch ID 12482
Prep Start 7/16/2012 12:00
Prep Finish 7/16/2012
Act. Rpt Units dpm

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

Bkg CPM 12.38
Bkg Duration 30.0 min
Bkg Ref BKG 7/17/2012
Bkg Ct Date/Time: 7/17/2012 15:21
Instrument ID: System #2

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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
459067	1.0	7/17/12 8:41	15.0	7/17/12 8:41	8.81	296.3	dpm/S	Pass
3072156021	1.0	6/11/12 0:01	15.0	7/17/12 8:57	8.10	247.8	dpm/S	Pass
3072156022	1.0	6/11/12 0:01	15.0	7/17/12 9:13	7.57	258.6	dpm/S	Pass
3072156023	1.0	6/11/12 0:01	15.0	7/17/12 9:28	7.44	208.2	dpm/S	Pass
3072156024	1.0	6/11/12 0:01	15.0	7/17/12 9:44	9.07	255.1	dpm/S	Pass
3072156025	1.0	6/11/12 0:01	15.0	7/17/12 10:00	6.83	302.5	dpm/S	High, Evaluate
3072156026	1.0	6/11/12 0:01	15.0	7/17/12 10:16	8.12	275.9	dpm/S	Pass
3072156027	1.0	6/11/12 0:01	15.0	7/17/12 10:32	9.12	267.1	dpm/S	Pass
3072156028	1.0	6/11/12 0:01	15.0	7/17/12 10:47	8.32	214.2	dpm/S	Pass
3072156029	1.0	6/11/12 0:01	15.0	7/17/12 11:03	8.38	197.7	dpm/S	Pass
3072156030	1.0	6/11/12 0:01	15.0	7/17/12 11:19	7.63	257.9	dpm/S	Pass
3072156031	1.0	6/11/12 0:01	15.0	7/17/12 11:35	7.25	248.4	dpm/S	Pass
3072156032	1.0	6/11/12 0:01	15.0	7/17/12 11:51	8.48	239.6	dpm/S	Pass
3072156033	1.0	6/11/12 0:01	15.0	7/17/12 12:07	8.79	260.8	dpm/S	Pass
3072156034	1.0	6/11/12 0:01	15.0	7/17/12 12:22	8.07	228.8	dpm/S	Pass
3072156035	1.0	6/11/12 0:01	15.0	7/17/12 12:38	7.64	282.9	dpm/S	Pass
3072156036	1.0	6/11/12 0:01	15.0	7/17/12 12:54	7.60	279.1	dpm/S	Pass
3072156037	1.0	6/11/12 0:01	15.0	7/17/12 13:10	8.68	261.8	dpm/S	Pass
3072156038	1.0	6/11/12 0:01	15.0				dpm/S	Low, Reprep
3072156039	1.0	6/11/12 0:01	15.0				dpm/S	Low, Reprep
3072156040	1.0	6/11/12 0:01	15.0	7/17/12 14:33	7.24	210.2	dpm/S	Pass

7/23/12 7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12482	**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
459067	0.4829	0.0000	1.0000	-7.393	4.059	4.154	9.122	3.802	0.546	4.059	1.00
3072156021	0.4936	0.0996	0.9945	-8.719	3.897	4.034	8.974	3.740	0.537	3.897	1.00
3072156022	0.4947	0.0996	0.9945	-9.778	3.816	3.990	8.955	3.732	0.536	3.816	1.00
3072156023	0.4730	0.0996	0.9945	-10.502	3.972	4.165	9.365	3.903	0.560	3.972	1.00
3072156024	0.4945	0.0997	0.9945	-6.731	4.020	4.099	8.957	3.733	0.536	4.020	1.00
3072156025	0.4787	0.0997	0.9945	-11.659	3.836	4.080	9.254	3.857	0.553	3.836	1.00
3072156026	0.4922	0.0997	0.9945	-8.703	3.911	4.046	8.999	3.751	0.538	3.911	1.00
3072156027	0.4941	0.0998	0.9945	-6.635	4.030	4.107	8.965	3.736	0.536	4.030	1.00
3072156028	0.4778	0.0998	0.9945	-8.544	4.057	4.183	9.271	3.864	0.554	4.057	1.00
3072156029	0.4631	0.0998	0.9945	-8.685	4.194	4.320	9.565	3.986	0.572	4.194	1.00
3072156030	0.4946	0.0999	0.9944	-9.656	3.825	3.994	8.955	3.732	0.536	3.825	1.00
3072156031	0.4937	0.0999	0.9944	-10.448	3.779	3.979	8.972	3.739	0.537	3.779	1.00
3072156032	0.4915	0.0999	0.9944	-7.979	3.966	4.078	9.012	3.756	0.539	3.966	1.00
3072156033	0.4946	0.0999	0.9944	-7.299	3.982	4.076	8.956	3.732	0.536	3.982	1.00
3072156034	0.4870	0.1000	0.9944	-8.899	3.946	4.086	9.096	3.791	0.544	3.946	1.00
3072156035	0.4898	0.1000	0.9944	-9.731	3.864	4.034	9.044	3.769	0.541	3.864	1.00
3072156036	0.4912	0.1000	0.9944	-9.785	3.847	4.020	9.018	3.758	0.539	3.847	1.00
3072156037	0.4946	0.1001	0.9944	-7.523	3.968	4.068	8.957	3.733	0.536	3.968	1.00
3072156038	-0.0696	-112.4463	528.0170	0.337	-0.034	0.041	-0.120	-0.050	-0.007	-0.007	1.00
3072156039	-0.0696	-112.4463	528.0170	0.337	-0.034	0.041	-0.120	-0.050	-0.007	-0.007	1.00
3072156040	0.4747	0.1002	0.9944	-10.889	3.929	4.138	9.332	3.889	0.558	3.929	1.00

7/23/12 7/23/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/31/2012	**Method:**	EPA 906.0M
Worklist:	12482	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459067

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-7.3930	4.1540	9.1220	3.80200		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/21/12 14:10	7/21/12 14:17				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.917	1184.916				
Volume Used (mL):	0.100	0.100				
Aliquot Volume (L, g, F):	1.000	1.000				
Target Conc. (DPM/Sample, g, F):	118.492	118.492				
1.96 Sigma Uncertainty (Calculated):	2.137	2.137				
Result (DPM/Sample, g, F):	102.607	97.892				
1.96 Sigma Unc:	17.566	17.220				
% Recovery:	86.59%	82.62%				
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.:	LCS12482					
Duplicate Sample I.D.	LCSD12482					
Sample Result (DPM/Sample, g, F):	102.6070					
1.96 Sigma Unc:	17.5660					
ple Duplicate Result (DPM/Sample, g, F):	97.8920					
Duplicate Sample 1.96 Sigma Unc.	17.2200					
Either results below MDC?	NO					
Relative Percent Difference:	4.70%					
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: 12482

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%

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\20120717_1521.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

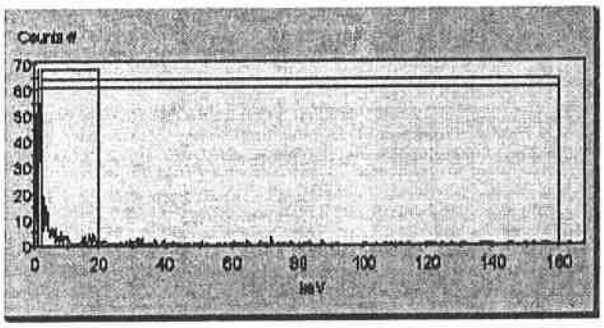
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM

14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM
3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: 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 071712	30	7/17/12	5.04	273.6	8.41	12.38	W
1	16	3:21:58 PM	33						

SpectraView Block Data



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_H3_C14_B
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\20120717_0218.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\12480.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14_B.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): 15.00
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	2.00
B	2.0	160.0	0.00
C	1.0	160.0	0.00

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				

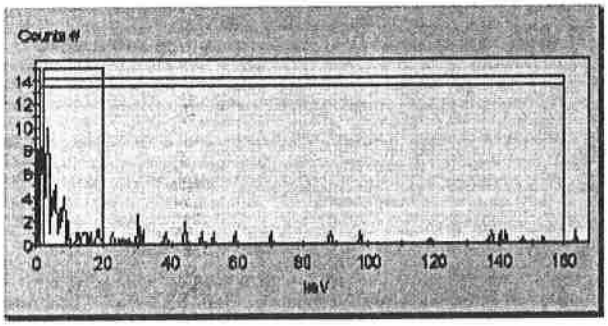
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM
14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM

3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

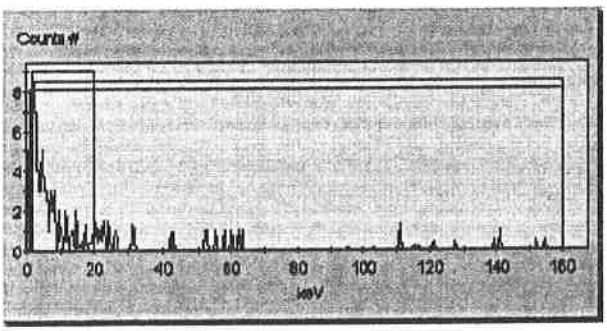
S#	PID	TIME	SMPL_ID LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	26	2:18:41 AM	~~BKG~~ 13	15	7/17/12	4.61	326.7	6.22	7.62	

SpectraView Block Data



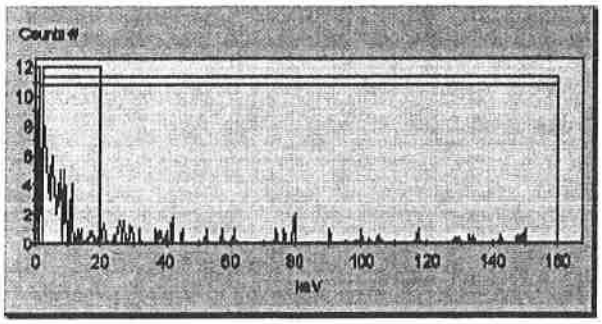
S#	PID	TIME	SMPL_ID LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
2	26	2:34:39 AM	3072156001 7	15	7/17/12	4.69	275.0	6.42	7.03	

SpectraView Block Data



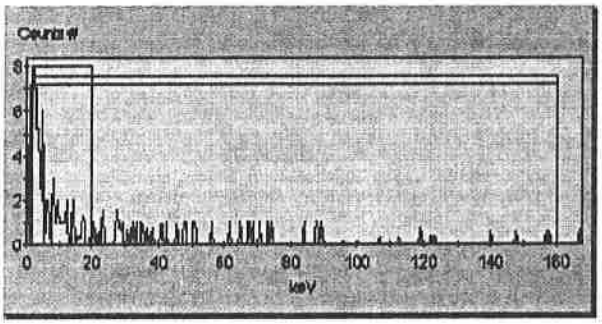
S#	PID	TIME	SMPL_ID LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
3	26	2:50:37 AM	3072156002 5	15	7/17/12	5.36	290.1	7.70	8.63	

SpectraView Block Data



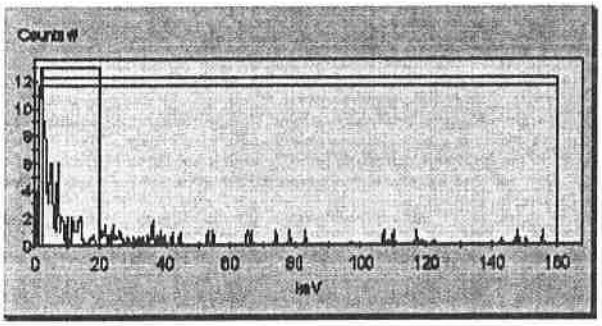
3072156003 15 7/17/12 4.38 262.2 6.98 7.72
4 26 3:06:34 AM 7

SpectraView Block Data



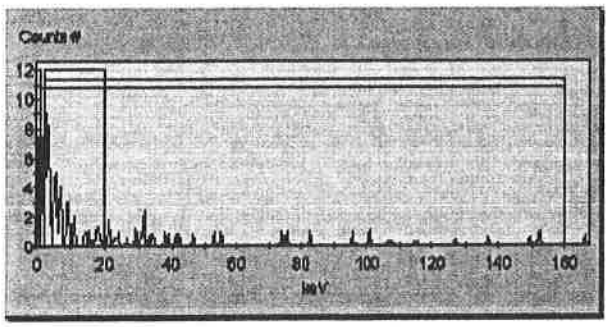
3072156004 15 7/17/12 5.20 260.8 7.58 8.85
5 26 3:22:32 AM 6

SpectraView Block Data



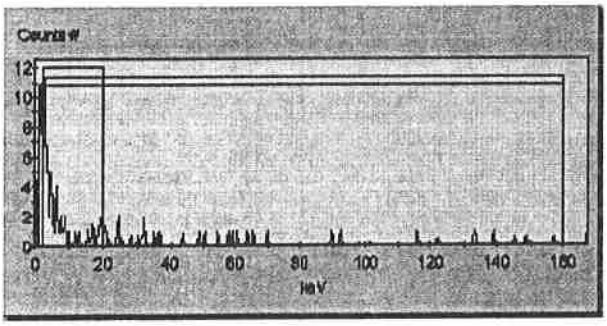
3072156005 15 7/17/12 4.05 268.8 6.01 7.21
6 26 3:38:30 AM 6

SpectraView Block Data



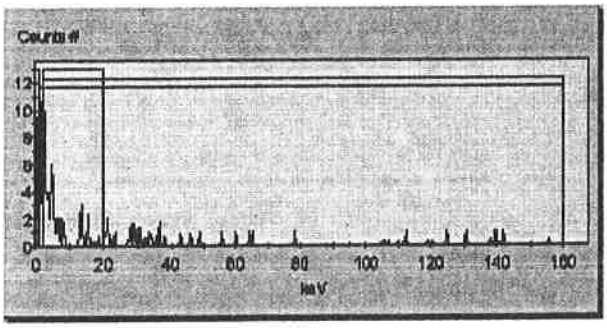
3072156006 15 7/17/12 4.75 272.1 6.85 7.78
7 26 3:54:27 AM 7

SpectraView Block Data



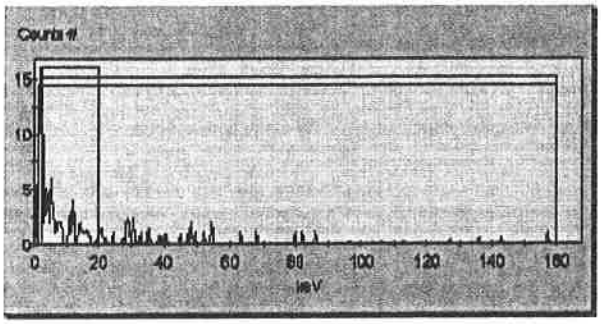
3072156007 15 7/17/12 3.33 255.7 5.67 7.21
8 26 4:10:24 AM 6

SpectraView Block Data



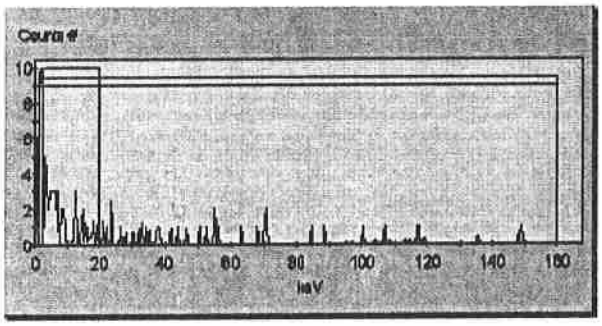
3072156008 15 7/17/12 4.65 260.9 7.25 8.85
9 26 4:26:21 AM 7

SpectraView Block Data



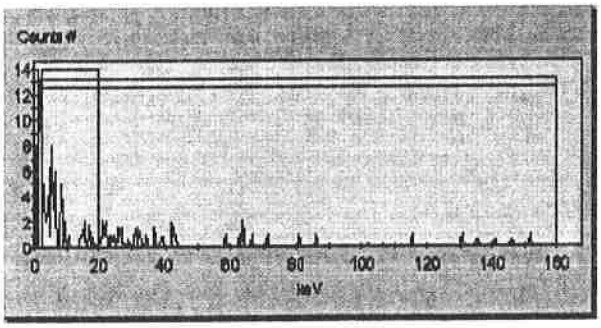
3072156009 15 7/17/12 3.79 291.6 6.30 7.57
10 26 4:42:18 AM 5

SpectraView Block Data



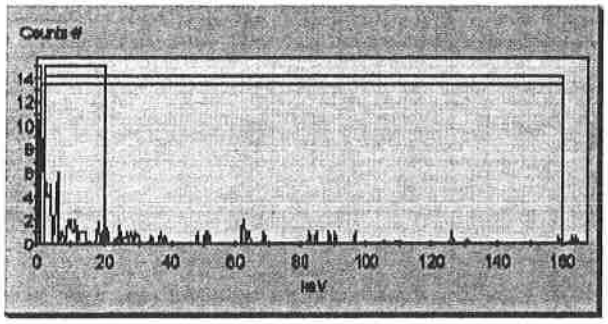
3072156010 15 7/17/12 3.98 262.0 6.66 8.46
11 26 4:58:14 AM 5

SpectraView Block Data



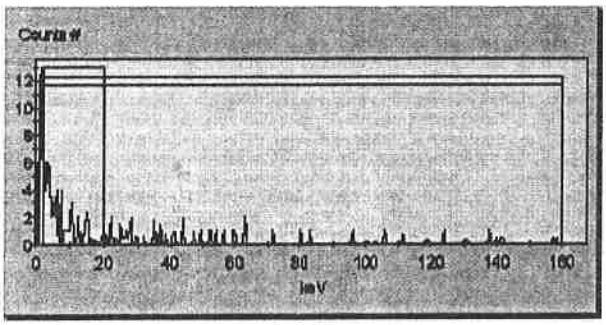
3072156011 15 7/17/12 3.63 243.3 5.65 7.12
12 26 5:14:11 AM 7

SpectraView Block Data



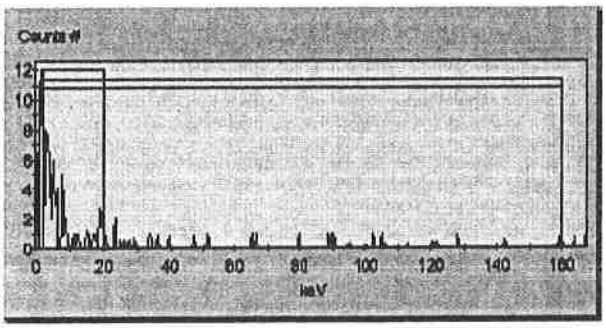
3072156012 15 7/17/12 3.91 279.2 6.81 8.41
13 14 5:30:14 AM 7

SpectraView Block Data



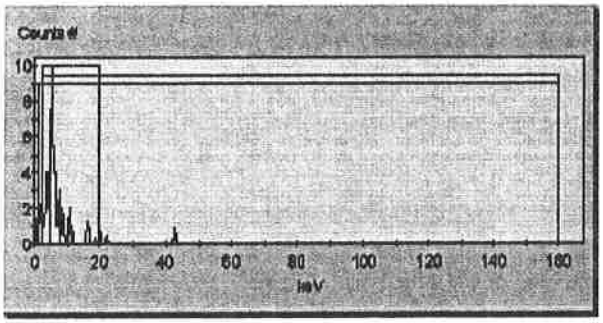
3072156013 15 7/17/12 4.52 274.4 6.00 7.40
14 14 5:46:12 AM 6

SpectraView Block Data



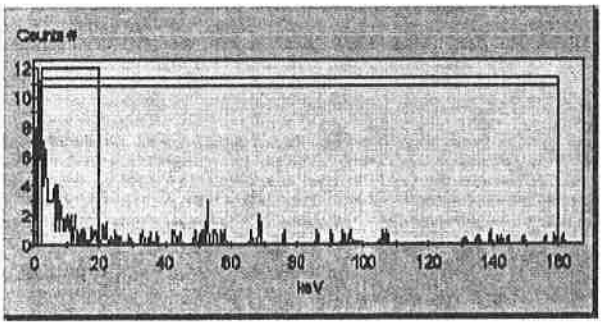
3072156014 15 7/17/12 2.84 13.6 3.00 3.33
15 14 6:09:58 AM 0

SpectraView Block Data



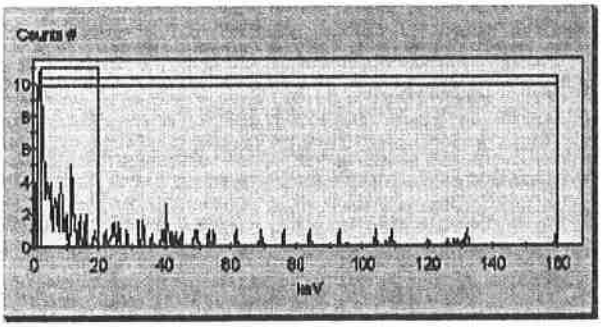
3072156015 15 7/17/12 4.23 273.2 6.83 8.37
16 14 6:25:41 AM 5

SpectraView Block Data



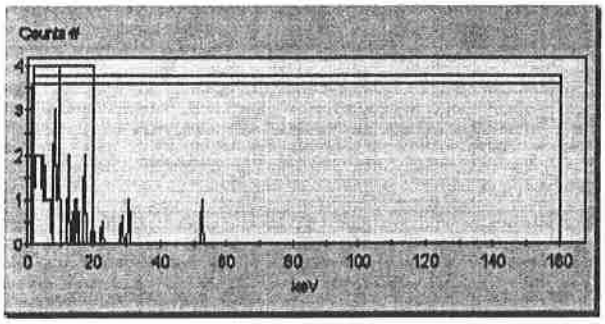
3072156016 15 7/17/12 5.08 256.1 7.53 8.60
17 14 6:41:38 AM 5

SpectraView Block Data



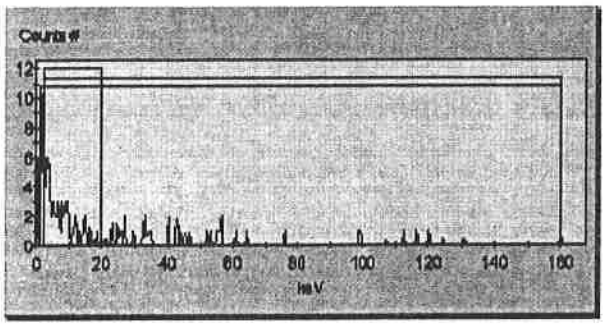
3072156017 15 7/17/12 2.17 12.4 2.41 2.41
18 14 7:05:22 AM 0

SpectraView Block Data



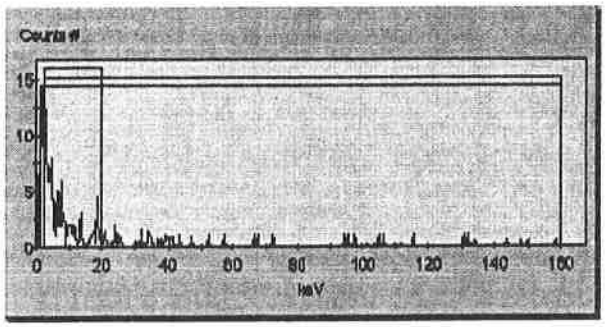
3072156018 15 7/17/12 4.73 246.4 7.33 8.33
19 14 7:21:04 AM 5

SpectraView Block Data



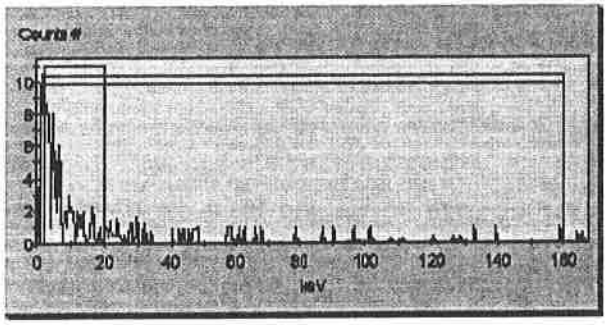
3072156019 15 7/17/12 6.89 260.6 9.41 10.68
20 14 7:37:32 AM 6

SpectraView Block Data



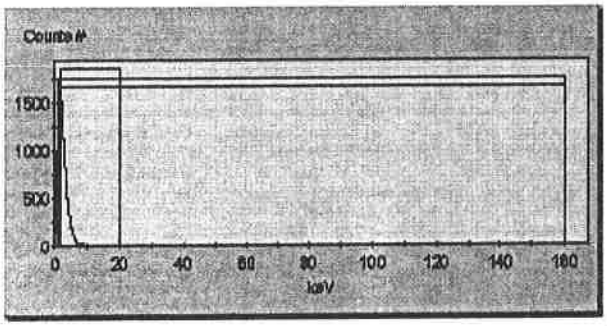
3072156020 15 7/17/12 5.97 217.3 8.66 9.59
21 14 7:53:30 AM 3

SpectraView Block Data



		LCS1	15	7/17/12	423.73	316.5	425.81	647.48
22	14	8:09:23 AM	0					

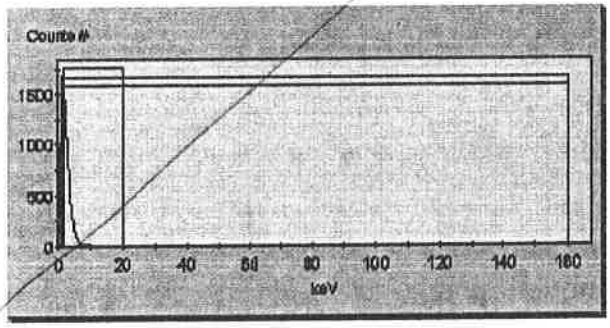
SpectraView Block Data



NOT used
CW 7/31/12

		LCS2	15	7/17/12	392.52	303.4	394.11	609.91
23	14	8:25:20 AM	0					

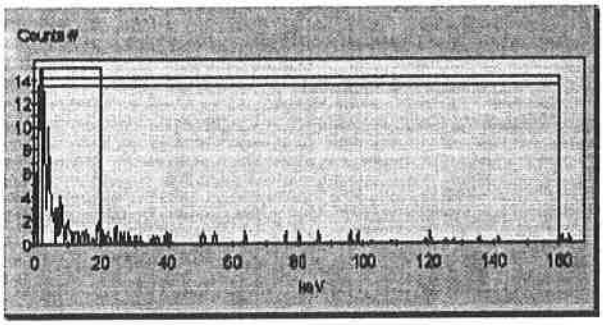
SpectraView Block Data



		459067 ~~BKG~~	15	7/17/12	5.47	296.3	7.41	8.81
24	14	8:41:18 AM	7					

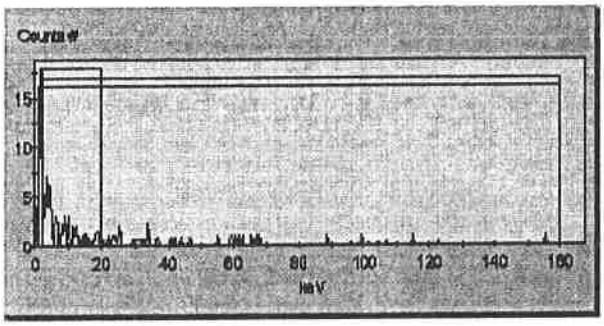
7/31/12

SpectraView Block Data



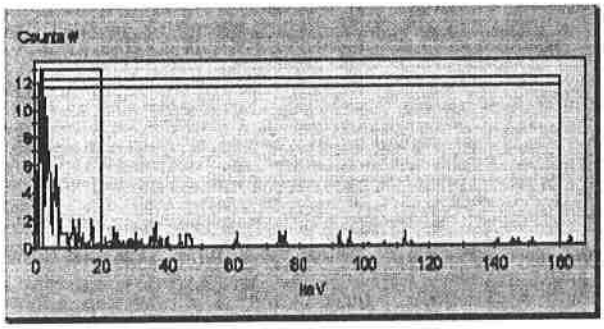
3072156021 15 7/17/12 4.22 247.8 6.50 8.10
25 13 8:57:21 AM 5

SpectraView Block Data



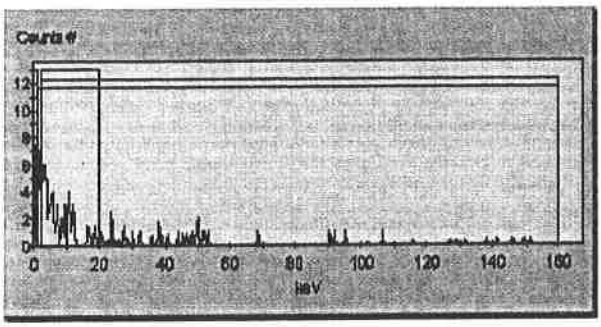
3072156022 15 7/17/12 4.39 258.6 6.10 7.57
26 13 9:13:08 AM 3

SpectraView Block Data



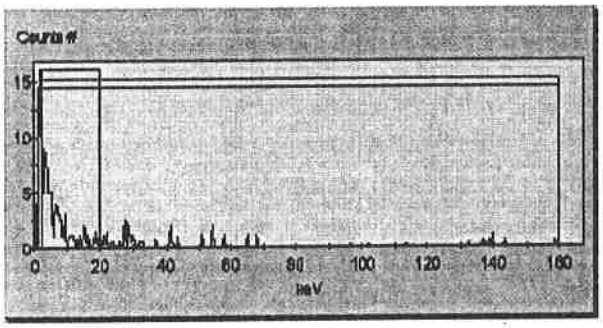
3072156023 15 7/17/12 4.06 208.2 6.24 7.44
27 13 9:28:58 AM 5

SpectraView Block Data



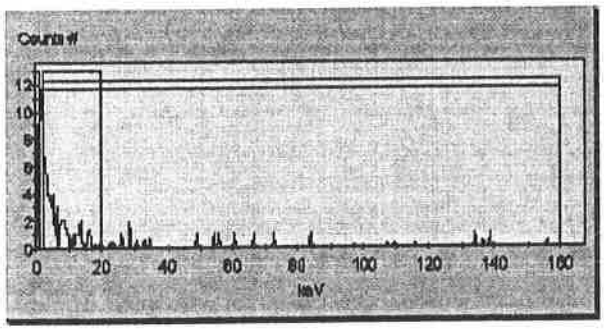
3072156024 15 7/17/12 5.47 255.1 7.54 9.07
28 13 9:44:45 AM 4

SpectraView Block Data



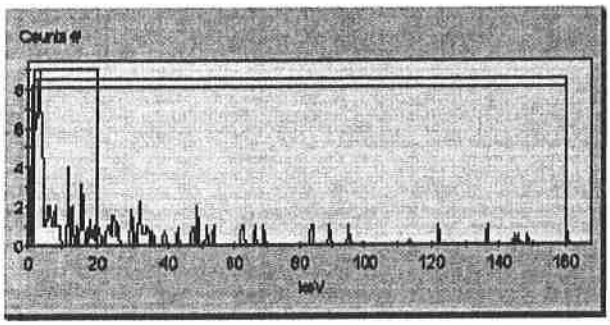
3072156025 15 7/17/12 4.09 302.5 5.23 6.83
29 13 10:00:32 AM 4

SpectraView Block Data



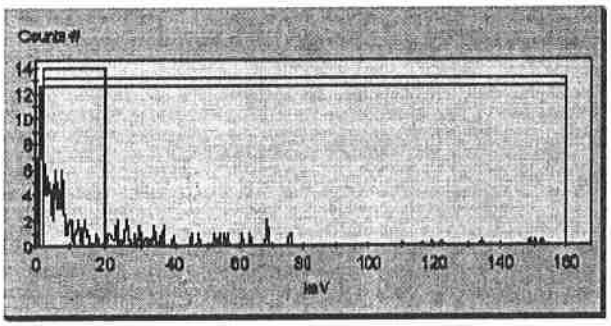
3072156026 15 7/17/12 4.44 275.9 7.12 8.12
30 13 10:16:21 AM 5

SpectraView Block Data



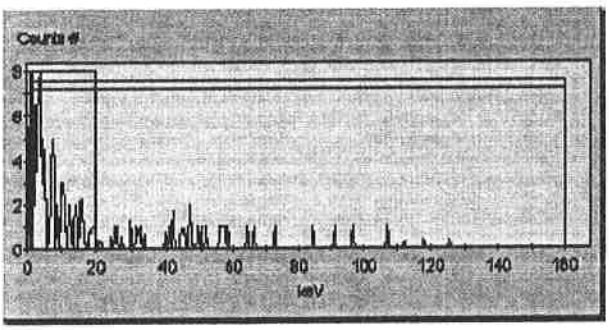
3072156027 15 7/17/12 5.66 267.1 7.98 9.12
31 13 10:32:09 AM 4

SpectraView Block Data



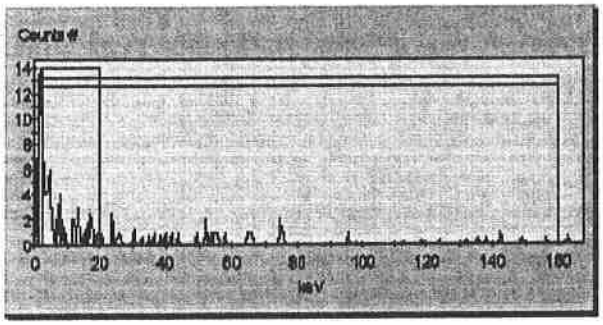
3072156028 15 7/17/12 5.22 214.2 7.46 8.32
32 13 10:47:55 AM 3

SpectraView Block Data



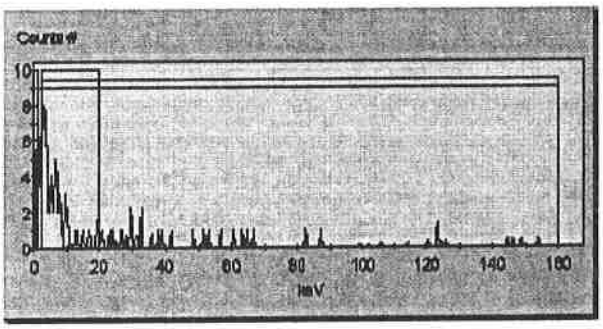
3072156029 15 7/17/12 4.25 197.7 6.64 8.38
33 13 11:03:43 AM 5

SpectraView Block Data



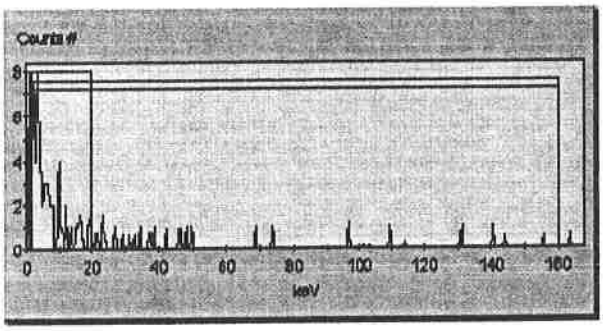
3072156030 15 7/17/12 4.44 257.9 6.63 7.63
34 13 11:19:29 AM 5

SpectraView Block Data



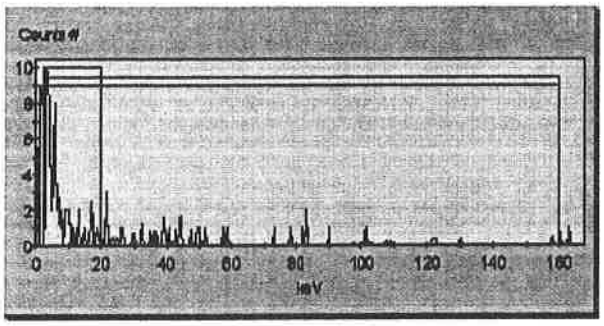
3072156031 15 7/17/12 4.62 248.4 6.18 7.25
35 13 11:35:17 AM 4

SpectraView Block Data



3072156032 15 7/17/12 5.06 239.6 7.42 8.48
36 13 11:51:06 AM 4

SpectraView Block Data



			3072156033	15	7/17/12	4.50	260.8	7.79	8.79
37	7	12:07:01 PM	4						
			3072156034	15	7/17/12	4.44	228.8	6.53	8.07
38	7	12:22:50 PM	5						
			3072156035	15	7/17/12	4.43	282.9	6.11	7.64
39	7	12:38:39 PM	5						
			3072156036	15	7/17/12	4.27	279.1	6.47	7.60
40	7	12:54:30 PM	5						
			3072156037	15	7/17/12	5.07	261.8	7.21	8.68
41	7	1:10:20 PM	4						
			3072156038	15	7/17/12	4.83	144.2	7.34	8.34
42	7	1:26:14 PM	5						
Missing vial 43.									
			3072156040	15	7/17/12	4.13	210.2	6.04	7.24
44	7	2:33:43 PM	4						
			LCS3	15	7/17/12	373.22	292.1	376.09	609.89
45	7	2:49:37 PM	0						
			LCS4	15	7/17/12	393.34	314.3	396.26	621.19
46	7	3:05:34 PM	0						

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Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156016	12481	Simple H3 C14	14	8	7/16/12 2130	15	NA	RMK
017								
018								
019								
020								
LCS								
LCSD								
~~BLG~~MB 459067	12480							
3072156021			13					
022								
023								
024								
025								
026								
027								
028								
029								
030								
031								
032			7					
033								
034								
035								
036								

Run comments: _____

Peer Review: _____

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Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156037	12482	SuperH3C14	7	8	7/16/12 2130	15	NA	RMK
038								
039								
040								
LCS			7	8	7/16/12 2130	15	NA	RMK
LCSD			↓	↓	↓	↓	↓	↓
BKG071712	BKG		16	2	7/17/12 1210	30	NA	RMK
MB 459068	12483	SuperH3C14	1	5	7/17/12 1545	20	NA	RMK
3072156041								
042								
043								
044								
045								
046								
047								
048								
049								
050								
051			↓					
052			15					
053								
054								
055								
056	↓	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Creation Date	06/28/2012 13:46		Assigned Analyst	MBT	
Batch ID	12482		Earliest Due Date	07/04/2012 07:12	
A-code	9060 I LEB	9060W	HBN	91053	
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
3072156	3072156038	PS	WP	6/11/2012 0:01	RTI	3.68U	5.55	11.1	7/21/12 23:42
3072156	3072156039	PS	WP	6/11/2012 0:01	RTI	2.33U	4.13	8.34	7/21/12 23:55

LIMS Load
Printed 7/31/2012 at 10:17 AM

7/31/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT			
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	8.26	
Batch ID	12482	**PrepSOP2**	n/a	**Bkg Duration**	30.0	min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	bkg 7/21	
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/21/2012 16:46	
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**Instrument ID:**	System #2	

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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
3072156038	1.0	6/11/12 0:01	12.0	7/21/12 23:42	9.61	137.0	dpm/S	Pass
3072156039	1.0	6/11/12 0:01	12.0	7/21/12 23:55	9.40	244.3	dpm/S	Pass

LEB Data Input
Printed 7/31/2012 at 10:17 AM

7/31/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12482	**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
3072156038	0.3696	0.1122	0.9938	3.676	5.537	5.554	11.120	4.411	0.866	5.537	1.00
3072156039	0.4929	0.1122	0.9938	2.328	4.118	4.127	8.338	3.307	0.650	4.118	1.00

7/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12482

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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

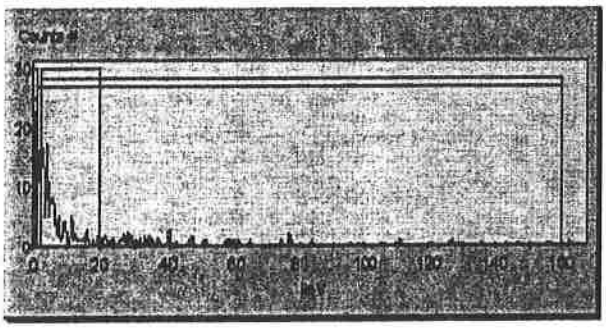
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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	7/21/2012	30 7/21/12	4.92	291.6	6.89	8.26	
1	10	4:46:13 PM	15						

SpectraView Block Data



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_D
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\20120721_2316.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\12481.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H-3_C-14_D.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): 12.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

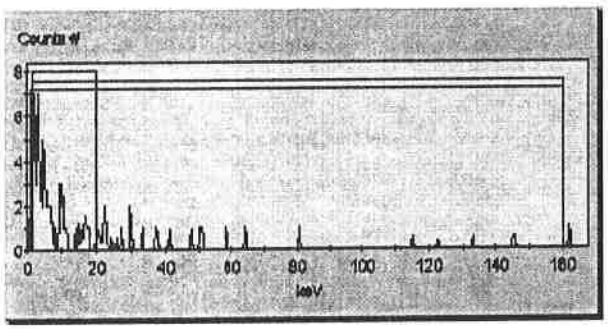
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

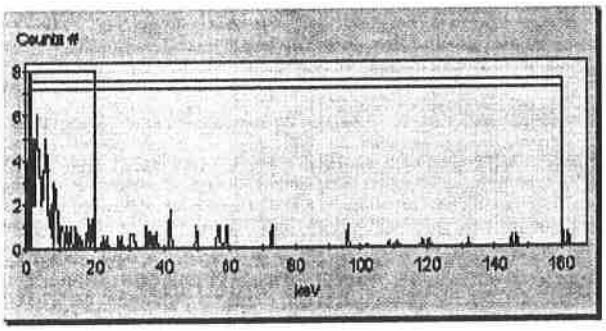
S#	PID	SMPL_ID / TIME	C.T. / LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	26	3072156014 / 11:17:27 PM	12 / 5	7/21/12	4.84	346.9	6.76	7.59	

SpectraView Block Data



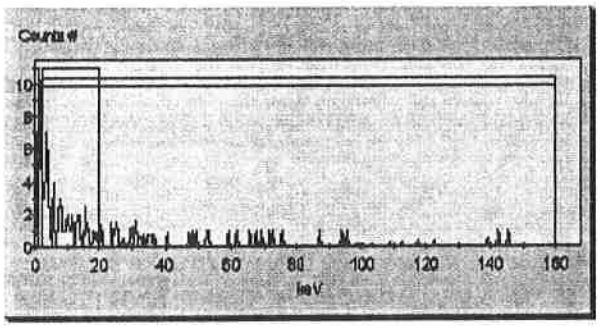
S#	PID	SMPL_ID / TIME	C.T. / LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
2	26	3072156017 / 11:30:10 PM	12 / 6	7/21/12	4.44	311.6	5.93	6.76	

SpectraView Block Data



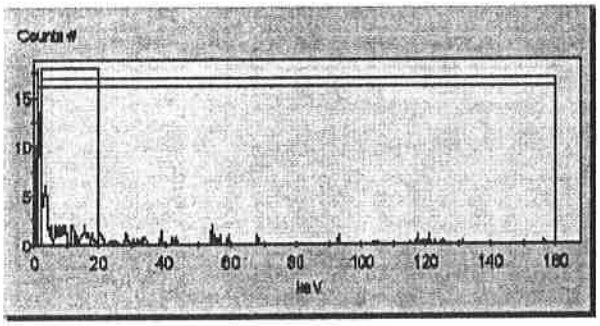
S#	PID	SMPL_ID / TIME	C.T. / LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
3	26	3072156038 / 11:42:55 PM	12 / 2	7/21/12	4.71	137.0	7.86	9.61	

SpectraView Block Data



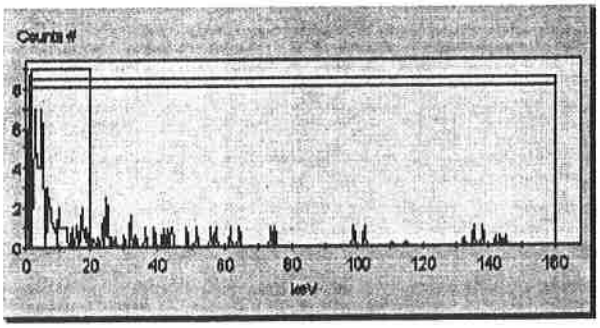
3072156039 12 7/21/12 4.68 244.3 6.90 9.40
4 26 11:55:39 PM 4

SpectraView Block Data



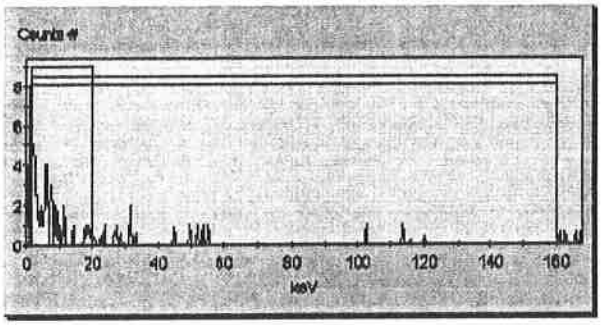
3072156049 12 7/22/12 5.09 130.9 7.65 9.06
5 26 12:08:24 AM 4

SpectraView Block Data



3072156069 12 7/22/12 3.75 254.6 5.00 5.83
6 26 12:21:09 AM 7

SpectraView Block Data


Counts #
8
6
4
2
0
0
20
40
60
80
100
120
140
160
keV

Pace Analytical

Pace Analytical Services, Inc.-Pittsurgh

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
30720401040	N/A	SuperH3C14	9	12	7/20/12 1500	~~13~~ 12	N/A	[illegible]
LCS						OK 7/21/12		
LCSD								
Blk 7/21/12		SuperH3C14E	10	3	7/21/12 1355	30		
30721S6014		SuperPuHC14D	26	19		12		
17								
33								
39								
49								
69								
LCS 12481		SuperH3C14B	17	5	7/21/12 1355	6		[illegible]
LCSD 12481								
LCS 12482								
LCSD 12482								
LCS 12483								
LCSD 12483								
LCS 12484								
LCSD 12484								
LCS 12485								
LCSD 12485								
LCS 12497								
LCSD 12497								

Run comments:

Peer Review: [illegible] 7/26/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

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

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

Bkg CPM 8.26
Bkg Duration 30.0 min
Bkg Ref BKG7/21/2012
Bkg Ct Date/Time: 7/21/2012 16:46
Instrument ID: System #2

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	6.0				dpm/S	Low, Reprep
LCS12481	1.0	7/21/12 13:56	6.0	7/21/12 13:56	58.29	319.0	dpm/S	High, Evaluate
LCSD12481	1.0	7/21/12 14:03	6.0	7/21/12 14:03	55.60	305.5	dpm/S	High, Evaluate
LCS12482	1.0	7/21/12 14:10	6.0	7/21/12 14:10	59.00	254.8	dpm/S	Pass
LCSD12482	1.0	7/21/12 14:17	6.0	7/21/12 14:17	54.73	307.6	dpm/S	High, Evaluate
LCS12483	1.0	7/21/12 14:23	6.0	7/21/12 14:23	60.56	288.2	dpm/S	Pass
LCSD12483	1.0	7/21/12 14:30	6.0	7/21/12 14:30	56.15	301.0	dpm/S	High, Evaluate
LCS12484	1.0	7/21/12 14:37	6.0	7/21/12 14:37	56.94	319.9	dpm/S	High, Evaluate
LCSD12484	1.0	7/21/12 14:44	6.0	7/21/12 14:44	59.13	309.0	dpm/S	High, Evaluate
LCSD12485	1.0	7/21/12 14:58	6.0	7/21/12 14:53	54.06	312.4	dpm/S	High, Evaluate
LCS12497	1.0	7/21/12 15:05	6.0	7/21/12 15:00	58.81	311.4	dpm/S	High, Evaluate
LCSD12497	1.0	7/21/12 15:12	6.0	7/21/12 15:07	62.56	310.8	dpm/S	High, Evaluate
LCS12485	1.0	7/28/12 15:29	12.0	7/28/12 15:29	51.27	299.3	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	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	-0.0696	0.0000	1.0000	118.714	-14.781	16.497	-84.905	-30.480	-8.466	-8.466	1.00
LCS12481	0.4643	0.0000	1.0000	107.761	13.344	18.527	12.724	4.568	1.269	13.344	1.00
LCSD12481	0.4764	0.0000	1.0000	99.373	12.709	17.378	12.401	4.452	1.237	12.709	1.00
LCS12482	0.4945	0.0000	1.0000	102.607	12.602	17.566	11.946	4.289	1.191	12.602	1.00
LCSD12482	0.4747	0.0000	1.0000	97.892	12.657	17.220	12.445	4.468	1.241	12.657	1.00
LCS12483	0.4874	0.0000	1.0000	107.296	12.948	18.205	12.120	4.351	1.209	12.948	1.00
LCSD12483	0.4797	0.0000	1.0000	99.823	12.681	17.394	12.314	4.421	1.228	12.681	1.00
LCS12484	0.4634	0.0000	1.0000	105.061	13.219	18.214	12.750	4.577	1.271	13.219	1.00
LCSD12484	0.4735	0.0000	1.0000	107.425	13.174	18.377	12.475	4.478	1.244	13.174	1.00
LCSD12485	0.4706	0.0000	1.0000	97.327	12.692	17.200	12.554	4.507	1.252	12.692	1.00
LCS12497	0.4715	0.0000	1.0000	107.218	13.197	18.376	12.530	4.498	1.249	13.197	1.00
LCSD12497	0.4720	0.0000	1.0000	115.043	13.585	19.309	12.516	4.493	1.248	13.585	1.00
LCS12485	0.4809	0.0000	1.0000	89.431	8.691	13.759	8.491	3.368	0.662	8.691	1.00

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7/31/12

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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

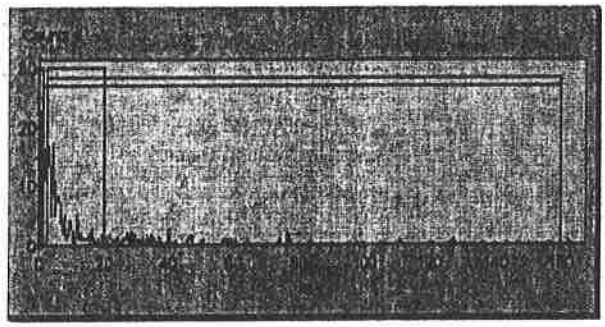
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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	7/21/2012	30 7/21/12	4.92	291.6	6.89	8.26	
1	10	4:46:13 PM	15						

SpectraView Block Data



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_H3_C14_B
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\20120721_1356.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\12480.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14_B.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): 6.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

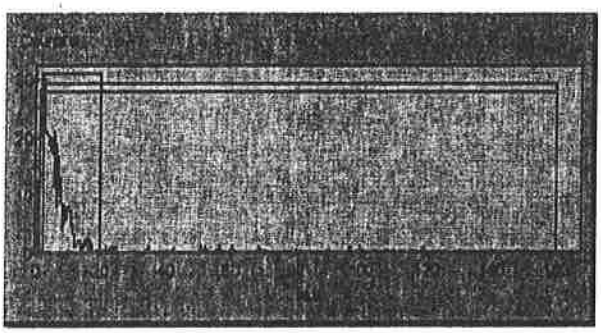
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 15.53 Date Processed: 7/20/12 8:36:50 PM
14C Chi Square: 11.84 Date Processed: 7/20/12 8:36:50 PM

3H E^2/B (1-18.6 keV): 311.34 Date Processed: 7/20/12 8:36:50 PM
14C E^2/B (4-156 keV): 556.50 Date Processed: 7/20/12 8:36:50 PM
3H Efficiency (0-18.6 keV): 61.98 Date Processed: 7/20/12 8:36:50 PM
14C Efficiency (0-156 keV): 94.97 Date Processed: 7/20/12 8:36:50 PM
IPA Background Date Processed: 7/20/12 8:36:50 PM
3H Background CPM (0-18.6 keV): 12.27 Date Processed: 7/20/12 8:36:50 PM
14C Background CPM (0-156 keV): 20.03 Date Processed: 7/20/12 8:36:50 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/20/12 8:36:50 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

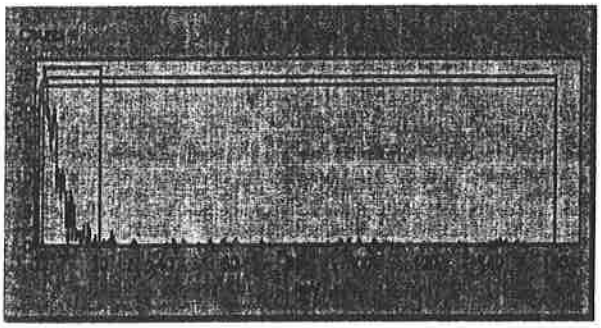
S#	PID	SMPL_ID TIME	C.T. LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	17	LCS12481 1:56:51 PM	6 1	7/21/12	47.38	319.0	49.79	58.29	

SpectraView Block Data



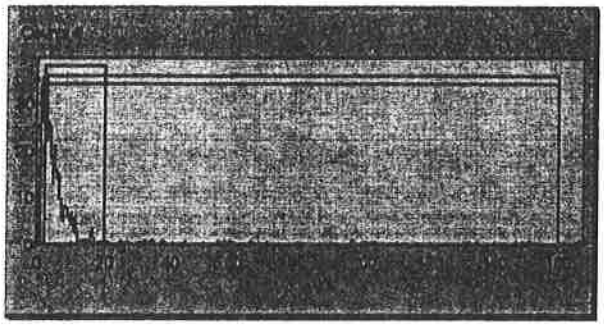
2	17	LCSD12481 2:03:37 PM	6 1	7/21/12	46.04	305.5	49.27	55.60	

SpectraView Block Data



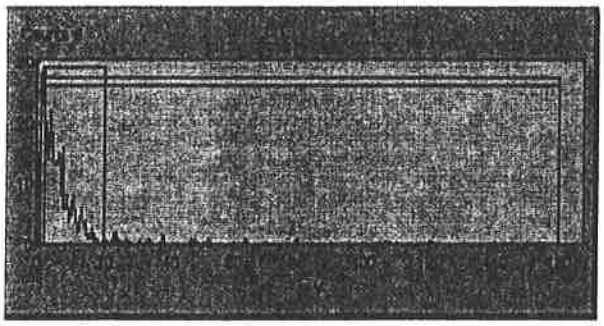
3	17	LCS12482 2:10:23 PM	6 1	7/21/12	48.40	254.8	51.17	59.00	

SpectraView Block Data



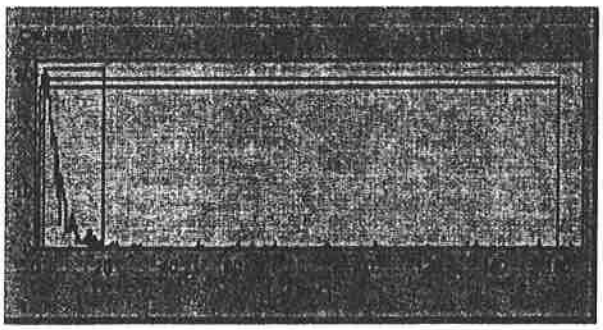
LCSD12482 6 7/21/12 43.13 307.6 45.73 54.73
4 17 2:17:08 PM 1

SpectraView Block Data



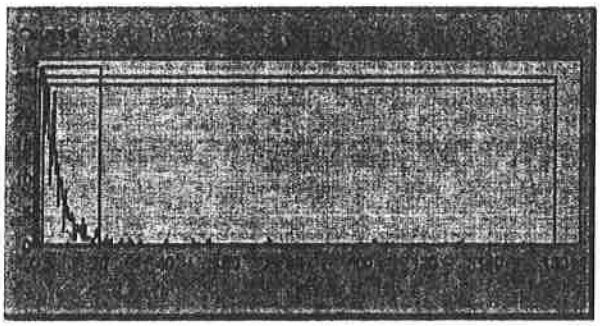
LCS12483 6 7/21/12 49.79 288.2 52.06 60.56
5 17 2:23:53 PM 1

SpectraView Block Data



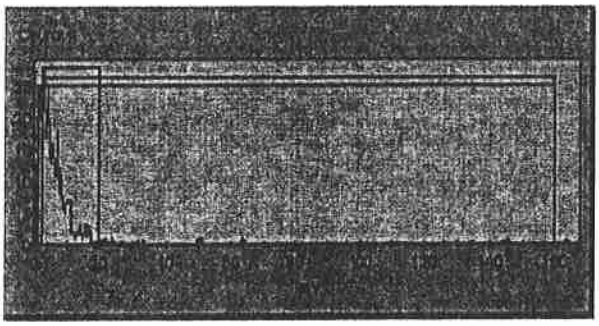
LCSD12483 6 7/21/12 45.19 301.0 47.31 56.15
6 17 2:30:38 PM 1

SpectraView Block Data



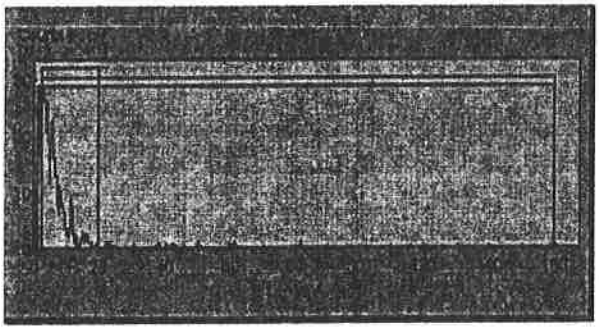
LCS12484 6 7/21/12 48.35 319.9 50.27 56.94
7 17 2:37:23 PM 1

SpectraView Block Data



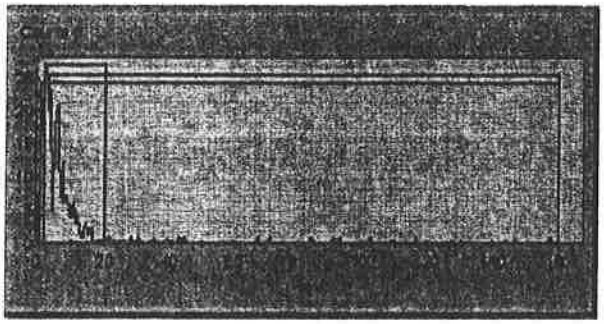
LCSD12484 6 7/21/12 51.38 309.0 53.46 59.13
8 17 2:44:09 PM 1

SpectraView Block Data



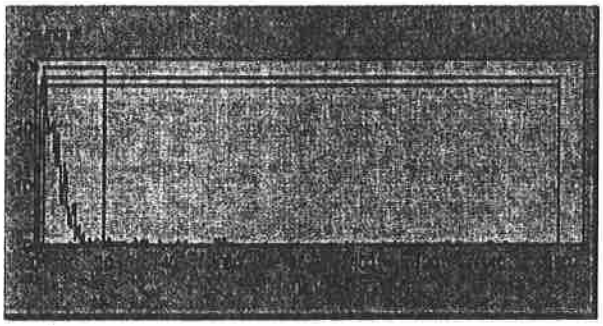
Missing vial 9.
LCSD12485 6 7/21/12 45.33 312.4 48.73 54.06
10 17 2:53:58 PM 2

SpectraView Block Data



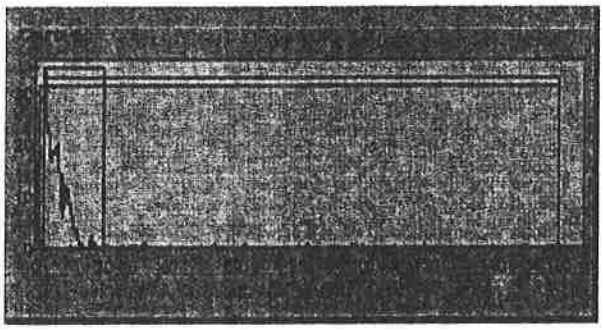
LCS12497 6 7/21/12 48.38 311.4 50.98 58.81
11 17 3:00:44 PM 1

SpectraView Block Data



LCSD12497 6 7/21/12 51.69 310.8 53.23 62.56
12 17 3:07:29 PM 1

SpectraView Block Data



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Pace Analytical Services, Inc.-Pittsurgh

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
30 [illegible] 1040	NA	Supel H3C14	9	13	7/20/12 1530	~~13~~ 12	NA	[illegible]
LCS	↓	↓	↓	↓	↓	Opt 7/20/12	↓	↓
LCSD	↓	↓	↓	↓	↓	↓	↓	↓
BLG 7/21/12	↓	Supel H3C14E	10	3	7/21/12 1355	36	↓	↓
30 [illegible] C14	↓	Supel H3C14D	26	19	↓	15	↓	↓
17	↓	↓	↓	↓	↓	↓	↓	↓
33	↓	↓	↓	↓	↓	↓	↓	↓
34	↓	↓	↓	↓	↓	↓	↓	↓
49	↓	↓	↓	↓	↓	↓	↓	↓
69	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12481	↓	Supel H3C14B	17	5	7/21/12 1355	6	↓	[illegible]
LCSD 12481	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12482	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12482	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12483	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12483	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12484	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12484	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12485	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12485	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12487	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12487	↓	↓	↓	↓	↓	↓	↓	↓

Run comments:

Peer Review: [illegible] 9/3/12

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

Low Energy Beta Sample Analysis Data

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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2 459068-BLANK for HBN 91054 [RADC/1248

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12483 **Prep Date** 7/17/2012 15:54 **Dilution**
Method EPA 906.0M **HBN** 91054 **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2860509 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 15:54 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2860509 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-6.03U ± 3.95 (7.98)	dpm/sa	-6.03U ± 3.95 (7.98)			dpm/sa

4 3072156041-SU-12-20

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmouth 1207076 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12483 **Prep Date** 7/17/2012 16:16 **Dilution**
Method EPA 906.0M **HBN** 91054 **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860510 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/17/2012 16:16 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860510 **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	-6.53U ± 3.84 (7.79)	dpm/sa	-6.53U ± 3.84 (7.79)					dpm/sa

6 3072156042-SU-12-21

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmouth 1207076 **Location**

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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6 3072156042-SU-12-21

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 16:37	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860511	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 16:37	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860511	**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	-7.21U ± 3.79 (7.73)	dpm/sa	-7.21U ± 3.79 (7.73)		dpm/sa		

8 3072156043-SU-12-22

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 16:58	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860512	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 16:58	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860512	**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	-7.40U ± 3.79 (7.73)	dpm/sa	-7.40U ± 3.79 (7.73)		dpm/sa		

10 3072156044-SU-12-23

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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10 3072156044-SU-12-23

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12483	**Prep Date**	7/17/2012 17:19	**Dilution**
Method	EPA 906.0M		**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860513		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 17:19	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860513		**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	-8.31U ± 3.78 (7.77)	dpm/sa	-8.31U ± 3.78 (7.77)		dpm/sa		

12 3072156045-SU-12-24

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12483	**Prep Date**	7/17/2012 17:40	**Dilution**
Method	EPA 906.0M		**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860514		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 17:40	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860514		**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	-6.64U ± 4.02 (8.15)	dpm/sa	-6.64U ± 4.02 (8.15)		dpm/sa		

14 3072156046-SU-12-24D

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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14 3072156046-SU-12-24D

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860515

Batch RADC/12483
HBN 91054
Instru NONE

Prep Date 7/17/2012 18:01
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860515

Instru NONE
Col ID
File

Run Date 7/17/2012 18:01
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.73U ± 3.77 (7.71)	dpm/sa	-7.73U ± 3.77 (7.71)		dpm/sa		

16 3072156047-SU-12-25

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860516

Batch RADC/12483
HBN 91054
Instru NONE

Prep Date 7/17/2012 18:22
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860516

Instru NONE
Col ID
File

Run Date 7/17/2012 18:22
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-9.43U ± 3.81 (7.86)	dpm/sa	-9.43U ± 3.81 (7.86)		dpm/sa		

18 3072156048-SU-12-26

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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18 3072156048-SU-12-26

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 18:43	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860517	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 18:43	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860517	**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	-5.79U ± 3.82 (7.71)	dpm/sa	-5.79U ± 3.82 (7.71)		dpm/sa		

20 3072156049-SU-12-27

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 19:04	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860523	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 19:04	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860523	**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	-6.57U ± 5.21 (10.4)	dpm/sa	-6.57U ± 5.21 (10.4)		dpm/sa		

22 3072156050-SU-12-28

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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22 3072156050-SU-12-28

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12483	**Prep Date**	7/17/2012 19:25	**Dilution**
Method	EPA 906.0M		**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860524		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 19:25	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860524		**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	-7.75U ± 3.77 (7.72)	dpm/sa	-7.75U ± 3.77 (7.72)		dpm/sa		

24 3072156051-SU-12-29

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12483	**Prep Date**	7/17/2012 19:46	**Dilution**
Method	EPA 906.0M		**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860525		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 19:46	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860525		**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	-7.81U ± 3.96 (8.10)	dpm/sa	-7.81U ± 3.96 (8.10)		dpm/sa		

26 3072156052-SU-12-30

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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26 3072156052-SU-12-30

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 20:07	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860526	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 20:07	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860526	**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	-10.9U ± 4.02 (8.31)	dpm/sa	-10.9U ± 4.02 (8.31)		dpm/sa		

28 3072156053-SU-12-31

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 20:28	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860527	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 20:28	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860527	**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	-11.1U ± 3.95 (8.19)	dpm/sa	-11.1U ± 3.95 (8.19)		dpm/sa		

30 3072156054-SU-12-32

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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30 3072156054-SU-12-32

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 20:49	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860528	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 20:49	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860528	**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	-7.33U ± 3.78 (7.72)	dpm/sa	-7.33U ± 3.78 (7.72)		dpm/sa		

32 3072156055-SU-13-1

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 21:10	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860529	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 21:10	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860529	**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	-10.0U ± 3.73 (7.72)	dpm/sa	-10.0U ± 3.73 (7.72)		dpm/sa		

34 3072156056-SU-13-2

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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34 3072156056-SU-13-2

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12483	**Prep Date**	7/17/2012 21:31	**Dilution**
Method	EPA 906.0M		**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860530		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 21:31	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860530		**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	-8.34U ± 3.82 (7.83)	dpm/sa	-8.34U ± 3.82 (7.83)		dpm/sa		

36 3072156057-SU-13-3

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmouth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12483	**Prep Date**	7/17/2012 21:52	**Dilution**
Method	EPA 906.0M		**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860531		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/17/2012 21:52	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860531		**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	-11.5U ± 3.72 (7.73)	dpm/sa	-11.5U ± 3.72 (7.73)		dpm/sa		

38 3072156058-SU-13-4

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmouth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12483	HBN	91054
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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38 3072156058-SU-13-4

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 22:13	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860532	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 22:13	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860532	**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	-12.2U ± 3.71 (7.71)	dpm/sa	-12.2U ± 3.71 (7.71)		dpm/sa		

40 3072156059-SU-13-4D

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 22:35	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860533	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 22:35	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860533	**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	-7.26U ± 3.81 (7.78)	dpm/sa	-7.26U ± 3.81 (7.78)		dpm/sa		

42 3072156060-SU-13-5

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12483	**HBN**	91054
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

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42 3072156060-SU-13-5

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12483	**Prep Date**	7/17/2012 22:56	**Dilution**	
Method	EPA 906.0M	**HBN**	91054	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860534	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/17/2012 22:56	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860534	**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	-10.0U ± 3.73 (7.71)	dpm/sa	-10.0U ± 3.73 (7.71)			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 13:47	Assigned Analyst	MBT
Batch ID	12483	Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB 9060W	HBN	91054
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
	459068	BLANK	IP		QCACCOUNT	-6.03U	3.95	7.98	7/17/12 15:54
3072156	3072156041	PS	WP	6/11/2012 0:01	RTI	-6.53U	3.84	7.79	7/17/12 16:16
3072156	3072156042	PS	WP	6/11/2012 0:01	RTI	-7.21U	3.79	7.73	7/17/12 16:37
3072156	3072156043	PS	WP	6/11/2012 0:01	RTI	-7.40U	3.79	7.73	7/17/12 16:58
3072156	3072156044	PS	WP	6/11/2012 0:01	RTI	-8.31U	3.78	7.77	7/17/12 17:19
3072156	3072156045	PS	WP	6/11/2012 0:01	RTI	-6.64U	4.02	8.15	7/17/12 17:40
3072156	3072156046	PS	WP	6/11/2012 0:01	RTI	-7.73U	3.77	7.71	7/17/12 18:01
3072156	3072156047	PS	WP	6/11/2012 0:01	RTI	-9.43U	3.81	7.86	7/17/12 18:22
3072156	3072156048	PS	WP	6/11/2012 0:01	RTI	-5.79U	3.82	7.71	7/17/12 18:43
3072156	3072156049	PS	WP	6/11/2012 0:01	RTI	-6.57U	5.21	10.4	7/17/12 19:04
3072156	3072156050	PS	WP	6/11/2012 0:01	RTI	-7.75U	3.77	7.72	7/17/12 19:25
3072156	3072156051	PS	WP	6/11/2012 0:01	RTI	-7.81U	3.96	8.10	7/17/12 19:46
3072156	3072156052	PS	WP	6/11/2012 0:01	RTI	-10.9U	4.02	8.31	7/17/12 20:07
3072156	3072156053	PS	WP	6/11/2012 0:01	RTI	-11.1U	3.95	8.19	7/17/12 20:28
3072156	3072156054	PS	WP	6/11/2012 0:01	RTI	-7.33U	3.78	7.72	7/17/12 20:49
3072156	3072156055	PS	WP	6/11/2012 0:01	RTI	-10.0U	3.73	7.72	7/17/12 21:10
3072156	3072156056	PS	WP	6/11/2012 0:01	RTI	-8.34U	3.82	7.83	7/17/12 21:31
3072156	3072156057	PS	WP	6/11/2012 0:01	RTI	-11.5U	3.72	7.73	7/17/12 21:52
3072156	3072156058	PS	WP	6/11/2012 0:01	RTI	-12.2U	3.71	7.71	7/17/12 22:13
3072156	3072156059	PS	WP	6/11/2012 0:01	RTI	-7.26U	3.81	7.78	7/17/12 22:35
3072156	3072156060	PS	WP	6/11/2012 0:01	RTI	-10.0U	3.73	7.71	7/17/12 22:56

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7/23/12

LIMS Load
Printed 7/22/2012 at 10:12 AM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
Matrix Smear
Batch ID 12483
Prep Start 7/16/2012 12:00
Prep Finish 7/16/2012
Act. Rpt Units dpm

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

Bkg CPM 12.38
Bkg Duration 30.0 min
Bkg Ref bkg 071712
Bkg Ct Date/Time: 7/17/2012 15:21
Instrument ID: System #2

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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
459068	1.0	7/17/12 15:54	20.0	7/17/12 15:54	9.51	306.4	dpm/S	High, Evaluate
3072156041	1.0	6/11/12 0:01	20.0	7/17/12 16:16	9.20	234.4	dpm/S	Pass
3072156042	1.0	6/11/12 0:01	20.0	7/17/12 16:37	8.84	268.9	dpm/S	Pass
3072156043	1.0	6/11/12 0:01	20.0	7/17/12 16:58	8.75	270.1	dpm/S	Pass
3072156044	1.0	6/11/12 0:01	20.0	7/17/12 17:19	8.32	238.8	dpm/S	Pass
3072156045	1.0	6/11/12 0:01	20.0	7/17/12 17:40	9.29	202.7	dpm/S	Pass
3072156046	1.0	6/11/12 0:01	20.0	7/17/12 18:01	8.58	255.9	dpm/S	Pass
3072156047	1.0	6/11/12 0:01	20.0	7/17/12 18:22	7.83	225.8	dpm/S	Pass
3072156048	1.0	6/11/12 0:01	20.0	7/17/12 18:43	9.53	257.3	dpm/S	Pass
3072156049	1.0	6/11/12 0:01	20.0	7/17/12 19:04	9.99	135.2	dpm/S	Pass
3072156050	1.0	6/11/12 0:01	20.0	7/17/12 19:25	8.57	250.6	dpm/S	Pass
3072156051	1.0	6/11/12 0:01	20.0	7/17/12 19:46	8.72	206.2	dpm/S	Pass
3072156052	1.0	6/11/12 0:01	20.0	7/17/12 20:07	7.42	193.9	dpm/S	Pass
3072156053	1.0	6/11/12 0:01	20.0	7/17/12 20:28	7.24	200.4	dpm/S	Pass
3072156054	1.0	6/11/12 0:01	20.0	7/17/12 20:49	8.78	251.9	dpm/S	Pass
3072156055	1.0	6/11/12 0:01	20.0	7/17/12 21:10	7.46	265.9	dpm/S	Pass
3072156056	1.0	6/11/12 0:01	20.0	7/17/12 21:31	8.34	288.8	dpm/S	Pass
3072156057	1.0	6/11/12 0:01	20.0	7/17/12 21:52	6.74	269.1	dpm/S	Pass
3072156058	1.0	6/11/12 0:01	20.0	7/17/12 22:13	6.38	261.1	dpm/S	Pass
3072156059	1.0	6/11/12 0:01	20.0	7/17/12 22:35	8.84	280.7	dpm/S	Pass
3072156060	1.0	6/11/12 0:01	20.0	7/17/12 22:56	7.45	257.9	dpm/S	Pass

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Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12483	**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
459068	0.4757	0.0000	1.0000	-6.034	3.883	3.949	7.976	3.523	0.438	3.883	1.00
3072156041	0.4896	0.1004	0.9944	-6.532	3.761	3.841	7.793	3.442	0.428	3.761	1.00
3072156042	0.4938	0.1005	0.9944	-7.209	3.690	3.789	7.726	3.413	0.424	3.690	1.00
3072156043	0.4936	0.1005	0.9944	-7.395	3.682	3.786	7.729	3.414	0.424	3.682	1.00
3072156044	0.4912	0.1005	0.9944	-8.311	3.652	3.785	7.767	3.431	0.426	3.652	1.00
3072156045	0.4681	0.1006	0.9944	-6.639	3.944	4.023	8.151	3.601	0.447	3.944	1.00
3072156046	0.4946	0.1006	0.9944	-7.727	3.656	3.771	7.714	3.408	0.423	3.656	1.00
3072156047	0.4854	0.1007	0.9944	-9.426	3.641	3.811	7.860	3.472	0.431	3.641	1.00
3072156048	0.4946	0.1007	0.9944	-5.794	3.758	3.821	7.713	3.407	0.423	3.758	1.00
3072156049	0.3658	0.1007	0.9944	-6.570	5.146	5.205	10.429	4.607	0.573	5.146	1.00
3072156050	0.4941	0.1008	0.9944	-7.755	3.659	3.774	7.722	3.411	0.424	3.659	1.00
3072156051	0.4713	0.1008	0.9944	-7.810	3.853	3.964	8.096	3.576	0.444	3.853	1.00
3072156052	0.4591	0.1009	0.9944	-10.865	3.801	4.016	8.311	3.671	0.456	3.801	1.00
3072156053	0.4658	0.1009	0.9944	-11.096	3.724	3.952	8.190	3.618	0.450	3.724	1.00
3072156054	0.4942	0.1009	0.9944	-7.325	3.680	3.783	7.720	3.410	0.424	3.680	1.00
3072156055	0.4942	0.1010	0.9944	-10.011	3.535	3.731	7.720	3.410	0.424	3.535	1.00
3072156056	0.4871	0.1010	0.9944	-8.340	3.686	3.817	7.832	3.460	0.430	3.686	1.00
3072156057	0.4938	0.1011	0.9944	-11.487	3.456	3.718	7.727	3.413	0.424	3.456	1.00
3072156058	0.4946	0.1011	0.9944	-12.199	3.409	3.706	7.714	3.408	0.423	3.409	1.00
3072156059	0.4907	0.1011	0.9944	-7.256	3.714	3.813	7.776	3.435	0.427	3.714	1.00
3072156060	0.4946	0.1012	0.9944	-10.023	3.531	3.728	7.713	3.407	0.423	3.531	1.00

7/23/12

7/23/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/31/2012	**Method:**	EPA 906.0M
Worklist:	12483	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459068

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-6.0340	3.9490	7.9760	3.52300		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/21/12 14:23	7/21/12 14:30				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.916	1184.916				
Volume Used (mL):	0.100	0.100				
Aliquot Volume (L, g, F):	1.000	1.000				
Target Conc. (DPM/Sample, g, F):	118.492	118.492				
1.96 Sigma Uncertainty (Calculated):	2.137	2.137				
Result (DPM/Sample, g, F):	107.296	99.823				
1.96 Sigma Unc:	18.205	17.394				
% Recovery:	90.55%	84.24%				
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.:	LCS12483					
Duplicate Sample I.D.	LCSD12483					
Sample Result (DPM/Sample, g, F):	107.2960					
1.96 Sigma Unc:	18.2050					
ple Duplicate Result (DPM/Sample, g, F):	99.8230					
Duplicate Sample 1.96 Sigma Unc.	17.3940					
Either results below MDC?	NO					
Relative Percent Difference:	7.22%					
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:

07/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12483

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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

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%

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\20120717_1521.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

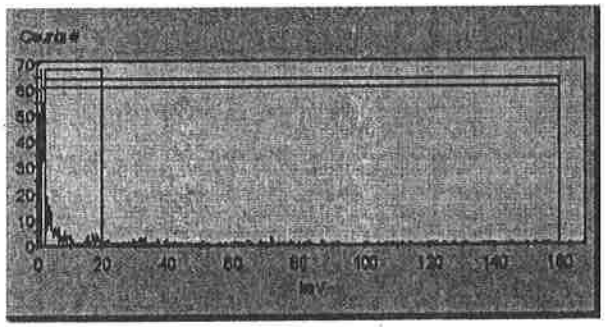
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM

14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM
3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: 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	071712	7/17/12	5.04	273.6	8.41	12.38	W
1	16	3:21:58 PM	33						

SpectraView Block Data



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_H3_C14
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\20120717_1554.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\12476.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14.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): 20.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

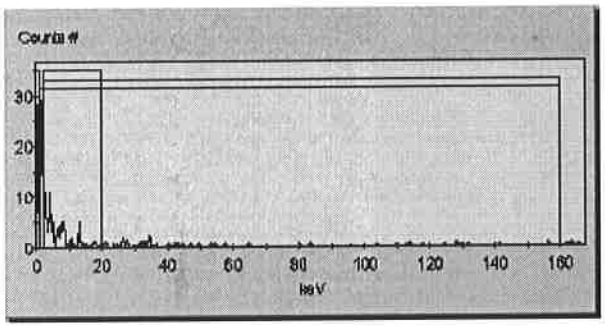
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM
14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM

3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

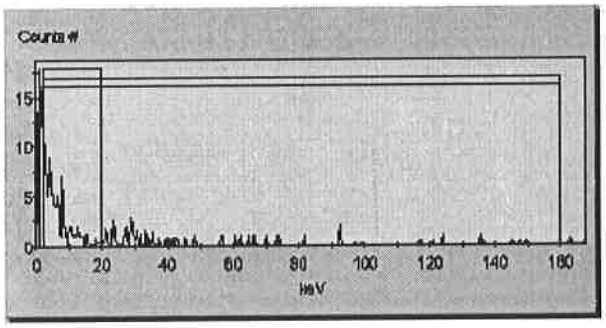
S#	PID	SMPL_ID TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
		459068	MB	20	7/17/12	4.41	306.4	6.41	9.51	
1	12	3:54:59 PM	32							

SpectraView Block Data 7/21/12



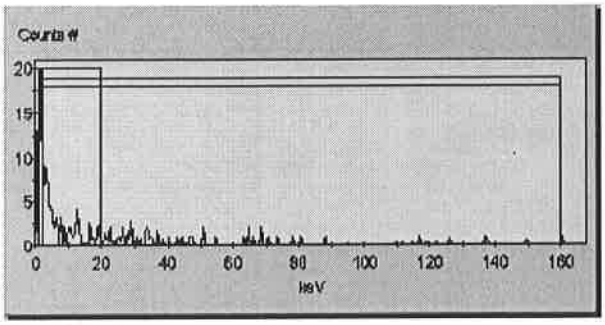
	3072156041		20	7/17/12	4.88	234.4	7.55	9.20	
2	12	4:16:02 PM	10						

SpectraView Block Data



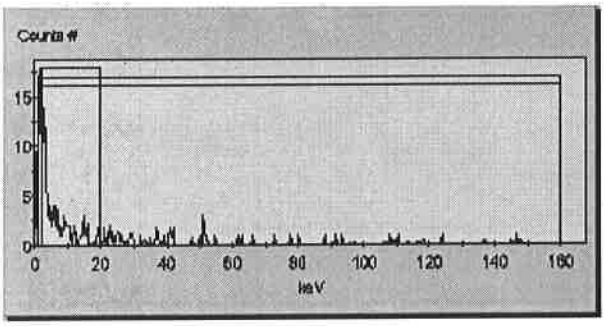
	3072156042		20	7/17/12	4.26	268.9	6.84	8.84	
3	12	4:37:05 PM	9						

SpectraView Block Data



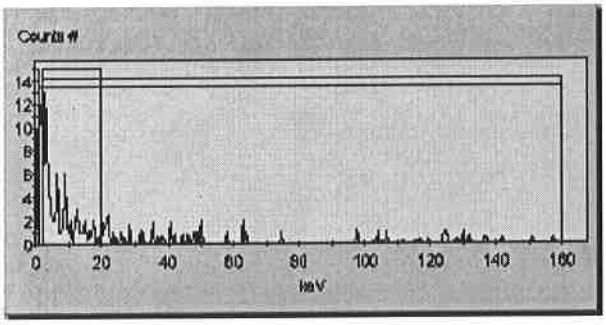
3072156043 20 7/17/12 4.58 270.1 7.10 8.75
4 12 4:58:08 PM 8

SpectraView Block Data



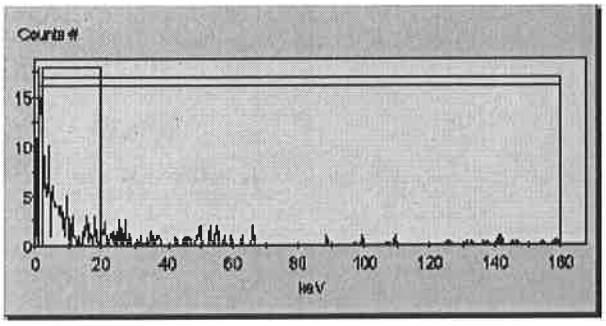
3072156044 20 7/17/12 4.67 238.8 7.02 8.32
5 12 5:19:11 PM 8

SpectraView Block Data



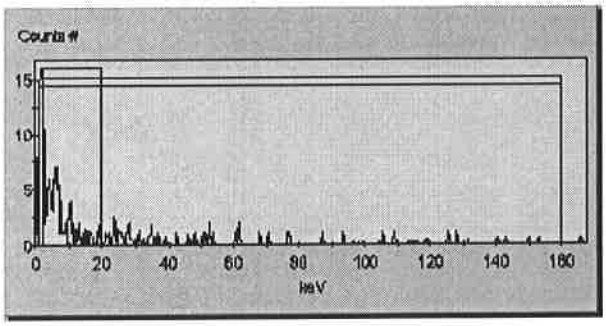
3072156045 20 7/17/12 5.09 202.7 7.69 9.29
6 12 5:40:14 PM 9

SpectraView Block Data



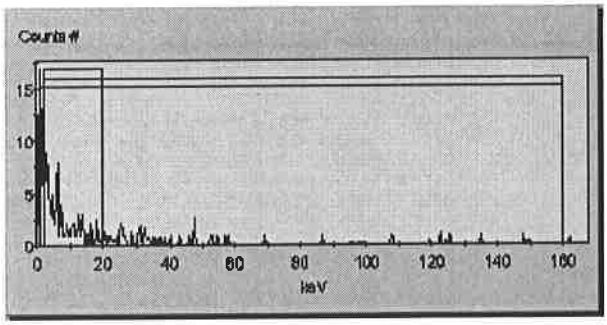
3072156046 20 7/17/12 4.60 255.9 7.18 8.58
7 12 6:01:16 PM 9

SpectraView Block Data



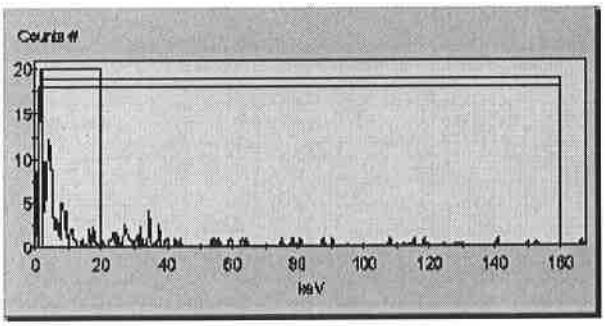
3072156047 20 7/17/12 4.19 225.8 6.38 7.83
8 12 6:22:20 PM 12

SpectraView Block Data



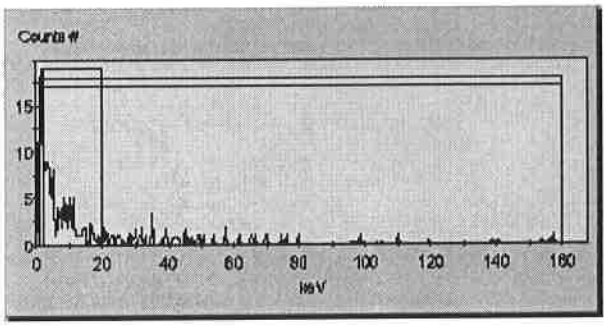
3072156048 20 7/17/12 5.22 257.3 7.92 9.53
9 12 6:43:23 PM 7

SpectraView Block Data



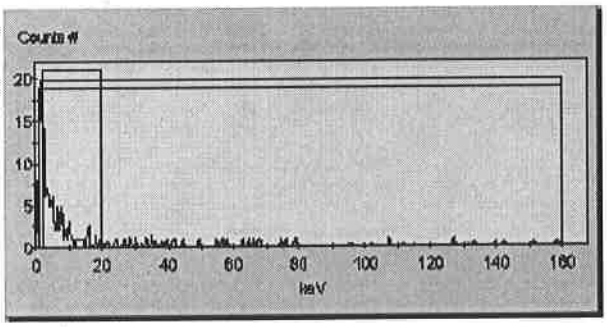
		3072156049	20	7/17/12		5.44	135.2	8.24	9.99
10	12	7:04:28 PM	4						

SpectraView Block Data



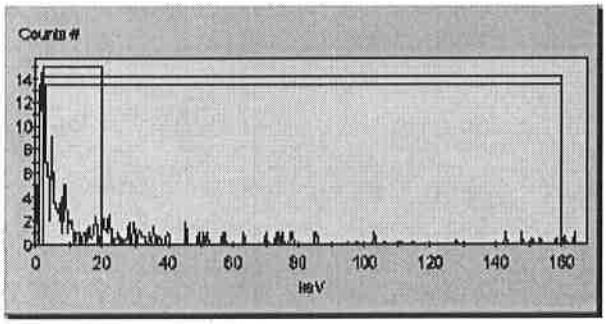
		3072156050	20	7/17/12		5.18	250.6	7.17	8.57
11	12	7:25:31 PM	6						

SpectraView Block Data



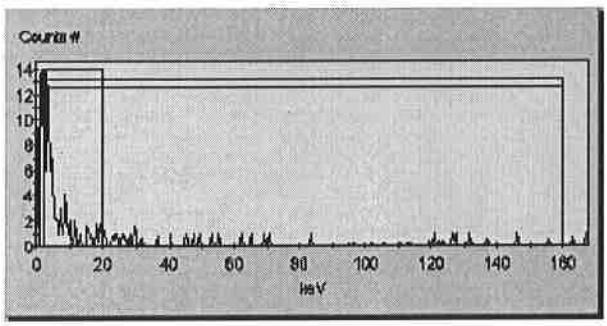
		3072156051	20	7/17/12		5.23	206.2	7.77	8.72
12	12	7:46:34 PM	4						

SpectraView Block Data



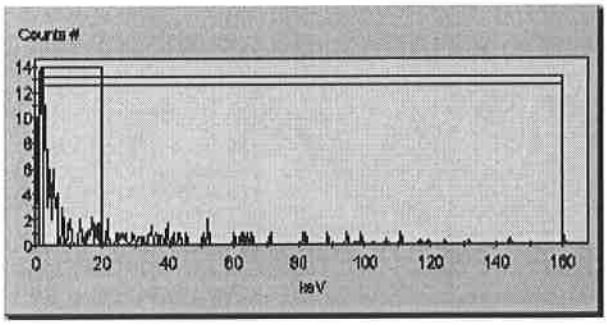
3072156052 20 7/17/12 4.28 193.9 6.08 7.42
13 15 8:07:40 PM 6

SpectraView Block Data



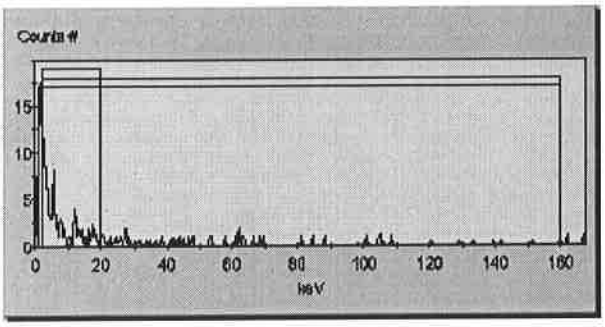
3072156053 20 7/17/12 3.82 200.4 5.89 7.24
14 15 8:28:43 PM 6

SpectraView Block Data



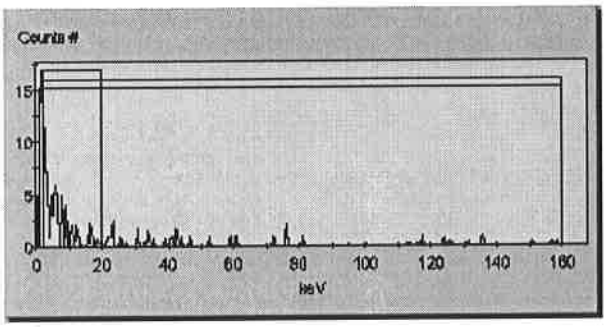
3072156054 20 7/17/12 5.05 251.9 7.48 8.78
15 15 8:49:44 PM 5

SpectraView Block Data



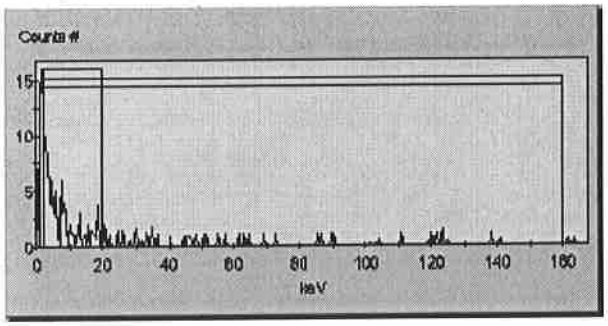
3072156055 20 7/17/12 4.37 265.9 6.16 7.46
16 15 9:10:40 PM 6

SpectraView Block Data



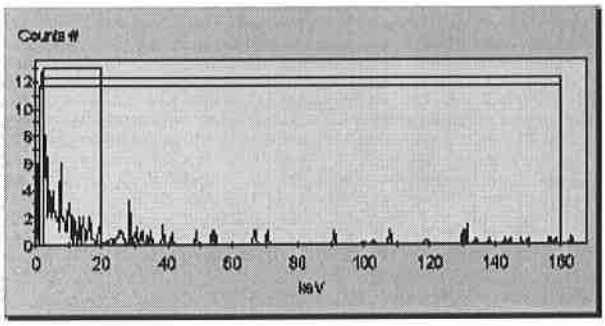
3072156056 20 7/17/12 4.82 288.8 6.99 8.34
17 15 9:31:39 PM 6

SpectraView Block Data



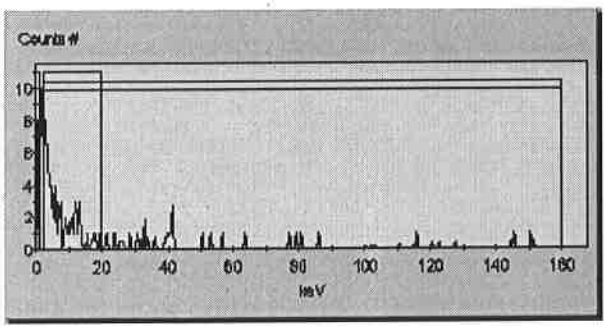
3072156057 20 7/17/12 3.90 269.1 5.64 6.74
18 15 9:52:36 PM 7

SpectraView Block Data



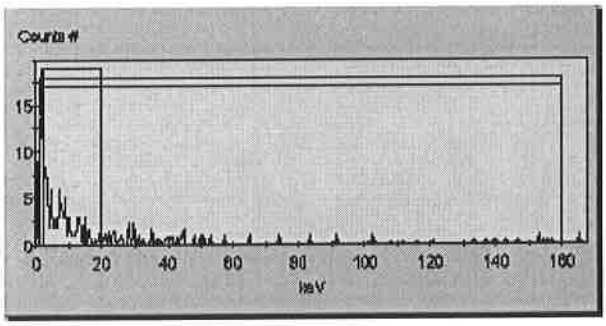
	3072156058	20	7/17/12	3.82	261.1	5.47	6.38	
19	15	10:13:48 PM	8					

SpectraView Block Data



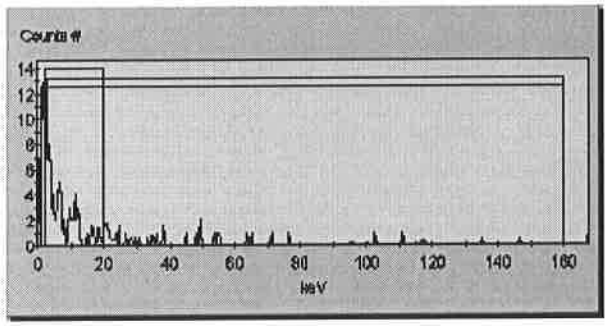
	3072156059	20	7/17/12	4.76	280.7	7.14	8.84	
20	15	10:35:08 PM	8					

SpectraView Block Data



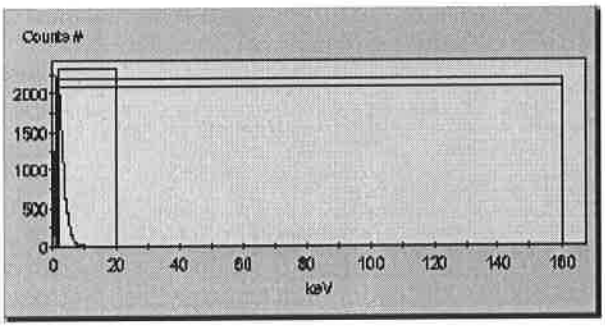
	3072156060	20	7/17/12	4.78	257.9	6.45	7.45	
21	15	10:56:12 PM	6					

SpectraView Block Data



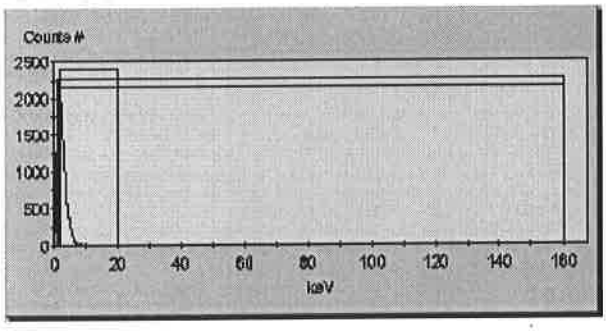
		LCS	20	7/17/12	424.58	319.0	426.76	639.16
22	15	11:19:02 PM	0					

SpectraView Block Data



		LCSD	20	7/17/12	394.56	300.5	396.72	611.52
23	15	11:40:07 PM	0					

SpectraView Block Data



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Pace Analytical Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156037	12482	SuperH3C14	7	8	7/16/12 2130	15	NA	RMK
038								
039								
040								
LCS			7	8	7/16/12 2130	15	NA	RMK
LCSD			↓	↓	↓	↓	↓	↓
BLG071712	Blk6	↓	16	2	7/17/12 1210	30	NA	RMK
MB 459068	S 12483	Super H3C14	12	5	7/17/12 1545	20	NA	RMK
3072156041								
042								
043								
044								
045								
046								
047								
048								
049								
050								
051			↓					
052			15					
053								
054								
055								
056	↓	↓	↓	↓	↓	↓	↓	↓

Run comments: _____

Peer Review: _____

Pace Analytical

Pace Analytical Services, Inc.-Pittsurgh

Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156 057	12483	Swipe H3 C14	15	5	7/17/12 1545	20	NA	
058								
059								
060								
LCS(#1)								
LCSD(#2)								
MB 459060970	12484	Swipe H3 C14	16	6				
3072156061								
062								
063								
064								
065								
066								
067								
068								
069								
070								
071								
072				5				
073								
074								
075								
076								
077								

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 8.26
Bkg Duration 30.0 min
Bkg Ref BKG7/21/2012
Bkg Ct Date/Time: 7/21/2012 16:46
Instrument ID: System #2

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	6.0				dpm/S	Low, Reprep
LCS12481	1.0	7/21/12 13:56	6.0	7/21/12 13:56	58.29	319.0	dpm/S	High, Evaluate
LCSD12481	1.0	7/21/12 14:03	6.0	7/21/12 14:03	55.60	305.5	dpm/S	High, Evaluate
LCS12482	1.0	7/21/12 14:10	6.0	7/21/12 14:10	59.00	254.8	dpm/S	Pass
LCSD12482	1.0	7/21/12 14:17	6.0	7/21/12 14:17	54.73	307.6	dpm/S	High, Evaluate
LCS12483	1.0	7/21/12 14:23	6.0	7/21/12 14:23	60.56	288.2	dpm/S	Pass
LCSD12483	1.0	7/21/12 14:30	6.0	7/21/12 14:30	56.15	301.0	dpm/S	High, Evaluate
LCS12484	1.0	7/21/12 14:37	6.0	7/21/12 14:37	56.94	319.9	dpm/S	High, Evaluate
LCSD12484	1.0	7/21/12 14:44	6.0	7/21/12 14:44	59.13	309.0	dpm/S	High, Evaluate
LCSD12485	1.0	7/21/12 14:58	6.0	7/21/12 14:53	54.06	312.4	dpm/S	High, Evaluate
LCS12497	1.0	7/21/12 15:05	6.0	7/21/12 15:00	58.81	311.4	dpm/S	High, Evaluate
LCSD12497	1.0	7/21/12 15:12	6.0	7/21/12 15:07	62.56	310.8	dpm/S	High, Evaluate
LCS12485	1.0	7/28/12 15:29	12.0	7/28/12 15:29	51.27	299.3	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	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	-0.0696	0.0000	1.0000	118.714	-14.781	16.497	-84.905	-30.480	-8.466	-8.466	1.00
LCS12481	0.4643	0.0000	1.0000	107.761	13.344	18.527	12.724	4.568	1.269	13.344	1.00
LCSD12481	0.4764	0.0000	1.0000	99.373	12.709	17.378	12.401	4.452	1.237	12.709	1.00
LCS12482	0.4945	0.0000	1.0000	102.607	12.602	17.566	11.946	4.289	1.191	12.602	1.00
LCSD12482	0.4747	0.0000	1.0000	97.892	12.657	17.220	12.445	4.468	1.241	12.657	1.00
LCS12483	0.4874	0.0000	1.0000	107.296	12.948	18.205	12.120	4.351	1.209	12.948	1.00
LCSD12483	0.4797	0.0000	1.0000	99.823	12.681	17.394	12.314	4.421	1.228	12.681	1.00
LCS12484	0.4634	0.0000	1.0000	105.061	13.219	18.214	12.750	4.577	1.271	13.219	1.00
LCSD12484	0.4735	0.0000	1.0000	107.425	13.174	18.377	12.475	4.478	1.244	13.174	1.00
LCSD12485	0.4706	0.0000	1.0000	97.327	12.692	17.200	12.554	4.507	1.252	12.692	1.00
LCS12497	0.4715	0.0000	1.0000	107.218	13.197	18.376	12.530	4.498	1.249	13.197	1.00
LCSD12497	0.4720	0.0000	1.0000	115.043	13.585	19.309	12.516	4.493	1.248	13.585	1.00
LCS12485	0.4809	0.0000	1.0000	89.431	8.691	13.759	8.491	3.368	0.662	8.691	1.00

7/31/12

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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

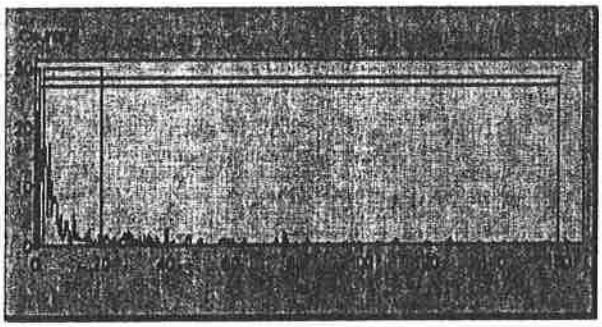
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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	7/21/2012	30 7/21/12	4.92	291.6	6.89	8.26	
1	10	4:46:13 PM	15						

SpectraView Block Data



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_H3_C14_B
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\20120721_1356.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\12480.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14_B.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): 6.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

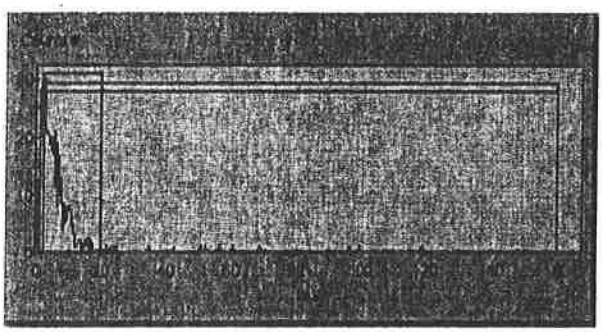
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 15.53 Date Processed: 7/20/12 8:36:50 PM
14C Chi Square: 11.84 Date Processed: 7/20/12 8:36:50 PM

3H E^2/B (1-18.6 keV): 311.34 Date Processed: 7/20/12 8:36:50 PM
14C E^2/B (4-156 keV): 556.50 Date Processed: 7/20/12 8:36:50 PM
3H Efficiency (0-18.6 keV): 61.98 Date Processed: 7/20/12 8:36:50 PM
14C Efficiency (0-156 keV): 94.97 Date Processed: 7/20/12 8:36:50 PM
IPA Background Date Processed: 7/20/12 8:36:50 PM
3H Background CPM (0-18.6 keV): 12.27 Date Processed: 7/20/12 8:36:50 PM
14C Background CPM (0-156 keV): 20.03 Date Processed: 7/20/12 8:36:50 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/20/12 8:36:50 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

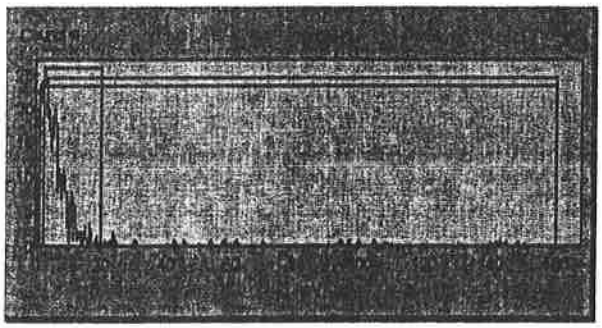
S#	PID	SMPL_ID TIME	C.T. LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	17	LCS12481 1:56:51 PM	6 1	7/21/12	47.38	319.0	49.79	58.29	

SpectraView Block Data



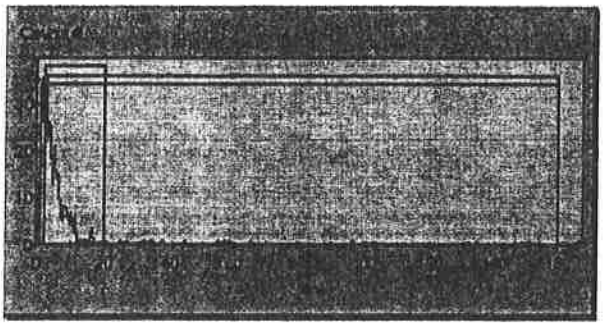
2	17	LCSD12481 2:03:37 PM	6 1	7/21/12	46.04	305.5	49.27	55.60	

SpectraView Block Data



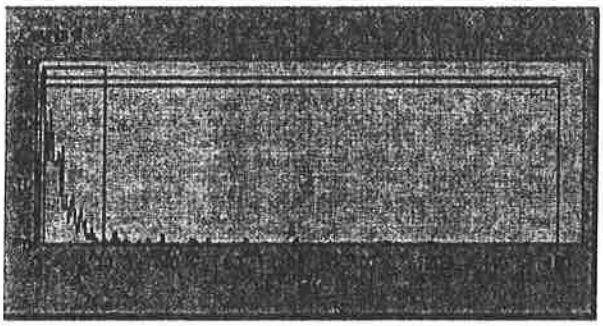
3	17	LCS12482 2:10:23 PM	6 1	7/21/12	48.40	254.8	51.17	59.00	

SpectraView Block Data



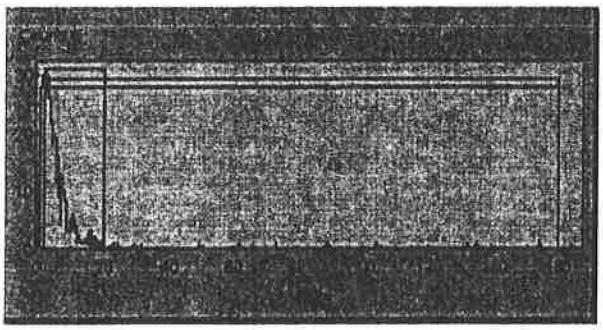
LCSD12482 6 7/21/12 43.13 307.6 45.73 54.73
4 17 2:17:08 PM 1

SpectraView Block Data



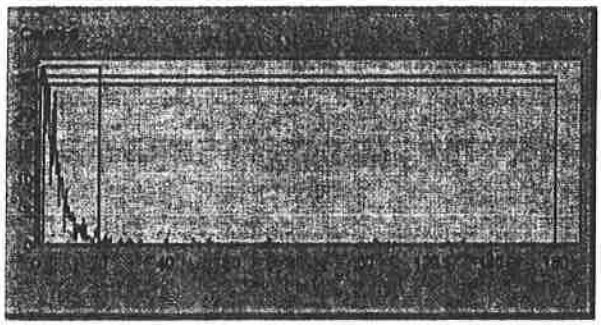
LCS12483 6 7/21/12 49.79 288.2 52.06 60.56
5 17 2:23:53 PM 1

SpectraView Block Data



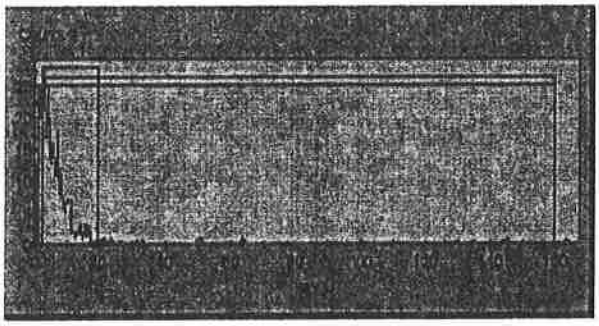
LCSD12483 6 7/21/12 45.19 301.0 47.31 56.15
6 17 2:30:38 PM 1

SpectraView Block Data



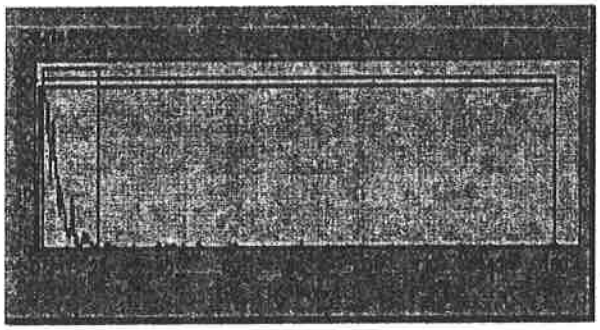
LCS12484 6 7/21/12 48.35 319.9 50.27 56.94
7 17 2:37:23 PM 1

SpectraView Block Data



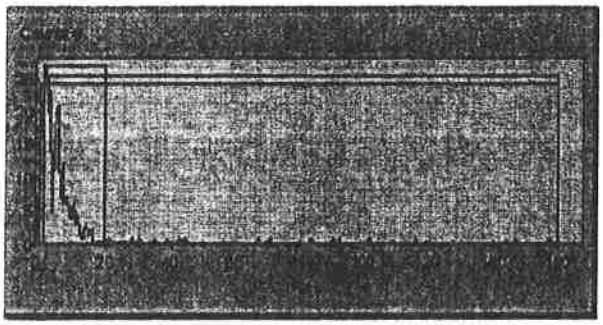
LCSD12484 6 7/21/12 51.38 309.0 53.46 59.13
8 17 2:44:09 PM 1

SpectraView Block Data



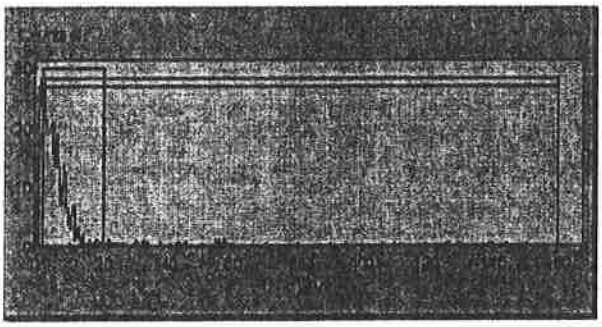
Missing vial 9.
LCSD12485 6 7/21/12 45.33 312.4 48.73 54.06
10 17 2:53:58 PM 2

SpectraView Block Data



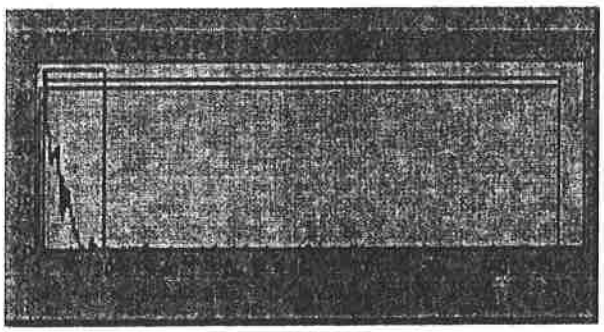
LCS12497 6 7/21/12 48.38 311.4 50.98 58.81
11 17 3:00:44 PM 1

SpectraView Block Data



LCSD12497 6 7/21/12 51.69 310.8 53.23 62.56
12 17 3:07:29 PM 1

SpectraView Block Data



Pace Analytical

Pace Analytical Services, Inc.-Pittsurgh

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
3073HL1040	NA	SuperH3C14	9	13	7/20/12 1500	~~13~~ 12 OH 7/21/12	NA	[illegible]
LCS	↓	↓	↓	↓	↓	↓	↓	↓
LCSD	↓	↓	↓	↓	↓	↓	↓	↓
BKG 7/21/12	↓	SuperH3C14E	10	3	7/21/12 1355	36	↓	↓
3073HSC14	↓	[illegible]C14D	26	19	↓	12	↓	↓
17	↓	↓	↓	↓	↓	↓	↓	↓
33	↓	↓	↓	↓	↓	↓	↓	↓
39	↓	↓	↓	↓	↓	↓	↓	↓
49	↓	↓	↓	↓	↓	↓	↓	↓
69	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12481	↓	SuperH3C14B	17	5	7/21/12 1355	6	↓	[illegible]
LCSD 12481	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12482	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12482	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12483	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12483	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12484	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12484	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12485	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12485	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12497	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12497	↓	↓	↓	↓	↓	↓	↓	↓

Run comments:

Peer Review: [illegible] 7/24/12

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

Low Energy Beta Sample Analysis Data

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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2 459070-BLANK for HBN 91055 [RADC/1248

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12484 **Prep Date** 7/18/2012 01:33 **Dilution**
Method EPA 906.0M **HBN** 91055 **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2860558 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 01:33 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2860558 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-11.2U ± 3.86 (8.00)	dpm/sa	-11.2U ± 3.86 (8.00)			dpm/sa

4 3072156061-SU-13-6

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmouth 1207076 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12484 **Prep Date** 7/18/2012 01:54 **Dilution**
Method EPA 906.0M **HBN** 91055 **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860559 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 01:54 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860559 **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	-10.1U ± 3.73 (7.71)	dpm/sa	-10.1U ± 3.73 (7.71)					dpm/sa

6 3072156062-SU-13-7

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmouth 1207076 **Location**

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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6 3072156062-SU-13-7

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 02:15	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860560	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 02:15	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860560	**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	-8.28U ± 3.77 (7.74)	dpm/sa	-8.28U ± 3.77 (7.74)		dpm/sa		

8 3072156063-SU-13-8

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 02:36	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860561	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 02:36	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860561	**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	-11.0U ± 3.72 (7.72)	dpm/sa	-11.0U ± 3.72 (7.72)		dpm/sa		

10 3072156064-SU-13-9

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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10 3072156064-SU-13-9

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860562

Batch RADC/12484
HBN 91055
Instru NONE

Prep Date 7/18/2012 02:57
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860562

Instru NONE
Col ID
File

Run Date 7/18/2012 02:57
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-8.17U ± 3.77 (7.73)	dpm/sa	-8.17U ± 3.77 (7.73)		dpm/sa		

12 3072156065-SU-13-10

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860564

Batch RADC/12484
HBN 91055
Instru NONE

Prep Date 7/18/2012 03:18
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860564

Instru NONE
Col ID
File

Run Date 7/18/2012 03:18
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-8.85U ± 3.76 (7.73)	dpm/sa	-8.85U ± 3.76 (7.73)		dpm/sa		

14 3072156066-SU-13-11

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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14 3072156066-SU-13-11

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860565

Batch RADC/12484
HBN 91055
Instru NONE

Prep Date 7/18/2012 03:39
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860565

Instru NONE
Col ID
File

Run Date 7/18/2012 03:39
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-10.2U ± 3.77 (7.81)	dpm/sa	-10.2U ± 3.77 (7.81)		dpm/sa		

16 3072156067-SU-13-11D

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860566

Batch RADC/12484
HBN 91055
Instru NONE

Prep Date 7/18/2012 04:00
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860566

Instru NONE
Col ID
File

Run Date 7/18/2012 04:00
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-8.81U ± 3.78 (7.77)	dpm/sa	-8.81U ± 3.78 (7.77)		dpm/sa		

18 3072156068-SU-13-12

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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18 3072156068-SU-13-12

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 04:21	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860567	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 04:21	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860567	**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	-7.90U ± 3.80 (7.79)	dpm/sa	-7.90U ± 3.80 (7.79)		dpm/sa		

19 3072156069-SU-13-13

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/22/2012 00:21	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2790029	**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**	7/22/2012 00:21	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2790029	**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	-4.94U ± 3.53 (8.31)	dpm/sa	-4.94U ± 3.53 (8.31)		dpm/sa		

21 3072156070-SU-13-14

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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21 3072156070-SU-13-14

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12484	**Prep Date**	7/18/2012 09:01	**Dilution**
Method	EPA 906.0M		**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860568		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/18/2012 09:01	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860568		**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	-8.69U ± 3.75 (7.72)	dpm/sa	-8.69U ± 3.75 (7.72)		dpm/sa		

23 3072156071-SU-13-15

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12484	**Prep Date**	7/18/2012 09:22	**Dilution**
Method	EPA 906.0M		**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860569		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/18/2012 09:22	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860569		**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	-6.87U ± 3.84 (7.81)	dpm/sa	-6.87U ± 3.84 (7.81)		dpm/sa		

25 3072156072-SU-13-16

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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25 3072156072-SU-13-16

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 09:43	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860570	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 09:43	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860570	**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	-9.21U ± 3.74 (7.71)	dpm/sa	-9.21U ± 3.74 (7.71)		dpm/sa		

27 3072156073-SU-13-17

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 10:04	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860571	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 10:04	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860571	**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	-7.47U ± 3.78 (7.72)	dpm/sa	-7.47U ± 3.78 (7.72)		dpm/sa		

29 3072156074-SU-13-18

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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29 3072156074-SU-13-18

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 10:25	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860572	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 10:25	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860572	**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	-5.82U ± 3.88 (7.83)	dpm/sa	-5.82U ± 3.88 (7.83)		dpm/sa		

31 3072156075-SU-13-19

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 10:46	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860573	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 10:46	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860573	**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	-9.43U ± 3.74 (7.71)	dpm/sa	-9.43U ± 3.74 (7.71)		dpm/sa		

33 3072156076-SU-13-20

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch RADC/12484 HBN 91055
Rule 9060 I LEB Status RE
Create Date 6/28/2012 Analyst MBT

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33 3072156076-SU-13-20

Prep Information

Procedure 9060 I LEB **Batch** RADC/12484 **Prep Date** 7/18/2012 11:07 **Dilution**
Method EPA 906.0M **HBN** 91055 **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860574 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 11:07 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860574 **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	-8.62U ± 3.76 (7.73)	dpm/sa	-8.62U ± 3.76 (7.73)		dpm/sa		

35 3072156077-SU-13-21

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmonth 1207076 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12484 **Prep Date** 7/18/2012 11:28 **Dilution**
Method EPA 906.0M **HBN** 91055 **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860575 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 11:28 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860575 **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	-8.81U ± 3.77 (7.75)	dpm/sa	-8.81U ± 3.77 (7.75)		dpm/sa		

37 3072156078-SU-13-22

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmonth 1207076 **Location**

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

Quality Control Review

Batch	RADC/12484	HBN	91055
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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37 3072156078-SU-13-22

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860576

Batch RADC/12484
HBN 91055
Instru NONE

Prep Date 7/18/2012 11:49
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860576

Instru NONE
Col ID
File

Run Date 7/18/2012 11:49
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.63U ± 3.78 (7.74)	dpm/sa	-7.63U ± 3.78 (7.74)		dpm/sa		

39 3072156079-SU-13-23

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860577

Batch RADC/12484
HBN 91055
Instru NONE

Prep Date 7/18/2012 12:10
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860577

Instru NONE
Col ID
File

Run Date 7/18/2012 12:10
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Req. Limits Low	Req. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-8.99U ± 3.75 (7.72)	dpm/sa	-8.99U ± 3.75 (7.72)		dpm/sa		

41 3072156080-SU-13-24

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12484	**HBN**	91055
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

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41 3072156080-SU-13-24

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12484	**Prep Date**	7/18/2012 12:31	**Dilution**	
Method	EPA 906.0M	**HBN**	91055	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860578	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 12:31	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860578	**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	-9.16U ± 3.75 (7.72)	dpm/sa	-9.16U ± 3.75 (7.72)			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 13:47		Assigned Analyst	MBT	
Batch ID	12484		Earliest Due Date	07/04/2012 07:12	
A-code	9060 I LEB	9060W	HBN	91055	
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
	459070	BLANK	IP		QCACCOUNT	-11.2U	3.86	8.00	7/18/12 1:33
3072156	3072156061	PS	WP	6/11/2012 0:01	RTI	-10.1U	3.73	7.71	7/18/12 1:54
3072156	3072156062	PS	WP	6/11/2012 0:01	RTI	-8.28U	3.77	7.74	7/18/12 2:15
3072156	3072156063	PS	WP	6/11/2012 0:01	RTI	-11.0U	3.72	7.72	7/18/12 2:36
3072156	3072156064	PS	WP	6/11/2012 0:01	RTI	-8.17U	3.77	7.73	7/18/12 2:57
3072156	3072156065	PS	WP	6/11/2012 0:01	RTI	-8.85U	3.76	7.73	7/18/12 3:18
3072156	3072156066	PS	WP	6/11/2012 0:01	RTI	-10.2U	3.77	7.81	7/18/12 3:39
3072156	3072156067	PS	WP	6/11/2012 0:01	RTI	-8.81U	3.78	7.77	7/18/12 4:00
3072156	3072156068	PS	WP	6/11/2012 0:01	RTI	-7.90U	3.80	7.79	7/18/12 4:21
3072156	3072156069	PS	WP	6/11/2012 0:01	RTI		0.0406	#NUM!	
3072156	3072156070	PS	WP	6/11/2012 0:01	RTI	-8.69U	3.75	7.72	7/18/12 9:01
3072156	3072156071	PS	WP	6/11/2012 0:01	RTI	-6.87U	3.84	7.81	7/18/12 9:22
3072156	3072156072	PS	WP	6/11/2012 0:01	RTI	-9.21U	3.74	7.71	7/18/12 9:43
3072156	3072156073	PS	WP	6/11/2012 0:01	RTI	-7.47U	3.78	7.72	7/18/12 10:04
3072156	3072156074	PS	WP	6/11/2012 0:01	RTI	-5.82U	3.88	7.83	7/18/12 10:25
3072156	3072156075	PS	WP	6/11/2012 0:01	RTI	-9.43U	3.74	7.71	7/18/12 10:46
3072156	3072156076	PS	WP	6/11/2012 0:01	RTI	-8.62U	3.76	7.73	7/18/12 11:07
3072156	3072156077	PS	WP	6/11/2012 0:01	RTI	-8.81U	3.77	7.75	7/18/12 11:28
3072156	3072156078	PS	WP	6/11/2012 0:01	RTI	-7.63U	3.78	7.74	7/18/12 11:49
3072156	3072156079	PS	WP	6/11/2012 0:01	RTI	-8.99U	3.75	7.72	7/18/12 12:10
3072156	3072156080	PS	WP	6/11/2012 0:01	RTI	-9.16U	3.75	7.72	7/18/12 12:31

q 7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
Matrix Smear
Batch ID 12484
Prep Start 7/16/2012 12:00
Prep Finish 7/16/2012
Act. Rpt Units dpm

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

Bkg CPM 12.38
Bkg Duration 30.0 min
Bkg Ref BKG 071712
Bkg Ct Date/Time: 7/17/2012 15:21
Instrument ID: System #2

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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
459070	1.0	7/18/12 1:33	20.0	7/18/12 1:33	7.08	308.5	dpm/S	High, Evaluate
3072156061	1.0	6/11/12 0:01	20.0	7/18/12 1:54	7.42	258.3	dpm/S	Pass
3072156062	1.0	6/11/12 0:01	20.0	7/18/12 2:15	8.32	271.7	dpm/S	Pass
3072156063	1.0	6/11/12 0:01	20.0	7/18/12 2:36	6.99	267.8	dpm/S	Pass
3072156064	1.0	6/11/12 0:01	20.0	7/18/12 2:57	8.37	268.9	dpm/S	Pass
3072156065	1.0	6/11/12 0:01	20.0	7/18/12 3:18	8.04	271.6	dpm/S	Pass
3072156066	1.0	6/11/12 0:01	20.0	7/18/12 3:39	7.43	285.9	dpm/S	Pass
3072156067	1.0	6/11/12 0:01	20.0	7/18/12 4:00	8.08	279.6	dpm/S	Pass
3072156068	1.0	6/11/12 0:01	20.0	7/18/12 4:21	8.53	282.7	dpm/S	Pass
3072156069	1.0	6/11/12 0:01	20.0				dpm/S	Low, Reprep
3072156070	1.0	6/11/12 0:01	20.0	7/18/12 9:01	8.11	264.3	dpm/S	Pass
3072156071	1.0	6/11/12 0:01	20.0	7/18/12 9:22	9.04	285.3	dpm/S	Pass
3072156072	1.0	6/11/12 0:01	20.0	7/18/12 9:43	7.85	261.5	dpm/S	Pass
3072156073	1.0	6/11/12 0:01	20.0	7/18/12 10:04	8.71	267.5	dpm/S	Pass
3072156074	1.0	6/11/12 0:01	20.0	7/18/12 10:25	9.56	228.9	dpm/S	Pass
3072156075	1.0	6/11/12 0:01	20.0	7/18/12 10:46	7.74	259.8	dpm/S	Pass
3072156076	1.0	6/11/12 0:01	20.0	7/18/12 11:07	8.15	271.3	dpm/S	Pass
3072156077	1.0	6/11/12 0:01	20.0	7/18/12 11:28	8.07	241.7	dpm/S	Pass
3072156078	1.0	6/11/12 0:01	20.0	7/18/12 11:49	8.64	272.4	dpm/S	Pass
3072156079	1.0	6/11/12 0:01	20.0	7/18/12 12:10	7.96	252.3	dpm/S	Pass
3072156080	1.0	6/11/12 0:01	20.0	7/18/12 12:31	7.88	266.4	dpm/S	Pass

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9W 7/23/12 7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12484	**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
459070	0.4740	0.0000	1.0000	-11.182	3.621	3.859	8.005	3.536	0.439	3.621	1.00
3072156061	0.4946	0.1015	0.9944	-10.084	3.528	3.727	7.714	3.407	0.423	3.528	1.00
3072156062	0.4933	0.1016	0.9944	-8.277	3.638	3.769	7.735	3.417	0.425	3.638	1.00
3072156063	0.4940	0.1016	0.9944	-10.973	3.484	3.721	7.724	3.412	0.424	3.484	1.00
3072156064	0.4938	0.1016	0.9943	-8.167	3.639	3.767	7.727	3.413	0.424	3.639	1.00
3072156065	0.4933	0.1017	0.9943	-8.848	3.607	3.758	7.735	3.417	0.425	3.607	1.00
3072156066	0.4885	0.1017	0.9943	-10.190	3.573	3.774	7.810	3.450	0.429	3.573	1.00
3072156067	0.4911	0.1018	0.9943	-8.807	3.628	3.777	7.770	3.432	0.427	3.628	1.00
3072156068	0.4899	0.1018	0.9943	-7.904	3.686	3.805	7.789	3.440	0.428	3.686	1.00
3072156069	-0.0696	-112.4463	528.0170	0.337	-0.034	0.041	-0.103	-0.046	-0.006	-0.006	1.00
3072156070	0.4944	0.1023	0.9943	-8.686	3.606	3.752	7.718	3.409	0.424	3.606	1.00
3072156071	0.4888	0.1024	0.9943	-6.872	3.750	3.839	7.806	3.448	0.429	3.750	1.00
3072156072	0.4946	0.1024	0.9943	-9.211	3.576	3.741	7.715	3.408	0.424	3.576	1.00
3072156073	0.4940	0.1024	0.9943	-7.471	3.675	3.781	7.724	3.412	0.424	3.675	1.00
3072156074	0.4871	0.1025	0.9943	-5.823	3.819	3.882	7.834	3.461	0.430	3.819	1.00
3072156075	0.4946	0.1025	0.9943	-9.434	3.564	3.737	7.714	3.408	0.423	3.564	1.00
3072156076	0.4934	0.1026	0.9943	-8.623	3.618	3.762	7.734	3.416	0.425	3.618	1.00
3072156077	0.4922	0.1026	0.9943	-8.808	3.618	3.768	7.753	3.425	0.426	3.618	1.00
3072156078	0.4931	0.1026	0.9943	-7.628	3.674	3.785	7.738	3.418	0.425	3.674	1.00
3072156079	0.4943	0.1027	0.9943	-8.994	3.591	3.748	7.720	3.410	0.424	3.591	1.00
3072156080	0.4942	0.1027	0.9943	-9.158	3.583	3.745	7.721	3.411	0.424	3.583	1.00

7/23/12 7/23/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/31/2012	**Method:**	EPA 906.0M
Worklist:	12484	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459070

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-11.1820	3.8590	8.0050	3.53600		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/21/12 14:37	7/21/12 14:44				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.916	1184.916				
Volume Used (mL):	0.100	0.100				
Aliquot Volume (L, g, F):	1.000	1.000				
Target Conc. (DPM/Sample, g, F):	118.492	118.492				
1.96 Sigma Uncertainty (Calculated):	2.137	2.137				
Result (DPM/Sample, g, F):	105.061	107.425				
1.96 Sigma Unc:	18.214	18.377				
% Recovery:	88.67%	90.66%				
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.:	LCS12484					
Duplicate Sample I.D.	LCSD12484					
Sample Result (DPM/Sample, g, F):	105.0610					
1.96 Sigma Unc:	18.2140					
ple Duplicate Result (DPM/Sample, g, F):	107.4250					
Duplicate Sample 1.96 Sigma Unc.	18.3770					
Either results below MDC?	NO					
Relative Percent Difference:	2.23%					
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:

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7/31/12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12484

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%

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\20120717_1521.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

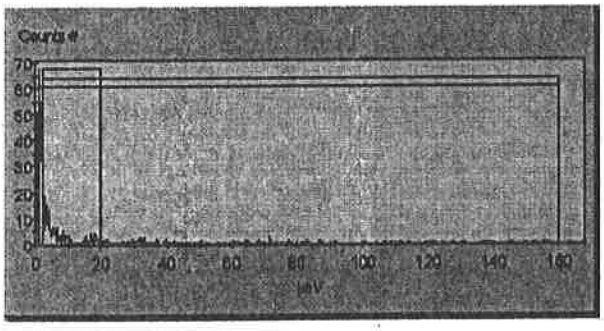
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM

14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM
3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: 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	071712	7/17/12	5.04	273.6	8.41	12.38	W
1	16	3:21:58 PM	33						

SpectraView Block Data



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_C
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_C\20120718_0132.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_C\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_C\12476.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H-3_C-14_C.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): 20.00
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	2.00
C	1.0	160.0	0.00

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: 21.73 Date Processed: 7/18/12 1:32:38 AM

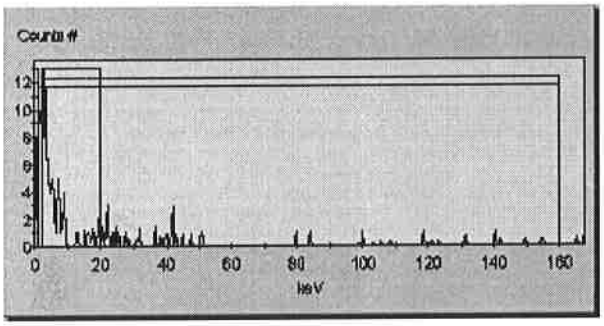
14C Chi Square: 11.64 Date Processed: 7/18/12 1:32:38 AM
3H E^2/B (1-18.6 keV): 319.55 Date Processed: 7/18/12 1:32:38 AM
14C E^2/B (4-156 keV): 554.21 Date Processed: 7/18/12 1:32:38 AM
3H Efficiency (0-18.6 keV): 62.33 Date Processed: 7/18/12 1:32:38 AM
14C Efficiency (0-156 keV): 95.83 Date Processed: 7/18/12 1:32:38 AM
IPA Background Date Processed: 7/18/12 1:32:38 AM
3H Background CPM (0-18.6 keV): 11.97 Date Processed: 7/18/12 1:32:38 AM
14C Background CPM (0-156 keV): 19.20 Date Processed: 7/18/12 1:32:38 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 ====
7/18/12 1:32:38 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	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
		459070	MB	20	7/18/12	4.23	308.5	5.97	7.08	
1	16	1:33:14 AM	12							

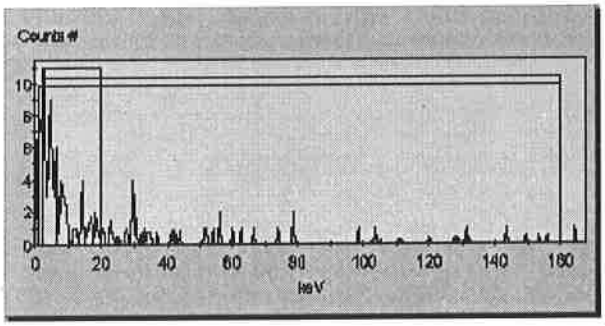
7/18/12

SpectraView Block Data



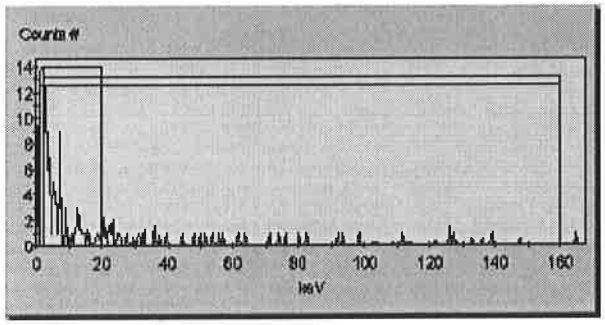
		3072156061		20	7/18/12	4.69	258.3	6.72	7.42	
2	16	1:54:18 AM	6							

SpectraView Block Data



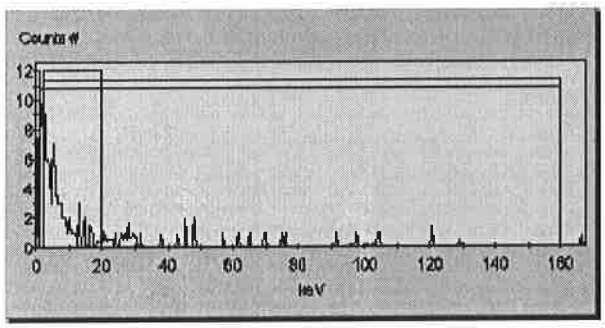
		3072156062		20	7/18/12	4.69	271.7	6.97	8.32	
3	16	2:15:17 AM	5							

SpectraView Block Data



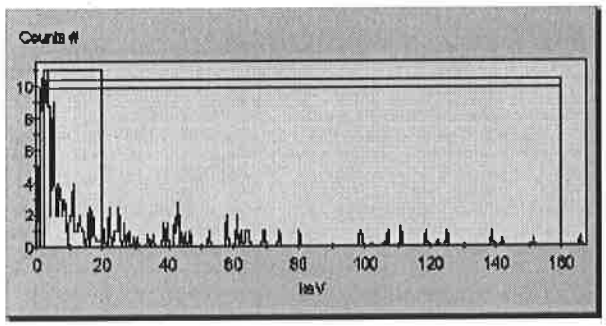
3072156063 20 7/18/12 4.21 267.8 5.94 6.99
4 16 2:36:15 AM 6

SpectraView Block Data



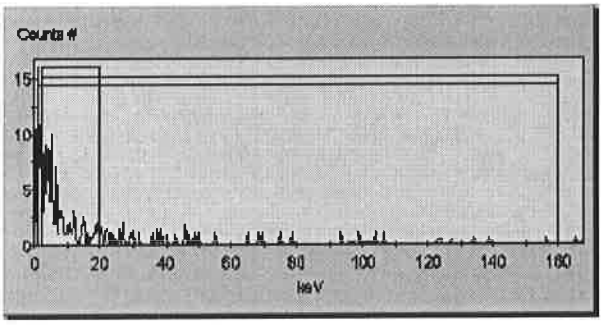
3072156064 20 7/18/12 5.07 268.9 7.57 8.37
5 16 2:57:07 AM 4

SpectraView Block Data



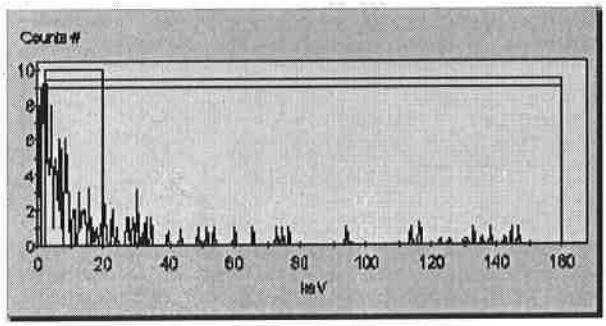
3072156065 20 7/18/12 4.91 271.6 6.89 8.04
6 16 3:17:58 AM 5

SpectraView Block Data



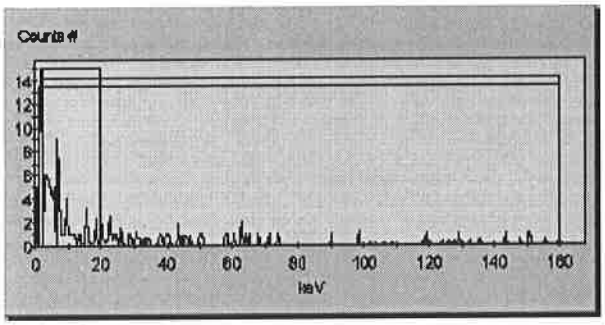
3072156066 20 7/18/12 4.68 285.9 6.68 7.43
7 16 3:39:22 AM 7

SpectraView Block Data



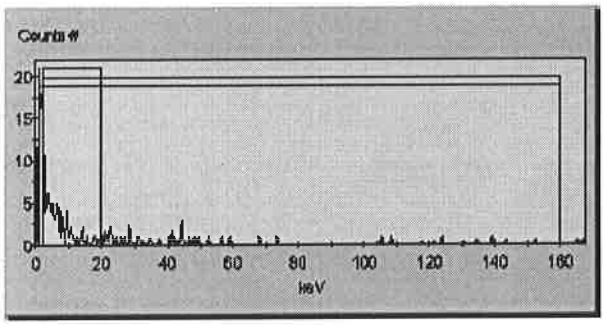
3072156067 20 7/18/12 4.04 279.6 6.88 8.08
8 16 4:00:19 AM 6

SpectraView Block Data



3072156068 20 7/18/12 4.53 282.7 6.63 8.53
9 16 4:21:54 AM 6

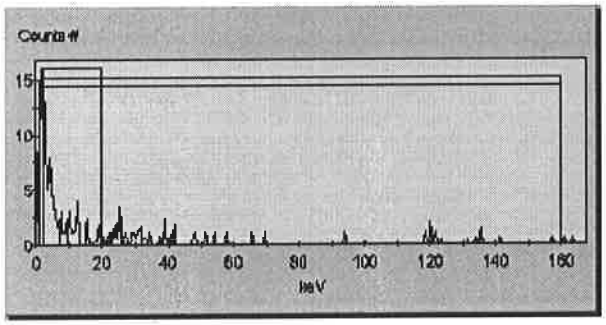
SpectraView Block Data



Missing vial 10.

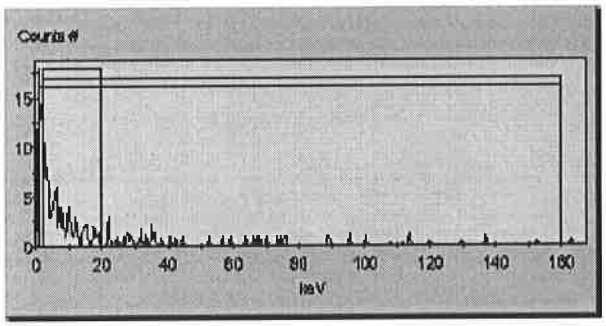
		3072156070	20	7/18/12		4.38	264.3	6.71	8.11
11	16	9:01:27 AM	5						

SpectraView Block Data



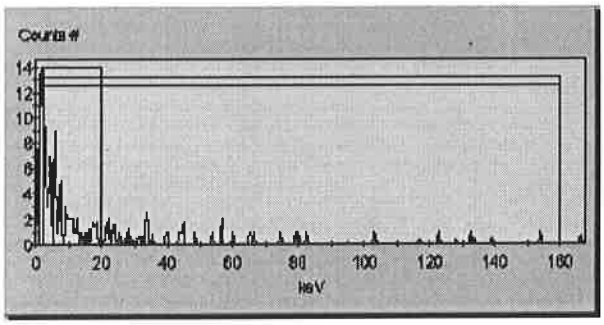
		3072156071	20	7/18/12		5.24	285.3	7.49	9.04
12	16	9:22:20 AM	4						

SpectraView Block Data



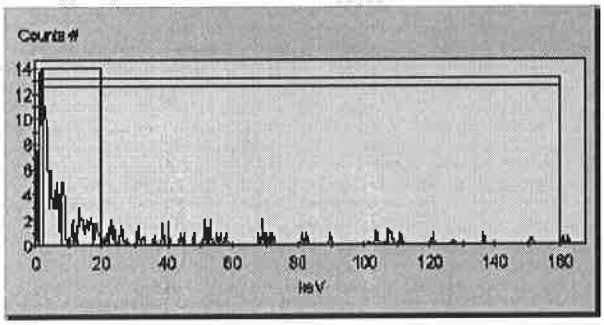
		3072156072	20	7/18/12		4.38	261.5	6.55	7.85
13	5	9:43:45 AM	6						

SpectraView Block Data



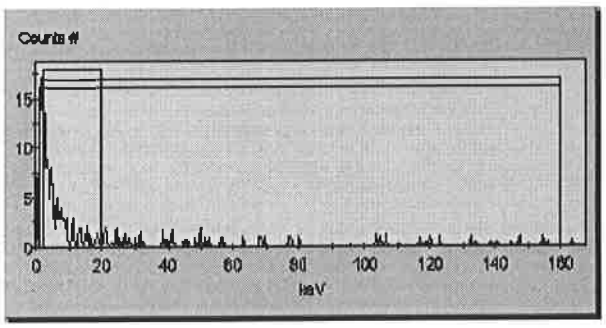
3072156073 20 7/18/12 5.04 267.5 7.36 8.71
14 5 10:04:43 AM 5

SpectraView Block Data



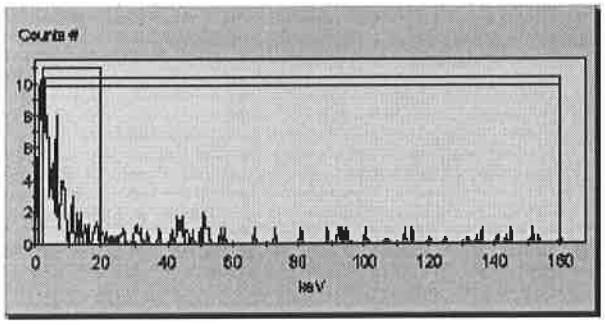
3072156074 20 7/18/12 5.68 228.9 8.26 9.56
15 5 10:25:36 AM 4

SpectraView Block Data



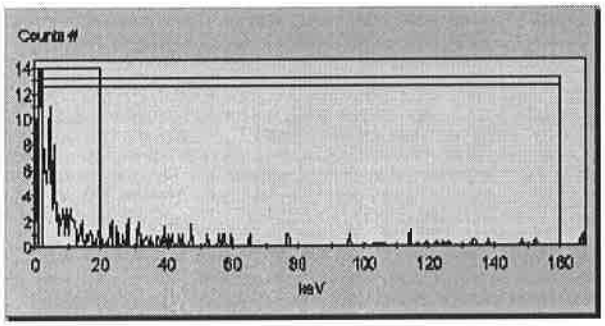
3072156075 20 7/18/12 4.59 259.8 6.99 7.74
16 5 10:46:28 AM 5

SpectraView Block Data



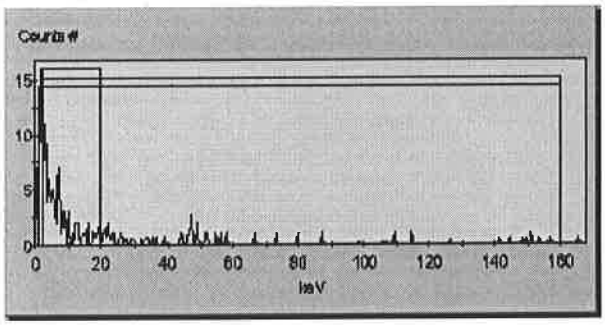
3072156076 20 7/18/12 4.84 271.3 6.75 8.15
17 5 11:07:18 AM 4

SpectraView Block Data



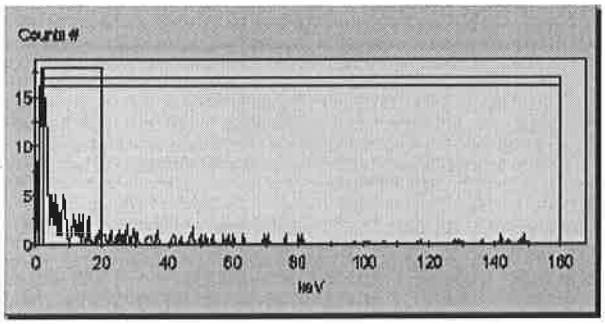
3072156077 20 7/18/12 4.74 241.7 6.82 8.07
18 5 11:28:07 AM 4

SpectraView Block Data



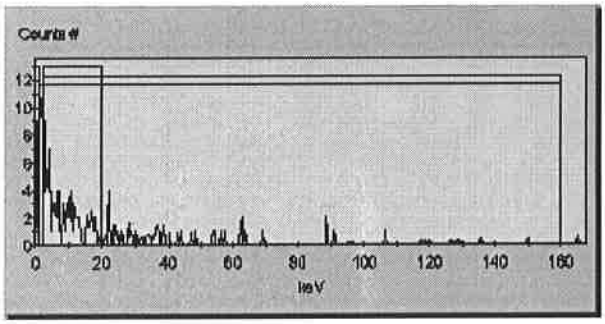
3072156078 20 7/18/12 5.01 272.4 7.19 8.64
19 5 11:48:56 AM 4

SpectraView Block Data



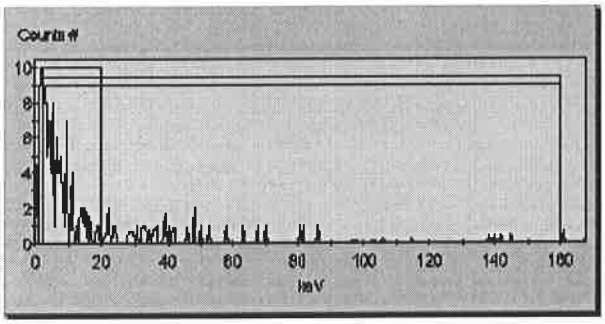
3072156079 20 7/18/12 4.44 252.3 6.81 7.96
20 5 12:09:44 PM 5

SpectraView Block Data



3072156080 20 7/18/12 5.22 266.4 7.08 7.88
21 5 12:30:32 PM 4

SpectraView Block Data



LCS 20 7/18/12 402.74 305.8 405.04 626.14
22 5 12:51:20 PM 0

SpectraView Block Data

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Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156 057	12483	Sioux H3 C14	15	5	7/17/12 1545	20	NA	
058								
059								
060								
LCS(#1)								
LCSD(#2)								
MB 459062470	12484	Sioux H3 C14	16	6				
3072156 061								
062								
063								
064								
065								
066								
067								
068								
069								
070								
071			5					
072								
073								
074								
075								
076								
077								

Run comments: _____

Peer Review: _____

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Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156078	12484	SuperH3C14-C	5	6	7/17/12 1545	20	U4	[illegible]
079								
080								
LCS								
LCSD								
MB 459072	12485		~~4~~ 5 7/17/12	~~15~~ 6 7/17/12				
3072156081			9					
082								
083								
084								
085								
086								
087								
088								
089								
090								
091								
092								
093			40					
094								
095								
096								
097								
098								

Run comments: __________

Peer Review: __________

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

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Creation Date	06/28/2012 13:47		Assigned Analyst	MBT
Batch ID	12484		Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB	9060W	HBN	91055
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
3072156	3072156069	PS	WP	6/11/2012 0:01	RTI	-4.94U	3.53	8.31	7/22/12 0:21

7/31/12

LIMS Load
Printed 7/31/2012 at 10:17 AM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code Low Energy Beta
Matrix Smear
Batch ID 12484
Prep Start 7/16/2012 12:00
Prep Finish 7/16/2012
Act. Rpt Units dpm

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

Bkg CPM 8.26
Bkg Duration 30.0 min
Bkg Ref bkg 7/21
Bkg Ct Date/Time: 7/21/2012 16:46
Instrument ID: System #2

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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
3072156069	1.0	6/11/12 0:01	12.0	7/22/12 0:21	5.83	254.6	dpm/S	Pass

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12484	**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
3072156069	0.4945	0.1123	0.9938	-4.945	3.480	3.529	8.310	3.296	0.647	3.480	1.00

Aug 31 12

Test: Low Energy Beta
Matrix: Smear
Batch ID: 12484

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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

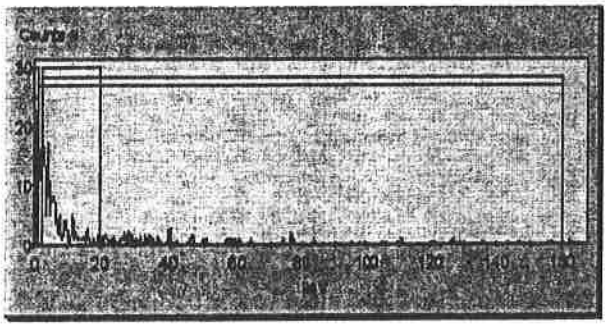
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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
1	10	BKG 7/21/2012 4:46:13 PM	30 15	7/21/12	4.92	291.6	6.89	8.26	

SpectraView Block Data



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_D
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\20120721_2316.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H-3_C-14_D\12481.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H-3_C-14_D.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): 12.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

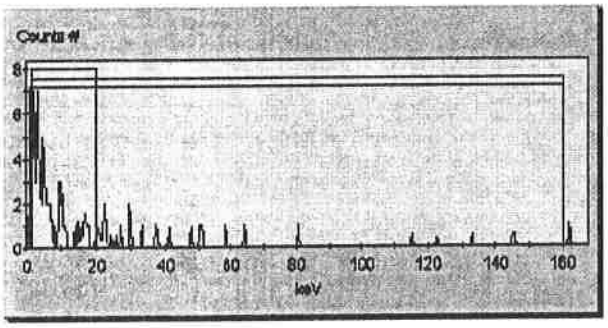
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

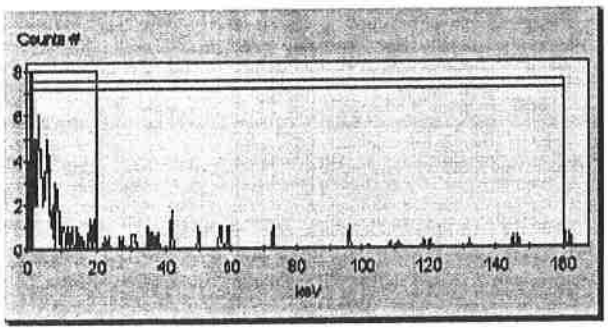
S#	PID	SMPL_ID TIME	C.T. LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	26	3072156014 11:17:27 PM	12 5	7/21/12	4.84	346.9	6.76	7.59	

SpectraView Block Data



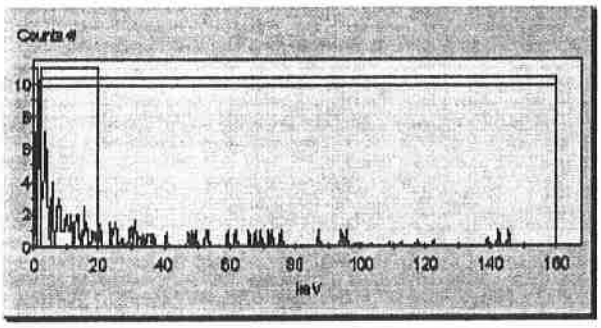
2	26	3072156017 11:30:10 PM	12 6	7/21/12	4.44	311.6	5.93	6.76	

SpectraView Block Data



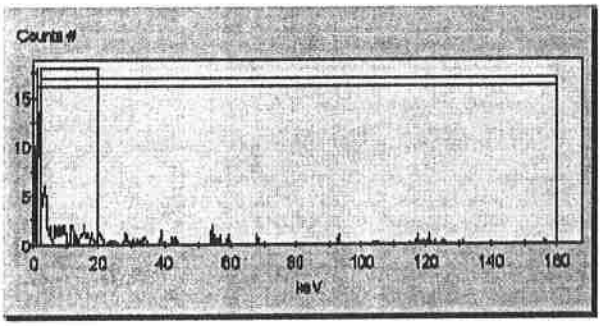
3	26	3072156038 11:42:55 PM	12 2	7/21/12	4.71	137.0	7.86	9.61	

SpectraView Block Data



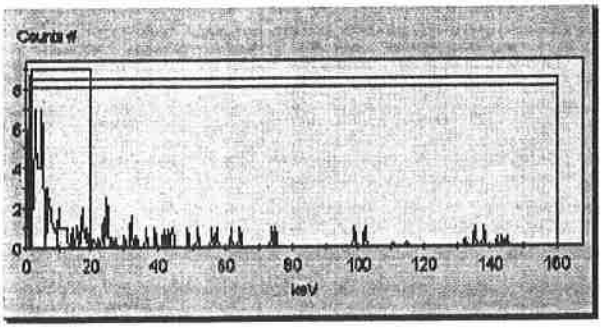
3072156039 12 7/21/12 4.68 244.3 6.90 9.40
4 26 11:55:39 PM 4

SpectraView Block Data



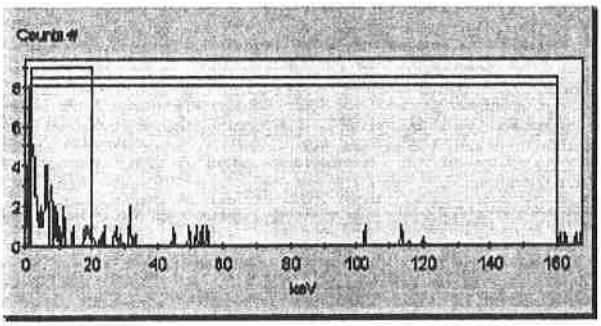
3072156049 12 7/22/12 5.09 130.9 7.65 9.06
5 26 12:08:24 AM 4

SpectraView Block Data



3072156069 12 7/22/12 3.75 254.6 5.00 5.83
6 26 12:21:09 AM 7

SpectraView Block Data


Counts
8
6
4
2
0
0
20
40
60
80
100
120
140
160
keV

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
307211e1040	N/A	SimpleH3C14	9	12	7/20/12 1500	~~1312~~ 0447/21/12	N/A	
LCS								
LCSD								
BKG 7/21/12		SimpleH3C14E	10	3	7/21/12 1355	30		
307215e014		SimpleHC14D	26	19		12		
17								
38								
39								
49								
69								
LCS 12481		SimpleH3C14B	17	5	7/21/12 1355	6		
LCSD 12481								
LCS 12482								
LCSD 12482								
LCS 12483								
LCSD 12483								
LCS 12484								
LCSD 12484								
LCS 12485								
LCSD 12485								
LCS 12497								
LCSD 12497								

Run comments:

Peer Review: 7/26/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

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

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

Bkg CPM 8.26
Bkg Duration 30.0 min
Bkg Ref BKG7/21/2012
Bkg Ct Date/Time: 7/21/2012 16:46
Instrument ID: System #2

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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	6.0				dpm/S	Low, Reprep
LCS12481	1.0	7/21/12 13:56	6.0	7/21/12 13:56	58.29	319.0	dpm/S	High, Evaluate
LCSD12481	1.0	7/21/12 14:03	6.0	7/21/12 14:03	55.60	305.5	dpm/S	High, Evaluate
LCS12482	1.0	7/21/12 14:10	6.0	7/21/12 14:10	59.00	254.8	dpm/S	Pass
LCSD12482	1.0	7/21/12 14:17	6.0	7/21/12 14:17	54.73	307.6	dpm/S	High, Evaluate
LCS12483	1.0	7/21/12 14:23	6.0	7/21/12 14:23	60.56	288.2	dpm/S	Pass
LCSD12483	1.0	7/21/12 14:30	6.0	7/21/12 14:30	56.15	301.0	dpm/S	High, Evaluate
LCS12484	1.0	7/21/12 14:37	6.0	7/21/12 14:37	56.94	319.9	dpm/S	High, Evaluate
LCSD12484	1.0	7/21/12 14:44	6.0	7/21/12 14:44	59.13	309.0	dpm/S	High, Evaluate
LCSD12485	1.0	7/21/12 14:58	6.0	7/21/12 14:53	54.06	312.4	dpm/S	High, Evaluate
LCS12497	1.0	7/21/12 15:05	6.0	7/21/12 15:00	58.81	311.4	dpm/S	High, Evaluate
LCSD12497	1.0	7/21/12 15:12	6.0	7/21/12 15:07	62.56	310.8	dpm/S	High, Evaluate
LCS12485	1.0	7/28/12 15:29	12.0	7/28/12 15:29	51.27	299.3	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	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	-0.0696	0.0000	1.0000	118.714	-14.781	16.497	-84.905	-30.480	-8.466	-8.466	1.00
LCS12481	0.4643	0.0000	1.0000	107.761	13.344	18.527	12.724	4.568	1.269	13.344	1.00
LCSD12481	0.4764	0.0000	1.0000	99.373	12.709	17.378	12.401	4.452	1.237	12.709	1.00
LCS12482	0.4945	0.0000	1.0000	102.607	12.602	17.566	11.946	4.289	1.191	12.602	1.00
LCSD12482	0.4747	0.0000	1.0000	97.892	12.657	17.220	12.445	4.468	1.241	12.657	1.00
LCS12483	0.4874	0.0000	1.0000	107.296	12.948	18.205	12.120	4.351	1.209	12.948	1.00
LCSD12483	0.4797	0.0000	1.0000	99.823	12.681	17.394	12.314	4.421	1.228	12.681	1.00
LCS12484	0.4634	0.0000	1.0000	105.061	13.219	18.214	12.750	4.577	1.271	13.219	1.00
LCSD12484	0.4735	0.0000	1.0000	107.425	13.174	18.377	12.475	4.478	1.244	13.174	1.00
LCSD12485	0.4706	0.0000	1.0000	97.327	12.692	17.200	12.554	4.507	1.252	12.692	1.00
LCS12497	0.4715	0.0000	1.0000	107.218	13.197	18.376	12.530	4.498	1.249	13.197	1.00
LCSD12497	0.4720	0.0000	1.0000	115.043	13.585	19.309	12.516	4.493	1.248	13.585	1.00
LCS12485	0.4809	0.0000	1.0000	89.431	8.691	13.759	8.491	3.368	0.662	8.691	1.00

7/31/12

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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

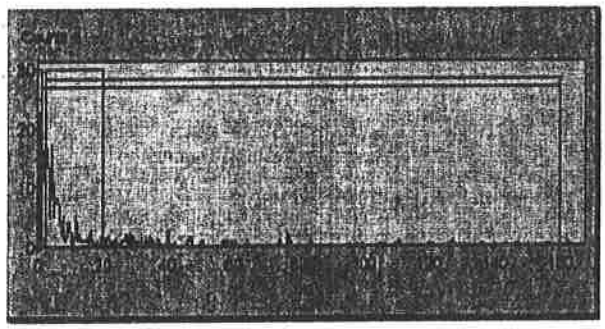
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
		BKG	7/21/2012	30							
1	10	4:46:13 PM		15		7/21/12	4.92	291.6	6.89	8.26	

SpectraView Block Data



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_H3_C14_B
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\20120721_1356.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\12480.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14_B.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): 6.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

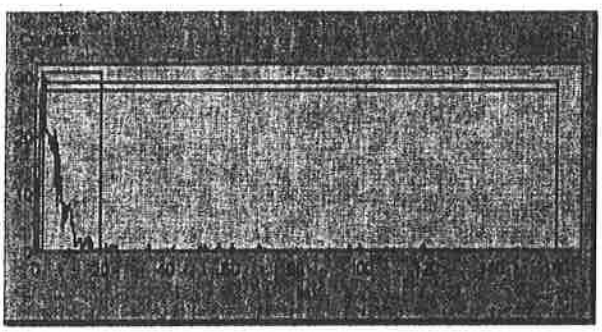
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 15.53 Date Processed: 7/20/12 8:36:50 PM
14C Chi Square: 11.84 Date Processed: 7/20/12 8:36:50 PM

3H E^2/B (1-18.6 keV): 311.34 Date Processed: 7/20/12 8:36:50 PM
14C E^2/B (4-156 keV): 556.50 Date Processed: 7/20/12 8:36:50 PM
3H Efficiency (0-18.6 keV): 61.98 Date Processed: 7/20/12 8:36:50 PM
14C Efficiency (0-156 keV): 94.97 Date Processed: 7/20/12 8:36:50 PM
IPA Background Date Processed: 7/20/12 8:36:50 PM
3H Background CPM (0-18.6 keV): 12.27 Date Processed: 7/20/12 8:36:50 PM
14C Background CPM (0-156 keV): 20.03 Date Processed: 7/20/12 8:36:50 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/20/12 8:36:50 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

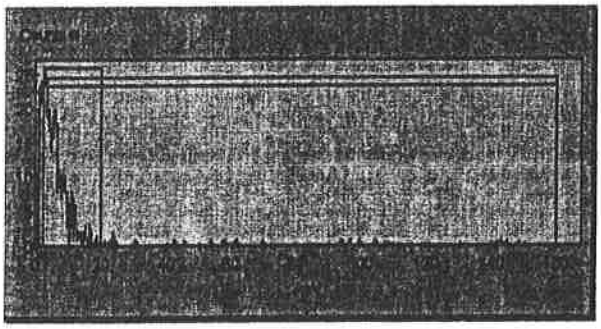
S#	PID	SMPL_ID TIME	LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	17	LCS12481 1:56:51 PM	1	6	7/21/12	47.38	319.0	49.79	58.29	

SpectraView Block Data



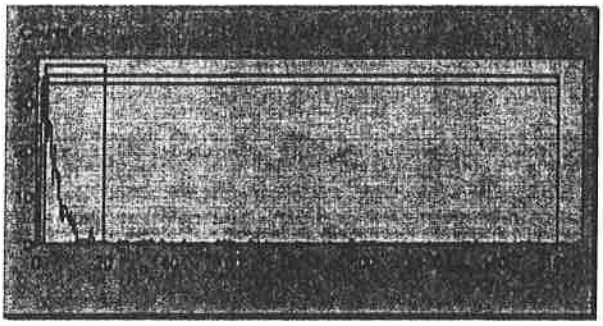
2	17	LCSD12481 2:03:37 PM	1	6	7/21/12	46.04	305.5	49.27	55.60	

SpectraView Block Data



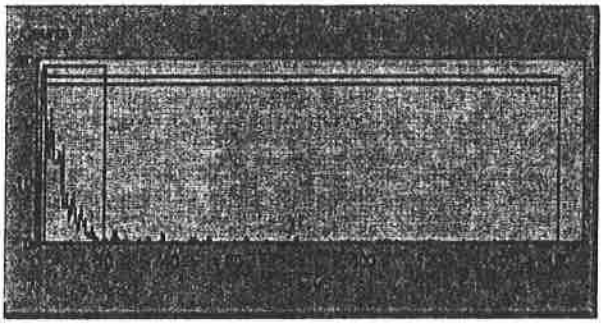
3	17	LCS12482 2:10:23 PM	1	6	7/21/12	48.40	254.8	51.17	59.00	

SpectraView Block Data



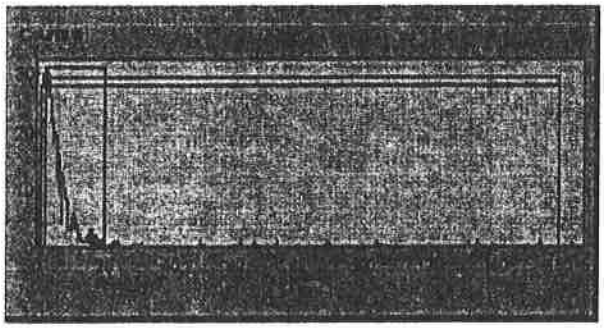
LCSD12482 6 7/21/12 43.13 307.6 45.73 54.73
4 17 2:17:08 PM 1

SpectraView Block Data



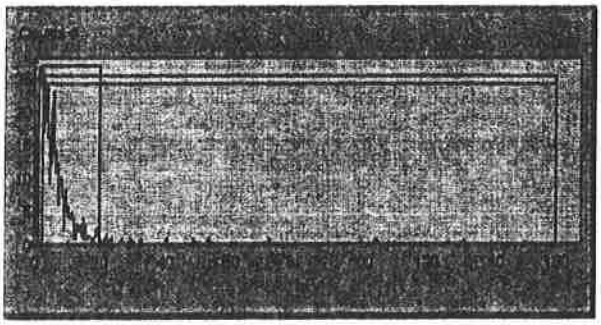
LCS12483 6 7/21/12 49.79 288.2 52.06 60.56
5 17 2:23:53 PM 1

SpectraView Block Data



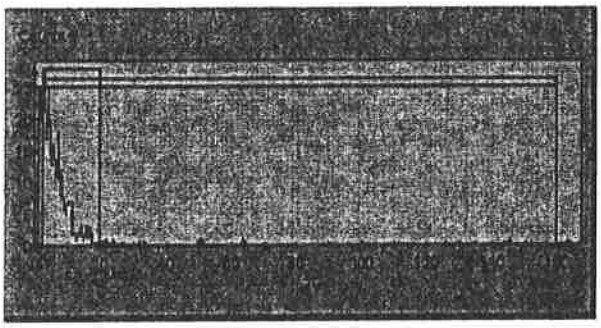
LCSD12483 6 7/21/12 45.19 301.0 47.31 56.15
6 17 2:30:38 PM 1

SpectraView Block Data



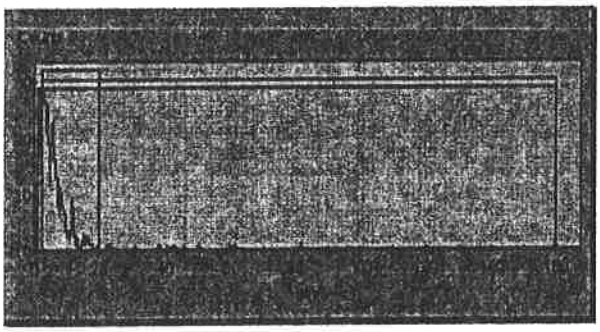
LCS12484 6 7/21/12 48.35 319.9 50.27 56.94
7 17 2:37:23 PM 1

SpectraView Block Data



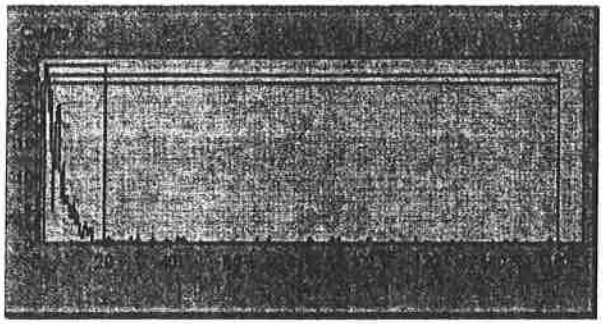
LCSD12484 6 7/21/12 51.38 309.0 53.46 59.13
8 17 2:44:09 PM 1

SpectraView Block Data



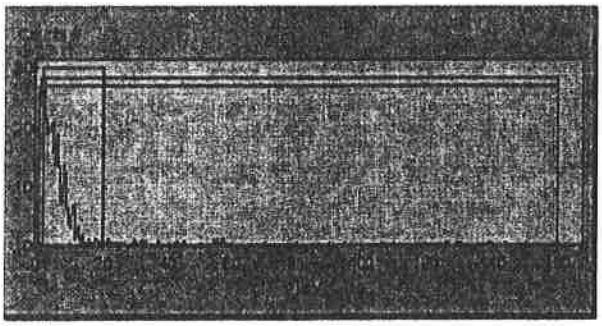
Missing vial 9.
LCSD12485 6 7/21/12 45.33 312.4 48.73 54.06
10 17 2:53:58 PM 2

SpectraView Block Data



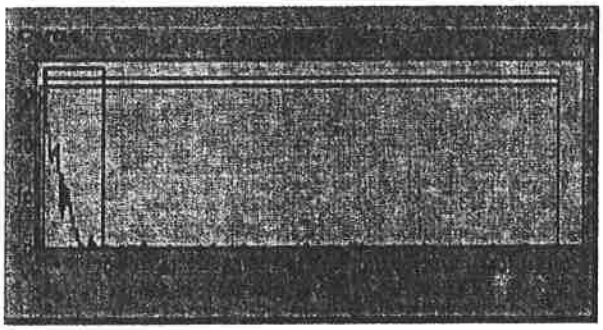
LCS12497 6 7/21/12 48.38 311.4 50.98 58.81
11 17 3:00:44 PM 1

SpectraView Block Data



LCSD12497 6 7/21/12 51.69 310.8 53.23 62.56
12 17 3:07:29 PM 1

SpectraView Block Data



Pace Analytical

Pace Analytical Services, Inc.-Pittsurgh

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
3C Daily 040	NA	Sample H3C14	9	13	7/20/12 1500	~~13~~ 12	NA	[illegible]
LCS	↓	↓	↓	↓		[illegible] 7/20/12	↓	↓
LCSD	↓	↓	↓	↓	↓	↓	↓	↓
Bkg 7/21/12	↓	Sample H3C14E	10	3	7/21/12 1355	36	↓	↓
3C 7 [illegible] C14	↓	Sample H3C14D	26	19	↓	12	↓	↓
17	↓	↓	↓	↓	↓	↓	↓	↓
33	↓	↓	↓	↓	↓	↓	↓	↓
39	↓	↓	↓	↓	↓	↓	↓	↓
49	↓	↓	↓	↓	↓	↓	↓	↓
69	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12481	↓	Sample H3C14B	17	5	7/21/12 1355	6	↓	[illegible]
LCSD 12481	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12482	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12482	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12483	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12483	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12484	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12484	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12485	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12485	↓	↓	↓	↓	↓	↓	↓	↓
LCS 12497	↓	↓	↓	↓	↓	↓	↓	↓
LCSD 12497	↓	↓	↓	↓	↓	↓	↓	↓

Run comments:

Peer Review: [illegible] 7/31/12

Low Energy Beta Sample Analysis Data

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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2 459072-BLANK for HBN 91056 [RADC/1248

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

Prep Information

Procedure 9060 I LEB **Batch** RADC/12485 **Prep Date** 7/18/2012 13:33 **Dilution**
Method EPA 906.0M **HBN** 91056 **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2860602 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 13:33 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/25/2012 23:59 **Analyst** MBT
Schedule 2860602 **File** **CC** OK F

Analyte	CC	Posted Result		Result	MDL	RDL	
Rad Chemistry	OK						
LSC Low Energy Beta	OK	-8.86U ± 3.93 (8.08)	dpm/sa	-8.86U ± 3.93 (8.08)		dpm/sa	

4 3072156081-SU-13-25

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmonth 1207076 **Location**

Prep Information

Procedure 9060 I LEB **Batch** RADC/12485 **Prep Date** 7/18/2012 13:54 **Dilution**
Method EPA 906.0M **HBN** 91056 **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860603 **Instru** NONE **CC** OK F

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

Analytical Information

Procedure 9060 I LEB **Instru** NONE **Run Date** 7/18/2012 13:54 **Dilution**
Method EPA 906.0M **Col ID** **Hold Date** 12/8/2012 23:59 **Analyst** MBT
Schedule 2860603 **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	-11.3U ± 3.72 (7.72)	dpm/sa	-11.3U ± 3.72 (7.72)		dpm/sa		

6 3072156082-SU-13-26

Type PS **Matrix** Wipe **Collected** 6/11/2012 00:01 **% Moisture**
Client RTI **WO** 3072156 **Work ID** Fort Monmonth 1207076 **Location**

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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6 3072156082-SU-13-26

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 14:15	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860604	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 14:15	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860604	**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	-10.4U ± 3.72 (7.72)	dpm/sa	-10.4U ± 3.72 (7.72)		dpm/sa		

8 3072156083-SU-13-27

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmouth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 14:36	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860605	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 14:36	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860605	**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	-6.11U ± 3.82 (7.73)	dpm/sa	-6.11U ± 3.82 (7.73)		dpm/sa		

10 3072156084-SU-13-27D

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmouth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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10 3072156084-SU-13-27D

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 14:57	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860606	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 14:57	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860606	**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	-8.01U ± 3.85 (7.89)	dpm/sa	-8.01U ± 3.85 (7.89)		dpm/sa		

12 3072156085-SU-13-28

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 15:18	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860607	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 15:18	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860607	**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	-6.96U ± 3.79 (7.72)	dpm/sa	-6.96U ± 3.79 (7.72)		dpm/sa		

14 3072156086-SU-13-29

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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14 3072156086-SU-13-29

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 15:39	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860608	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 15:39	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860608	**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	-8.18U ± 3.76 (7.72)	dpm/sa	-8.18U ± 3.76 (7.72)		dpm/sa		

16 3072156087-SU-13-30

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 16:00	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860610	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 16:00	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860610	**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	-9.03U ± 3.74 (7.71)	dpm/sa	-9.03U ± 3.74 (7.71)		dpm/sa		

18 3072156088-SU-13-31

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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18 3072156088-SU-13-31

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 16:21
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59
Schedule	2860611	**Instru**	NONE		

Dilution
Analyst MBT
CC OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 16:21
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2860611	**File**			

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.09U ± 3.79 (7.73)	dpm/sa	-7.09U ± 3.79 (7.73)		dpm/sa		

20 3072156089-SU-13-32

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 16:42
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59
Schedule	2860612	**Instru**	NONE		

Dilution
Analyst MBT
CC OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 16:42
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59
Schedule	2860612	**File**			

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-10.7U ± 3.73 (7.74)	dpm/sa	-10.7U ± 3.73 (7.74)		dpm/sa		

22 3072156090-SU-13-33

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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22 3072156090-SU-13-33

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12485	**Prep Date**	7/18/2012 17:02	**Dilution**
Method	EPA 906.0M		**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860613		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/18/2012 17:02	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860613		**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	-9.72U ± 3.73 (7.71)	dpm/sa	-9.72U ± 3.73 (7.71)		dpm/sa		

24 3072156091-SU-13-34

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

Prep Information

Procedure	9060 I LEB		**Batch**	RADC/12485	**Prep Date**	7/18/2012 17:23	**Dilution**
Method	EPA 906.0M		**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860614		**Instru**	NONE			**CC** OK F
Initial Volume	1 mL	Default	1 mL				
Final Volume,	1 mL	Default	1 mL				

Analytical Information

Procedure	9060 I LEB		**Instru**	NONE	**Run Date**	7/18/2012 17:23	**Dilution**
Method	EPA 906.0M		**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst** MBT
Schedule	2860614		**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	-9.80U ± 3.73 (7.71)	dpm/sa	-9.80U ± 3.73 (7.71)		dpm/sa		

26 3072156092-SU-13-35

Type	PS		**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**
Client	RTI		**WO**	3072156	**Work ID**	Fort Monmonth 1207076	**Location**

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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26 3072156092-SU-13-35

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860616

Batch RADC/12485
HBN 91056
Instru NONE

Prep Date 7/18/2012 17:44
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860616

Instru NONE
Col ID
File

Run Date 7/18/2012 17:44
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-9.19U ± 3.74 (7.71)	dpm/sa	-9.19U ± 3.74 (7.71)		dpm/sa		

28 3072156093-SU-13-35D

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860617

Batch RADC/12485
HBN 91056
Instru NONE

Prep Date 7/18/2012 18:05
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860617

Instru NONE
Col ID
File

Run Date 7/18/2012 18:05
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-8.19U ± 3.83 (7.84)	dpm/sa	-8.19U ± 3.83 (7.84)		dpm/sa		

30 3072156094-SU-13-36

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12485	**HBN**	91056
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

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30 3072156094-SU-13-36

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 18:26	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860618	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 18:26	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860618	**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	-7.72U ± 3.81 (7.79)	dpm/sa	-7.72U ± 3.81 (7.79)		dpm/sa		

32 3072156095-SU-13-37

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmouth 1207076	**Location**	

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 18:47	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860619	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 18:47	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860619	**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	-5.34U ± 3.94 (7.91)	dpm/sa	-5.34U ± 3.94 (7.91)		dpm/sa		

34 3072156096-SU-13-38

Type	PS	**Matrix**	Wipe	**Collected**	6/11/2012 00:01	**% Moisture**	
Client	RTI	**WO**	3072156	**Work ID**	Fort Monmouth 1207076	**Location**	

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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34 3072156096-SU-13-38

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860620

Batch RADC/12485
HBN 91056
Instru NONE

Prep Date 7/18/2012 19:08
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860620

Instru NONE
Col ID
File

Run Date 7/18/2012 19:08
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.65U ± 3.77 (7.71)	dpm/sa	-7.65U ± 3.77 (7.71)		dpm/sa		

36 3072156097-SU-13-39

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860621

Batch RADC/12485
HBN 91056
Instru NONE

Prep Date 7/18/2012 19:29
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860621

Instru NONE
Col ID
File

Run Date 7/18/2012 19:29
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-8.28U ± 3.84 (7.88)	dpm/sa	-8.28U ± 3.84 (7.88)		dpm/sa		

38 3072156098-SU-13-40

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmonth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12485	HBN	91056
Rule	9060 I LEB	Status	RE
Create Date	6/28/2012	Analyst	MBT

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38 3072156098-SU-13-40

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860622

Batch RADC/12485
HBN 91056
Instru NONE

Prep Date 7/18/2012 19:50
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860622

Instru NONE
Col ID
File

Run Date 7/18/2012 19:50
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.79U ± 3.77 (7.72)	dpm/sa	-7.79U ± 3.77 (7.72)		dpm/sa		

40 3072156099-SU-10-1

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207076

% Moisture
Location

Prep Information

Procedure 9060 I LEB
Method EPA 906.0M
Schedule 2860623

Batch RADC/12485
HBN 91056
Instru NONE

Prep Date 7/18/2012 20:11
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
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 2860623

Instru NONE
Col ID
File

Run Date 7/18/2012 20:11
Hold Date 12/8/2012 23:59

Dilution
Analyst MBT
CC OK F

Analyte	CC	Posted Result		Result	MDL	RDL	Reg. Limits Low	Reg. Limits High
Rad Chemistry	OK							
LSC Low Energy Beta	OK	-7.16U ± 3.78 (7.71)	dpm/sa	-7.16U ± 3.78 (7.71)		dpm/sa		

42 3072156100-SU-10-2

Type PS
Client RTI

Matrix Wipe
WO 3072156

Collected 6/11/2012 00:01
Work ID Fort Monmouth 1207076

% Moisture
Location

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

Quality Control Review

Batch	RADC/12485	**HBN**	91056
Rule	9060 I LEB	**Status**	RE
Create Date	6/28/2012	**Analyst**	MBT

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42 3072156100-SU-10-2

Prep Information

Procedure	9060 I LEB	**Batch**	RADC/12485	**Prep Date**	7/18/2012 20:32	**Dilution**	
Method	EPA 906.0M	**HBN**	91056	**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860624	**Instru**	NONE			**CC**	OK F

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

Analytical Information

Procedure	9060 I LEB	**Instru**	NONE	**Run Date**	7/18/2012 20:32	**Dilution**	
Method	EPA 906.0M	**Col ID**		**Hold Date**	12/8/2012 23:59	**Analyst**	MBT
Schedule	2860624	**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	-8.12U ± 3.77 (7.74)	dpm/sa	-8.12U ± 3.77 (7.74)		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 13:48	Assigned Analyst	MBT
Batch ID	12485	Earliest Due Date	07/04/2012 07:12
A-code	9060 I LEB 9060W	HBN	91056
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
	459072	BLANK	IP		QCACCOUNT	-8.86U	3.93	8.08	7/18/12 13:33
3072156	3072156081	PS	WP	6/11/2012 0:01	RTI	-11.3U	3.72	7.72	7/18/12 13:54
3072156	3072156082	PS	WP	6/11/2012 0:01	RTI	-10.4U	3.72	7.72	7/18/12 14:15
3072156	3072156083	PS	WP	6/11/2012 0:01	RTI	-6.11U	3.82	7.73	7/18/12 14:36
3072156	3072156084	PS	WP	6/11/2012 0:01	RTI	-8.01U	3.85	7.89	7/18/12 14:57
3072156	3072156085	PS	WP	6/11/2012 0:01	RTI	-6.96U	3.79	7.72	7/18/12 15:18
3072156	3072156086	PS	WP	6/11/2012 0:01	RTI	-8.18U	3.76	7.72	7/18/12 15:39
3072156	3072156087	PS	WP	6/11/2012 0:01	RTI	-9.03U	3.74	7.71	7/18/12 16:00
3072156	3072156088	PS	WP	6/11/2012 0:01	RTI	-7.09U	3.79	7.73	7/18/12 16:21
3072156	3072156089	PS	WP	6/11/2012 0:01	RTI	-10.7U	3.73	7.74	7/18/12 16:42
3072156	3072156090	PS	WP	6/11/2012 0:01	RTI	-9.72U	3.73	7.71	7/18/12 17:02
3072156	3072156091	PS	WP	6/11/2012 0:01	RTI	-9.80U	3.73	7.71	7/18/12 17:23
3072156	3072156092	PS	WP	6/11/2012 0:01	RTI	-9.19U	3.74	7.71	7/18/12 17:44
3072156	3072156093	PS	WP	6/11/2012 0:01	RTI	-8.19U	3.83	7.84	7/18/12 18:05
3072156	3072156094	PS	WP	6/11/2012 0:01	RTI	-7.72U	3.81	7.79	7/18/12 18:26
3072156	3072156095	PS	WP	6/11/2012 0:01	RTI	-5.34U	3.94	7.91	7/18/12 18:47
3072156	3072156096	PS	WP	6/11/2012 0:01	RTI	-7.65U	3.77	7.71	7/18/12 19:08
3072156	3072156097	PS	WP	6/11/2012 0:01	RTI	-8.28U	3.84	7.88	7/18/12 19:29
3072156	3072156098	PS	WP	6/11/2012 0:01	RTI	-7.79U	3.77	7.72	7/18/12 19:50
3072156	3072156099	PS	WP	6/11/2012 0:01	RTI	-7.16U	3.78	7.71	7/18/12 20:11
3072156	3072156100	PS	WP	6/11/2012 0:01	RTI	-8.12U	3.77	7.74	7/18/12 20:32

7/23/12

7/23/12

LIMS Load
Printed 7/22/2012 at 10:13 AM

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT		
Matrix	Smear	**PrepSOP1**		**Bkg CPM**	12.38
Batch ID	12485	**PrepSOP2**	n/a	**Bkg Duration**	30.0 min
Prep Start	7/16/2012 12:00	**AnalSOP1**		**Bkg Ref**	BKG 071712
Prep Finish	7/16/2012	**AnalSOP2**	n/a	**Bkg Ct Date/Time:**	7/17/2012 15:21
Act. Rpt Units	dpm	**Aliq. Rpt Units**	Sample	**Instrument ID:**	System #2

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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
459072	1.0	7/18/12 13:33	20.0	7/18/12 13:33	8.22	313.4	dpm/S	High, Evaluate
3072156081	1.0	6/11/12 0:01	20.0	7/18/12 13:54	6.81	265.7	dpm/S	Pass
3072156082	1.0	6/11/12 0:01	20.0	7/18/12 14:15	7.28	254.9	dpm/S	Pass
3072156083	1.0	6/11/12 0:01	20.0	7/18/12 14:36	9.38	269.1	dpm/S	Pass
3072156084	1.0	6/11/12 0:01	20.0	7/18/12 14:57	8.53	295.2	dpm/S	Pass
3072156085	1.0	6/11/12 0:01	20.0	7/18/12 15:18	8.96	267.1	dpm/S	Pass
3072156086	1.0	6/11/12 0:01	20.0	7/18/12 15:39	8.36	262.6	dpm/S	Pass
3072156087	1.0	6/11/12 0:01	20.0	7/18/12 16:00	7.94	259.3	dpm/S	Pass
3072156088	1.0	6/11/12 0:01	20.0	7/18/12 16:21	8.90	247.7	dpm/S	Pass
3072156089	1.0	6/11/12 0:01	20.0	7/18/12 16:42	7.16	273.1	dpm/S	Pass
3072156090	1.0	6/11/12 0:01	20.0	7/18/12 17:02	7.60	259.3	dpm/S	Pass
3072156091	1.0	6/11/12 0:01	20.0	7/18/12 17:23	7.56	258.6	dpm/S	Pass
3072156092	1.0	6/11/12 0:01	20.0	7/18/12 17:44	7.86	258.1	dpm/S	Pass
3072156093	1.0	6/11/12 0:01	20.0	7/18/12 18:05	8.42	290.1	dpm/S	Pass
3072156094	1.0	6/11/12 0:01	20.0	7/18/12 18:26	8.62	282.8	dpm/S	Pass
3072156095	1.0	6/11/12 0:01	20.0	7/18/12 18:47	9.82	297.4	dpm/S	Pass
3072156096	1.0	6/11/12 0:01	20.0	7/18/12 19:08	8.62	257.5	dpm/S	Pass
3072156097	1.0	6/11/12 0:01	20.0	7/18/12 19:29	8.39	293.7	dpm/S	Pass
3072156098	1.0	6/11/12 0:01	20.0	7/18/12 19:50	8.55	262.1	dpm/S	Pass
3072156099	1.0	6/11/12 0:01	20.0	7/18/12 20:11	8.86	258.8	dpm/S	Pass
3072156100	1.0	6/11/12 0:01	20.0	7/18/12 20:32	8.40	245.4	dpm/S	Pass

7/17/23/12 7/23/12

Pace Analytical Services
Low Energy Beta Emitters by Liquid Scintillation

Test Code	Low Energy Beta	**Analyst**	MBT
Matrix	Smear	**PrepSOP1**	0
Batch ID	12485	**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
459072	0.4697	0.0000	1.0000	-8.857	3.787	3.932	8.078	3.568	0.443	3.787	1.00
3072156081	0.4943	0.1029	0.9943	-11.334	3.461	3.716	7.720	3.410	0.424	3.461	1.00
3072156082	0.4945	0.1029	0.9943	-10.372	3.513	3.725	7.716	3.409	0.424	3.513	1.00
3072156083	0.4938	0.1030	0.9943	-6.111	3.749	3.819	7.728	3.414	0.424	3.749	1.00
3072156084	0.4836	0.1030	0.9943	-8.007	3.734	3.855	7.891	3.486	0.433	3.734	1.00
3072156085	0.4941	0.1030	0.9943	-6.962	3.701	3.793	7.723	3.411	0.424	3.701	1.00
3072156086	0.4945	0.1031	0.9943	-8.176	3.633	3.762	7.716	3.408	0.424	3.633	1.00
3072156087	0.4947	0.1031	0.9943	-9.028	3.586	3.744	7.714	3.408	0.423	3.586	1.00
3072156088	0.4936	0.1032	0.9943	-7.091	3.699	3.794	7.731	3.415	0.424	3.699	1.00
3072156089	0.4930	0.1032	0.9943	-10.650	3.511	3.733	7.741	3.419	0.425	3.511	1.00
3072156090	0.4947	0.1032	0.9943	-9.719	3.548	3.733	7.714	3.408	0.423	3.548	1.00
3072156091	0.4947	0.1033	0.9943	-9.800	3.544	3.731	7.714	3.408	0.423	3.544	1.00
3072156092	0.4946	0.1033	0.9943	-9.191	3.577	3.741	7.714	3.408	0.423	3.577	1.00
3072156093	0.4865	0.1034	0.9943	-8.187	3.700	3.827	7.844	3.465	0.431	3.700	1.00
3072156094	0.4899	0.1034	0.9943	-7.720	3.696	3.809	7.790	3.441	0.428	3.696	1.00
3072156095	0.4822	0.1034	0.9942	-5.340	3.886	3.938	7.914	3.496	0.434	3.886	1.00
3072156096	0.4946	0.1035	0.9942	-7.646	3.661	3.773	7.715	3.408	0.424	3.661	1.00
3072156097	0.4845	0.1035	0.9942	-8.283	3.712	3.841	7.876	3.479	0.432	3.712	1.00
3072156098	0.4946	0.1036	0.9942	-7.789	3.654	3.770	7.716	3.408	0.424	3.654	1.00
3072156099	0.4947	0.1036	0.9942	-7.157	3.687	3.784	7.714	3.408	0.423	3.687	1.00
3072156100	0.4931	0.1036	0.9942	-8.118	3.648	3.774	7.738	3.418	0.425	3.648	1.00

7/23/12

7/23/12

Quality Control Sample Performance Assessment

RCDU Upload

Analyst:	RMK		
Date:	7/31/2012	**Method:**	EPA 906.0M
Worklist:	12485	**SOP:**	
Matrix:	Filter	**MB Sample ID:**	459072

Method Blank Assessment

Analyte	Activity	1.96 Sig Unc.	MDC	Critical Value	Flag	Assessment
LSC Low Energy Beta	-8.8570	3.9320	8.0780	3.56800		

Laboratory Control Sample Assessment

	LCS	LCSD	LCS	LCSD	LCS	LCSD
Analyte:	LSC Low Energy Beta					
Count Date:	7/28/12 15:29	7/21/12 14:53				
Spike I.D.:	09-009LEB	09-009LEB				
Spike Concentration (DPM/Sample):	1184.758	1184.916				
Volume Used (mL):	0.100	0.100				
Aliquot Volume (L, g, F):	1.000	1.000				
Target Conc. (DPM/Sample, g, F):	118.476	118.492				
1.96 Sigma Uncertainty (Calculated):	2.136	2.137				
Result (DPM/Sample, g, F):	89.431	97.327				
1.96 Sigma Unc:	13.859	17.200				
% Recovery:	75.48%	82.14%				
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.:	LCS12485					
Duplicate Sample I.D.	LCSD12485					
Sample Result (DPM/Sample, g, F):	89.4310					
1.96 Sigma Unc:	13.8590					
nple Duplicate Result (DPM/Sample, g, F):	97.3270					
Duplicate Sample 1.96 Sigma Unc.	17.2000					
Either results below MDC?	NO					
Relative Percent Difference:	8.46%					
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: 12485

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%

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\20120717_1521.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

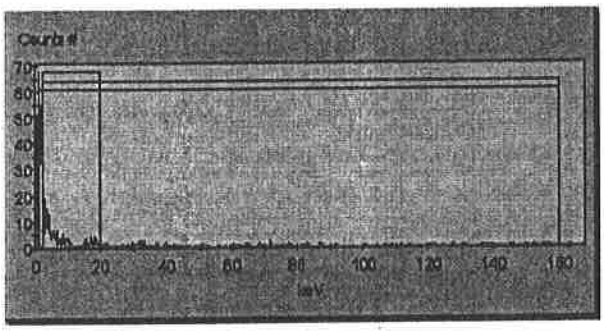
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 16.79 Date Processed: 7/16/12 11:47:23 PM

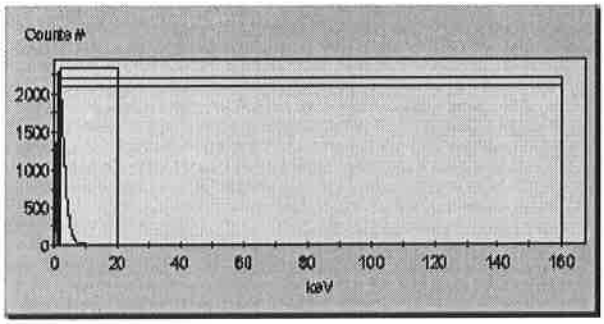
14C Chi Square: 13.77 Date Processed: 7/16/12 11:47:23 PM
3H E^2/B (1-18.6 keV): 295.03 Date Processed: 7/16/12 11:47:23 PM
14C E^2/B (4-156 keV): 557.95 Date Processed: 7/16/12 11:47:23 PM
3H Efficiency (0-18.6 keV): 62.44 Date Processed: 7/16/12 11:47:23 PM
14C Efficiency (0-156 keV): 95.66 Date Processed: 7/16/12 11:47:23 PM
IPA Background Date Processed: 7/16/12 11:47:23 PM
3H Background CPM (0-18.6 keV): 12.98 Date Processed: 7/16/12 11:47:23 PM
14C Background CPM (0-156 keV): 19.95 Date Processed: 7/16/12 11:47:23 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/16/12 11:47:23 PM: 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 LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
		BKG 071712	30	7/17/12	5.04	273.6	8.41	12.38	W
1	16	3:21:58 PM	33						

SpectraView Block Data

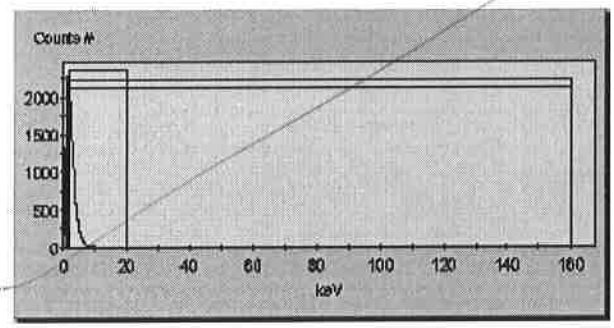




NB Dh 7/31/12

			LCSD	20	7/18/12	399.94	319.1	401.79	620.34
23	5	1:12:25 PM	0						

SpectraView Block Data

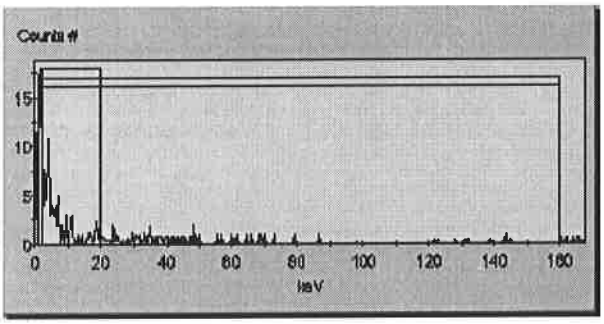


454072

			MB	20	7/18/12	4.05	313.4	6.53	8.22
24	5	1:33:29 PM	8						

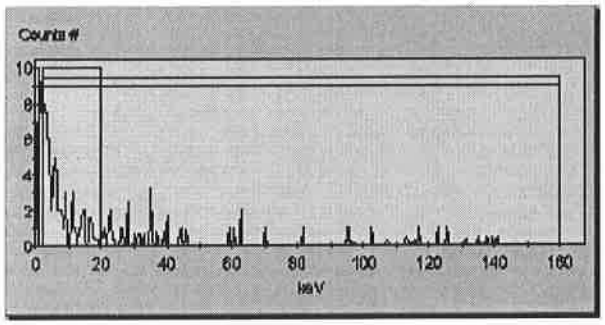
Dh 7/31/12

SpectraView Block Data



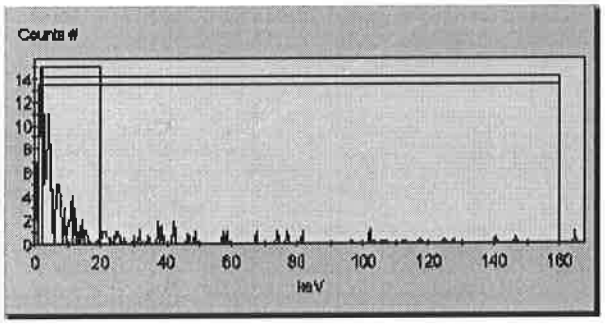
			3072156081	20	7/18/12	3.91	265.7	5.86	6.81
25	9	1:54:57 PM	5						

SpectraView Block Data



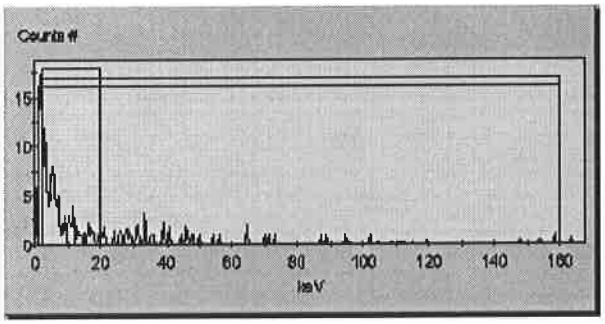
3072156082 20 7/18/12 4.63 254.9 6.08 7.28
26 9 2:15:46 PM 6

SpectraView Block Data



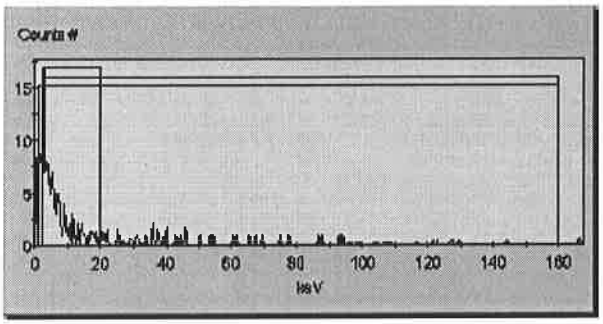
3072156083 20 7/18/12 5.68 269.1 8.18 9.38
27 9 2:36:38 PM 4

SpectraView Block Data



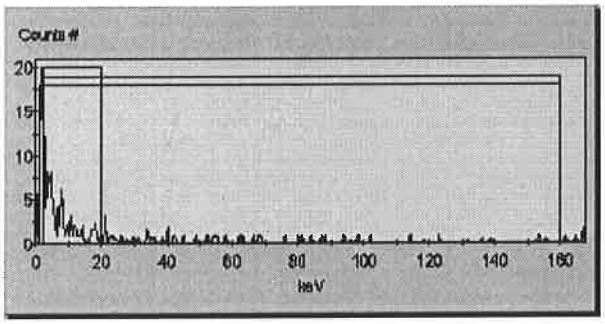
3072156084 20 7/18/12 5.56 295.2 7.58 8.53
28 9 2:57:32 PM 5

SpectraView Block Data



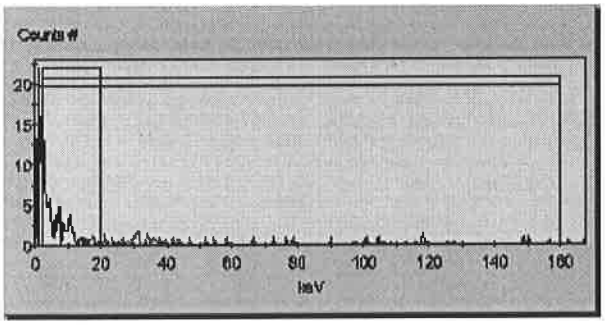
3072156085 20 7/18/12 5.14 267.1 7.56 8.96
29 9 3:18:28 PM 5

SpectraView Block Data



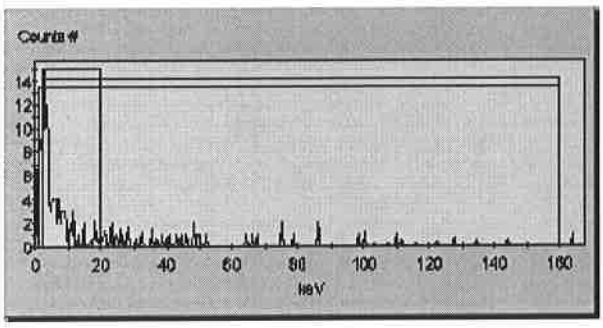
3072156086 20 7/18/12 4.49 262.6 6.56 8.36
30 9 3:39:21 PM 5

SpectraView Block Data



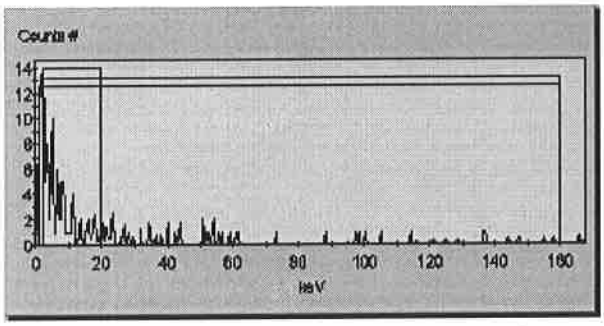
3072156087 20 7/18/12 4.88 259.3 7.04 7.94
31 9 4:00:12 PM 5

SpectraView Block Data



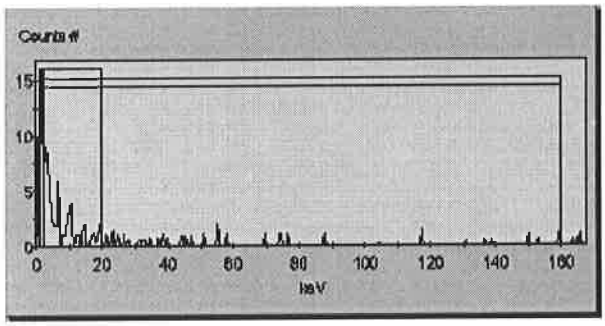
3072156088 20 7/18/12 5.28 247.7 7.75 8.90
32 9 4:21:03 PM 5

SpectraView Block Data



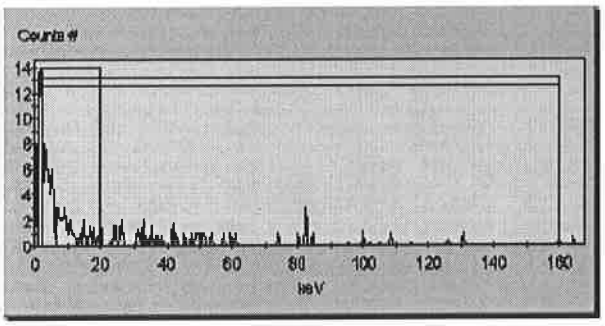
3072156089 20 7/18/12 3.94 273.1 5.56 7.16
33 9 4:42:04 PM 6

SpectraView Block Data



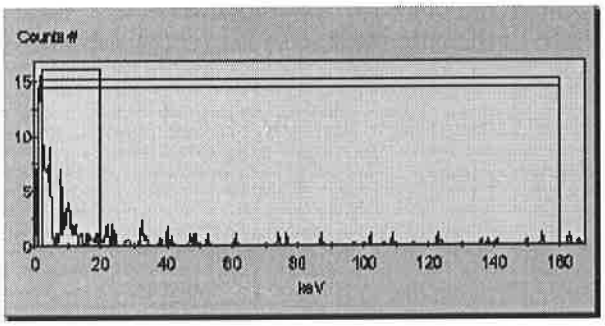
3072156090 20 7/18/12 4.09 259.3 6.25 7.60
34 9 5:02:58 PM 4

SpectraView Block Data



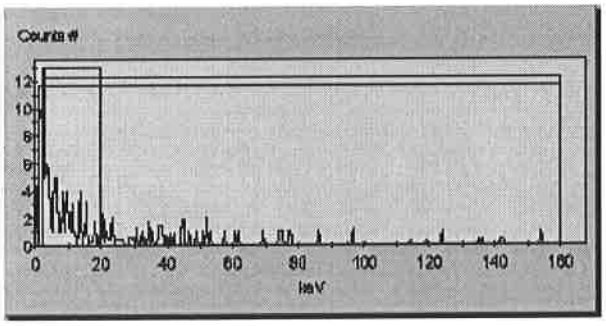
3072156091 20 7/18/12 4.59 258.6 6.36 7.56
35 9 5:23:49 PM 5

SpectraView Block Data



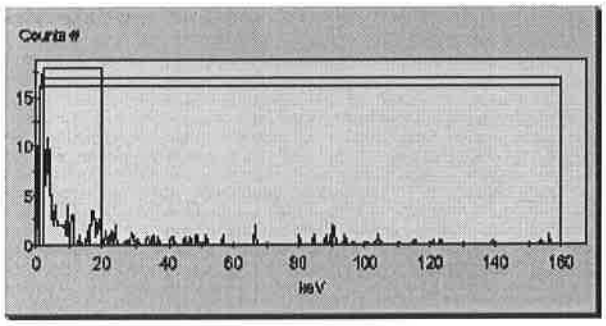
3072156092 20 7/18/12 4.49 258.1 7.01 7.86
36 9 5:44:42 PM 6

SpectraView Block Data



3072156093 20 7/18/12 4.90 290.1 6.82 8.42
37 40 6:05:45 PM 5

SpectraView Block Data



		3072156094	20	7/18/12	5.04	282.8	7.27	8.62
38	40	6:26:38 PM 5						
		3072156095	20	7/18/12	6.11	297.4	8.37	9.82
39	40	6:47:35 PM 10						
		3072156096	20	7/18/12	4.76	257.5	7.17	8.62
40	40	7:08:39 PM 5						
		3072156097	20	7/18/12	5.33	293.7	7.54	8.39
41	40	7:29:34 PM 5						
		3072156098	20	7/18/12	4.50	262.1	7.10	8.55
42	40	7:50:28 PM 5						
		3072156099	20	7/18/12	5.08	258.8	7.31	8.86
43	40	8:11:19 PM 3						
		3072156100	20	7/18/12	4.24	245.4	6.75	8.40
44	40	8:32:10 PM 5						
		LCS	20	7/18/12	333.65	281.0	335.98	546.98
45	40	8:53:02 PM 0						
		LCSD	20	7/18/12	375.81	300.2	378.26	604.11
46	40	9:13:55 PM 0						

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Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
3072156078	12484	SwipeH3C14.0	5	6	7/17/12 1545	20	uA	[illegible]
079								
080								
LCS								
LCSD								
MB 459072	12485		~~4~~ 5 [illegible] 7/17/12	~~15~~ 6				
3072156081			9	[illegible] 7/17/12				
082								
083								
084								
085								
086								
087								
088								
089								
090								
091								
092								
093			40					
094								
095								
096								
097								
098								

Run comments:

Peer Review:

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

Pace Analytical™

Pace Analytical Services, Inc.-Pittsburgh

Liquid Scintillation Counter Run Log System 2

Logbook ID: 6-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
5072156099	12485	Supe H3C14	40	15	7/17/12 1545	20	NA	QL
↓ 100	↓	↓	↓	↓	↓	↓	↓	↓
LCS								
LCSD	↓	↓	↓	↓	↓	↓	↓	↓
BKG	C-14 Cal	Supe H3C14	13	9	4/18/12 1700	3	NA	JL
C14 20120718-N1	↓	↓	↓	↓	↓	↓	↓	↓
N2								
N3								
N4								
N5								
N6								
N7								
N8								
N9								
↓ N10	↓	↓	↓	↓	↓	↓	↓	↓
BKG	H-3 Cal	Supe H3C14	31	10	~~4/18/12~~ 7/19/12 0400 NA 7/19/12	5	NA	JL
H3 20120718-N1	↓	↓	↓	↓	↓	↓	↓	↓
- N2								
- N3								
- N4								
- N5								
- N6								
- N7								
↓ - N8	↓	↓	↓	↓	↓	↓	↓	↓

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 8.26
Bkg Duration 30.0 min
Bkg Ref BKG7/21/2012
Bkg Ct Date/Time: 7/21/2012 16:46
Instrument ID: System #2

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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	6.0				dpm/S	Low, Reprep
LCS12481	1.0	7/21/12 13:56	6.0	7/21/12 13:56	58.29	319.0	dpm/S	High, Evaluate
LCSD12481	1.0	7/21/12 14:03	6.0	7/21/12 14:03	55.60	305.5	dpm/S	High, Evaluate
LCS12482	1.0	7/21/12 14:10	6.0	7/21/12 14:10	59.00	254.8	dpm/S	Pass
LCSD12482	1.0	7/21/12 14:17	6.0	7/21/12 14:17	54.73	307.6	dpm/S	High, Evaluate
LCS12483	1.0	7/21/12 14:23	6.0	7/21/12 14:23	60.56	288.2	dpm/S	Pass
LCSD12483	1.0	7/21/12 14:30	6.0	7/21/12 14:30	56.15	301.0	dpm/S	High, Evaluate
LCS12484	1.0	7/21/12 14:37	6.0	7/21/12 14:37	56.94	319.9	dpm/S	High, Evaluate
LCSD12484	1.0	7/21/12 14:44	6.0	7/21/12 14:44	59.13	309.0	dpm/S	High, Evaluate
LCSD12485	1.0	7/21/12 14:58	6.0	7/21/12 14:53	54.06	312.4	dpm/S	High, Evaluate
LCS12497	1.0	7/21/12 15:05	6.0	7/21/12 15:00	58.81	311.4	dpm/S	High, Evaluate
LCSD12497	1.0	7/21/12 15:12	6.0	7/21/12 15:07	62.56	310.8	dpm/S	High, Evaluate
LCS12485	1.0	7/28/12 15:29	12.0	7/28/12 15:29	51.27	299.3	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	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	-0.0696	0.0000	1.0000	118.714	-14.781	16.497	-84.905	-30.480	-8.466	-8.466	1.00
LCS12481	0.4643	0.0000	1.0000	107.761	13.344	18.527	12.724	4.568	1.269	13.344	1.00
LCSD12481	0.4764	0.0000	1.0000	99.373	12.709	17.378	12.401	4.452	1.237	12.709	1.00
LCS12482	0.4945	0.0000	1.0000	102.607	12.602	17.566	11.946	4.289	1.191	12.602	1.00
LCSD12482	0.4747	0.0000	1.0000	97.892	12.657	17.220	12.445	4.468	1.241	12.657	1.00
LCS12483	0.4874	0.0000	1.0000	107.296	12.948	18.205	12.120	4.351	1.209	12.948	1.00
LCSD12483	0.4797	0.0000	1.0000	99.823	12.681	17.394	12.314	4.421	1.228	12.681	1.00
LCS12484	0.4634	0.0000	1.0000	105.061	13.219	18.214	12.750	4.577	1.271	13.219	1.00
LCSD12484	0.4735	0.0000	1.0000	107.425	13.174	18.377	12.475	4.478	1.244	13.174	1.00
LCSD12485	0.4706	0.0000	1.0000	97.327	12.692	17.200	12.554	4.507	1.252	12.692	1.00
LCS12497	0.4715	0.0000	1.0000	107.218	13.197	18.376	12.530	4.498	1.249	13.197	1.00
LCSD12497	0.4720	0.0000	1.0000	115.043	13.585	19.309	12.516	4.493	1.248	13.585	1.00
LCS12485	0.4809	0.0000	1.0000	89.431	8.691	13.759	8.491	3.368	0.662	8.691	1.00

7/31/12

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%

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\20120721_1645.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): 30.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

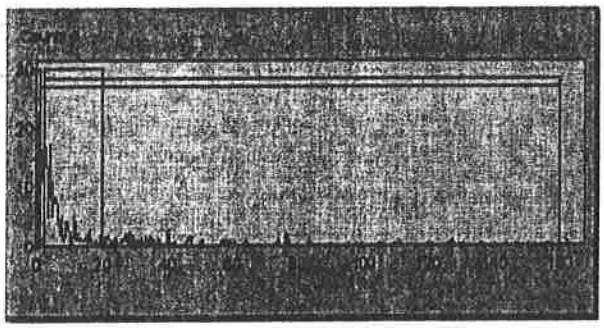
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.13 Date Processed: 7/21/12 4:45:38 PM

14C Chi Square: 18.58 Date Processed: 7/21/12 4:45:38 PM
3H E^2/B (1-18.6 keV): 308.22 Date Processed: 7/21/12 4:45:38 PM
14C E^2/B (4-156 keV): 562.59 Date Processed: 7/21/12 4:45:38 PM
3H Efficiency (0-18.6 keV): 62.32 Date Processed: 7/21/12 4:45:38 PM
14C Efficiency (0-156 keV): 95.60 Date Processed: 7/21/12 4:45:38 PM
IPA Background Date Processed: 7/21/12 4:45:38 PM
3H Background CPM (0-18.6 keV): 12.50 Date Processed: 7/21/12 4:45:38 PM
14C Background CPM (0-156 keV): 19.42 Date Processed: 7/21/12 4:45:38 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/21/12 4:45:38 PM: 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	7/21/2012	30 7/21/12	4.92	291.6	6.89	8.26	
1	10	4:46:13 PM	15						

SpectraView Block Data



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_H3_C14_B
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\20120721_1356.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14_B\12480.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14_B.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): 6.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

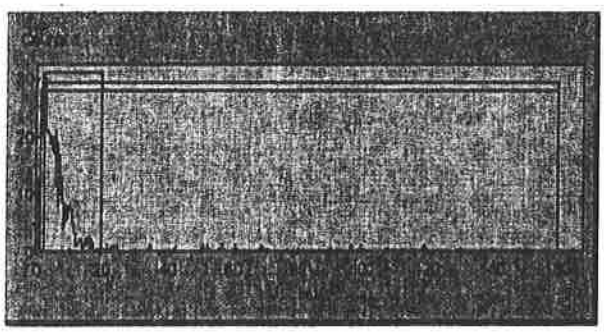
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 15.53 Date Processed: 7/20/12 8:36:50 PM
14C Chi Square: 11.84 Date Processed: 7/20/12 8:36:50 PM

3H E^2/B (1-18.6 keV): 311.34 Date Processed: 7/20/12 8:36:50 PM
14C E^2/B (4-156 keV): 556.50 Date Processed: 7/20/12 8:36:50 PM
3H Efficiency (0-18.6 keV): 61.98 Date Processed: 7/20/12 8:36:50 PM
14C Efficiency (0-156 keV): 94.97 Date Processed: 7/20/12 8:36:50 PM
IPA Background Date Processed: 7/20/12 8:36:50 PM
3H Background CPM (0-18.6 keV): 12.27 Date Processed: 7/20/12 8:36:50 PM
14C Background CPM (0-156 keV): 20.03 Date Processed: 7/20/12 8:36:50 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/20/12 8:36:50 PM: WARNING: Questionable H3 Efficiency value - Please rerun quench curves
== End of IPA Errors and Warnings for Last Aquired Data Per Parameter ==

Cycle 1 Results

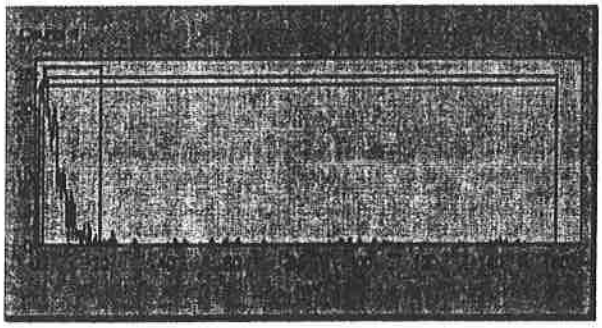
S#	PID	SMPL_ID TIME LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
1	17	LCS12481 1:56:51 PM 1	6	7/21/12	47.38	319.0	49.79	58.29	

SpectraView Block Data



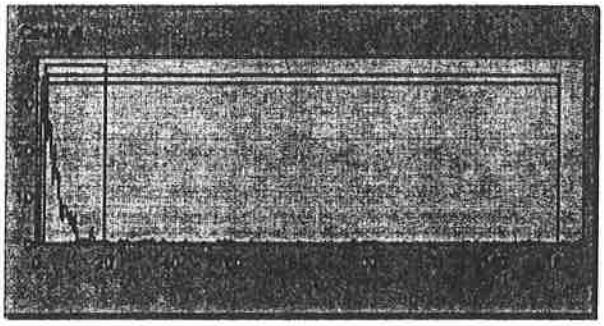
2	17	LCSD12481 2:03:37 PM 1	6	7/21/12	46.04	305.5	49.27	55.60	

SpectraView Block Data



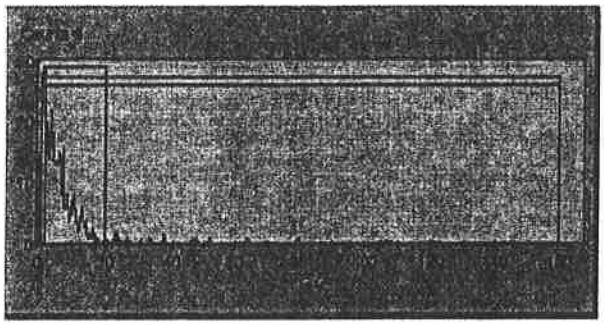
3	17	LCS12482 2:10:23 PM 1	6	7/21/12	48.40	254.8	51.17	59.00	

SpectraView Block Data



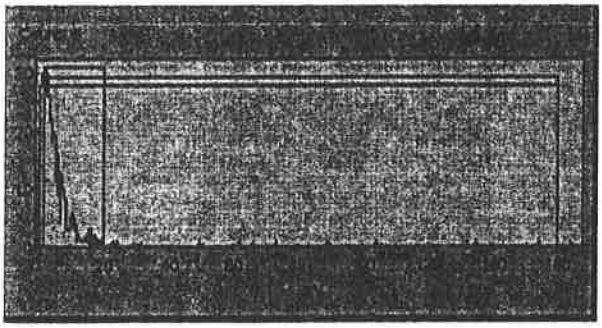
LCSD12482 6 7/21/12 43.13 307.6 45.73 54.73
4 17 2:17:08 PM 1

SpectraView Block Data



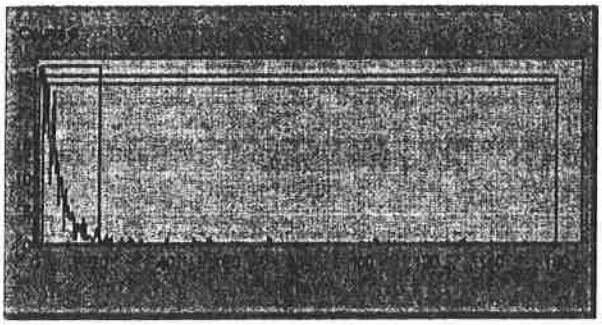
LCS12483 6 7/21/12 49.79 288.2 52.06 60.56
5 17 2:23:53 PM 1

SpectraView Block Data



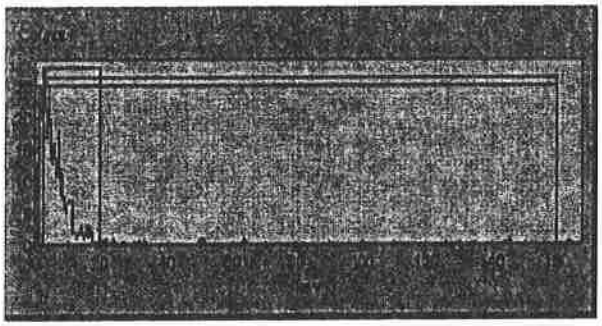
LCSD12483 6 7/21/12 45.19 301.0 47.31 56.15
6 17 2:30:38 PM 1

SpectraView Block Data



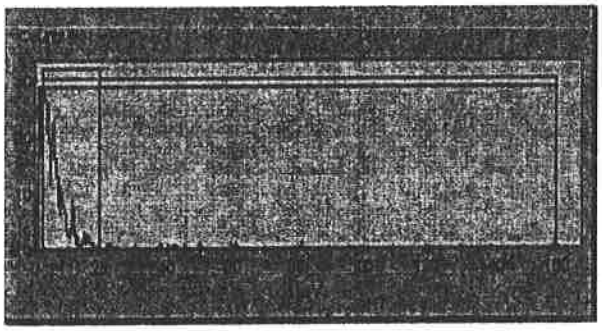
LCS12484 6 7/21/12 48.35 319.9 50.27 56.94
7 17 2:37:23 PM 1

SpectraView Block Data



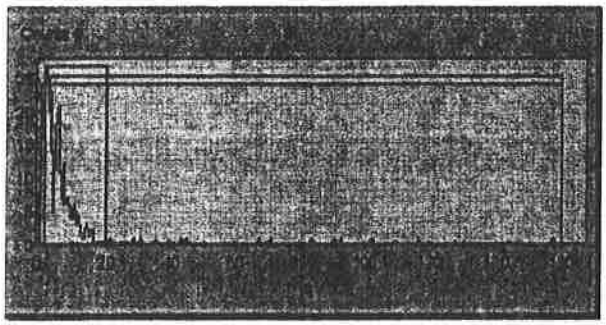
LCSD12484 6 7/21/12 51.38 309.0 53.46 59.13
8 17 2:44:09 PM 1

SpectraView Block Data



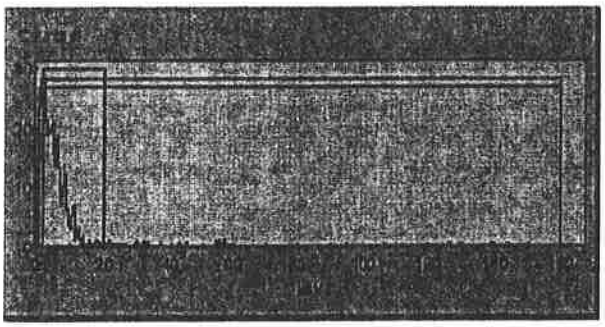
Missing vial 9.
LCSD12485 6 7/21/12 45.33 312.4 48.73 54.06
10 17 2:53:58 PM 2

SpectraView Block Data



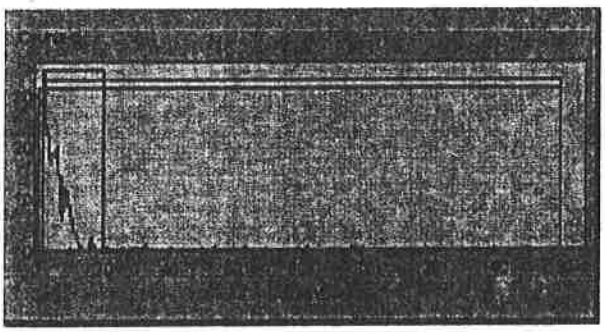
LCS12497 6 7/21/12 48.38 311.4 50.98 58.81
11 17 3:00:44 PM 1

SpectraView Block Data



LCSD12497 6 7/21/12 51.69 310.8 53.23 62.56
12 17 3:07:29 PM 1

SpectraView Block Data



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_H3_C14
Raw Results Path: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\20120728_1515.results
RTF File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\H3cpm.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\SWIPE_H3_C14\12476.txt
Assay File Name: C:\Packard\TriCarb\Assays\SWIPE_H3_C14.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): 12.00
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: Off

Regions	LL	UL
A	2.0	20.0
B	2.0	160.0
C	1.0	160.0

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				

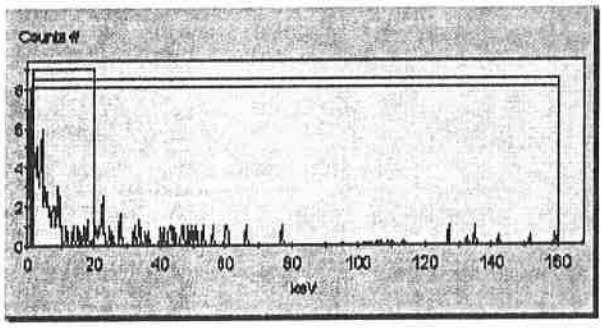
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 18.77 Date Processed: 7/28/12 3:15:37 PM
14C Chi Square: 19.53 Date Processed: 7/28/12 3:15:37 PM

3H E^2/B (1-18.6 keV): 309.97 Date Processed: 7/28/12 3:15:37 PM
14C E^2/B (4-156 keV): 578.03 Date Processed: 7/28/12 3:15:37 PM
3H Efficiency (0-18.6 keV): 62.71 Date Processed: 7/28/12 3:15:37 PM
14C Efficiency (0-156 keV): 95.37 Date Processed: 7/28/12 3:15:36 PM
IPA Background Date Processed: 7/28/12 3:15:37 PM
3H Background CPM (0-18.6 keV): 12.62 Date Processed: 7/28/12 3:15:37 PM
14C Background CPM (0-156 keV): 19.20 Date Processed: 7/28/12 3:15:37 PM
3H Calibration DPM: 278800
3H Reference Date: 12/5/07
14C Calibration DPM: 135100
===== IPA Errors and Warnings for Last Aquired Data Per Parameter ====
7/28/12 3:15:37 PM: 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	TIME	SMPL_ID LUM	C.T.	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
			BKG	12	7/28/12	4.47	319.7	7.39	8.47	
1	6	3:16:11 PM	5							

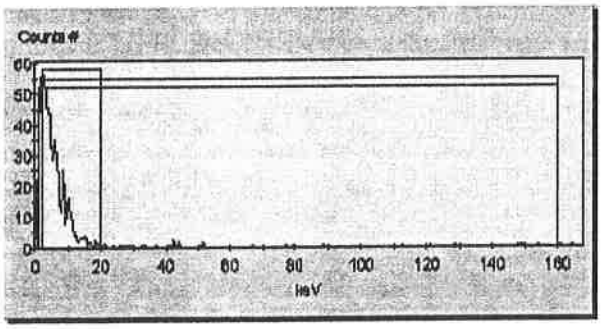
SpectraView Block Data



13485

			LCS	12	7/28/12	49.13	299.3	51.27	58.19	
2	6	3:29:02 PM	1							

SpectraView Block Data



7/31/12

Pace Analytical

Pace Analytical Services, Inc.-Pittsurgh

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
30[illegible]0490	NA	Supe H3C14	9	13	7/20/12 1502	~~13~~ 12	NA	[illegible]
LCS						OA 7/21/12		
LCSD								
BKG 7/21/12		Supe H3C14E	10	3	7/21/12 1355	36		
30[illegible]C14		Supe H3C14D	26	19		12		
17								
33								
34								
49								
69								
LCS 12481		Supe H3C14B	17	5	7/21/12 1355	6		[illegible]
LCSD 12481								
LCS 12482								
LCSD 12482								
LCS 12483								
LCSD 12483								
LCS 12484								
LCSD 12484								
LCS 12485								
LCSD 12485								
LCS 12497								
LCSD 12497								

Run comments:

Peer Review: [illegible] 9/3/12

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

Pace Analytical

Pace Analytical Services, Inc.-Pittsurgh

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
30730069008	12701	Pu241 CAR-H3	16	6	7-26-12 15:20	120	N/A	CAL
LCS12701	↓	↓	↓	↓	↓	↓	↓	↓
LCSD12701	↓	↓	↓	↓	↓	↓	↓	↓
BKG	N/A	Super-H3-14	6	2	7/27/12 1030	12	N/A	CJ
LW 15485	↓	↓	↓	↓	↓	↓	↓	↓

Run comments: ______

Peer Review: ______

Low Energy Beta Calibration Documentation

Low Energy Beta Smear Calibration Narrative
Applicable to Methods: Smear Counting
Date: 7/19/2012
Calibration Source Prep Analyst: JLK
Calibration Calculations by: JLK

Calibration Description Details:

Five (5.0) mL of DI water was added to each of ten glass liquid scintillation vials with reflective lids. Portions of Analytics SRM 81012-493 were added to each of the calibration vials in the masses documented in the table below. Fifteen (15) ml of Ultima Gold LLT liquid scintillation cocktail was added to each vial. The vials were capped and shaken gently to mix the contents. The caps were carefully removed, and varying volumes of nitromethane were added to the calibration vials in the quantities documented in the table. The calibration sources were capped and shaken to mix, wiped clean with methanol and DI water. A label was attached to the outside of each vial to be consistent with the sample vials.

The samples were counted on each of Pace's 2 liquid scintillation counters, and calculations were performed to determine the ratio of detector Ni-63 efficiency versus quench number (TSIE) for each detector system.

Cal Source ID	Mass (g) of Ni-63 Standard 81012-493	Volume of Nitromethane Added (uL)
Ni63-20120719-N1	0.1019	0
Ni63-20120719-N2	0.0995	10
Ni63-20120719-N3	0.0998	20
Ni63-20120719-N4	0.1040	30
Ni63-20120719-N5	0.1014	40
Ni63-20120719-N6	0.1015	50
Ni63-20120719-N7	0.2060	60
Ni63-20120719-N8	0.2034	70
Ni63-20120719-N9	0.2044	80
Ni63-20120719-N10	0.2036	90

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

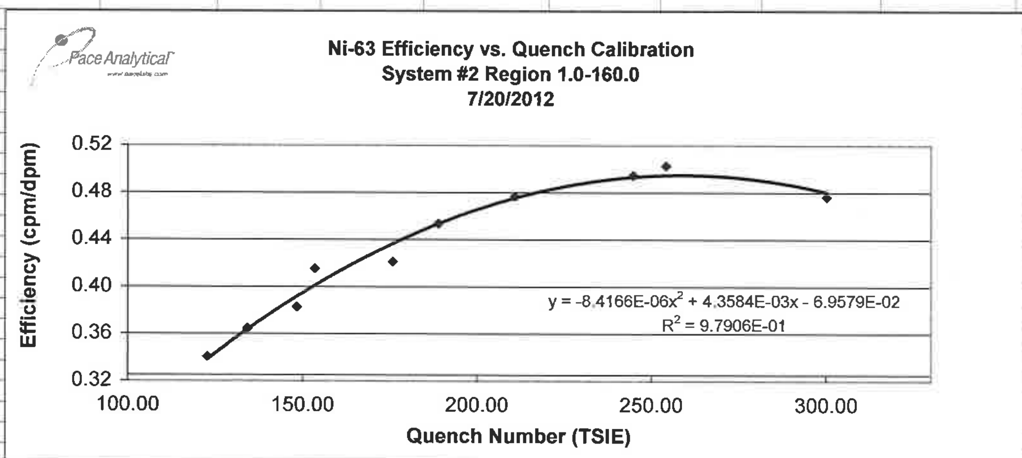
Date: 11-6-09

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Nickel-63 Efficiency Quench Curve Calibration

Analyst:	JLK	Detector System Settings	
Calibration Date:	7/20/2012	Count Mode:	Low Level
Ni-63 Standard:	81012-493	Background Subtract:	Off
Standard Bq on Reference Date	3456	Low CPM Threshold:	Off
Standard Total Mass (g)	4.99626	Static Controller:	On
System ID:	System #2	Region:	1.0-160.0
Background:	7.83		

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



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

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				

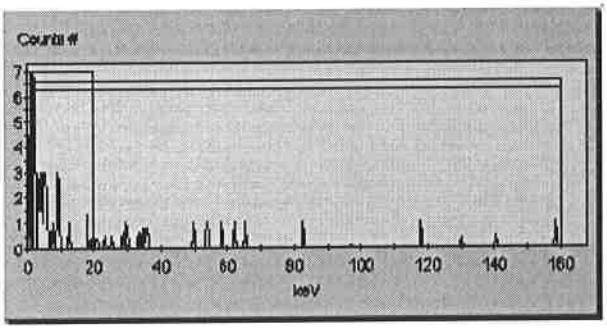
Instrument Block Data
Machine=2900
Version=1.10
426001
MODEL=2900
VERSION=1.10
SERIAL=426001
IPA Block Data
Software Version IC: 2.11
Software Version EC: 1.31
Instrument Model: 2900
Instrument Serial Number: 426001
3H Chi Square: 15.92 Date Processed: 7/19/12 11:40:58 AM

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

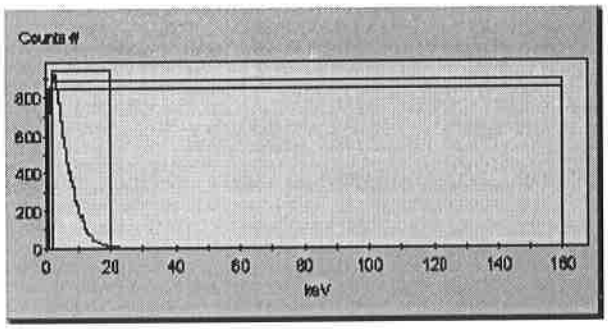
S#	PID	SMPL_ID / TIME	C.T. / LUM	DATE	CPMA	tSIE	CPMB	CPMC	MESSAGES
			BKG	8	7/20/12	4.34	317.6	6.45	7.83	
1	5	8:59:56 AM	8						

SpectraView Block Data



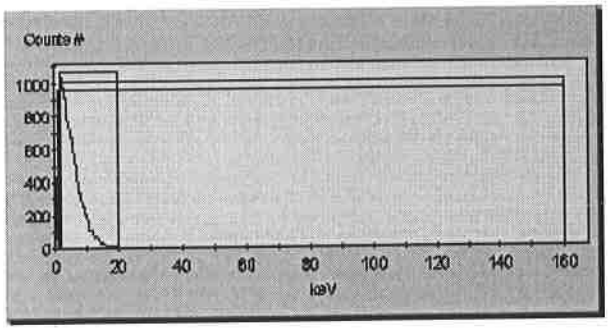
		NI63-20120719-N1	6	7/20/12	1763.93	300.1	1771.83	2020.85	
2	5	9:08:46 AM	0						

SpectraView Block Data



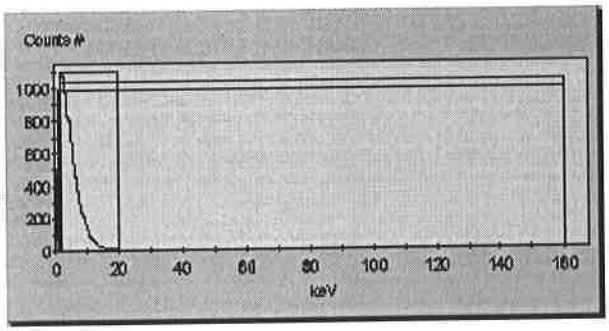
		NI63-20120179-N2	6	7/20/12	1813.72	254.2	1818.36	2082.61	
3	5	9:15:40 AM	0						

SpectraView Block Data



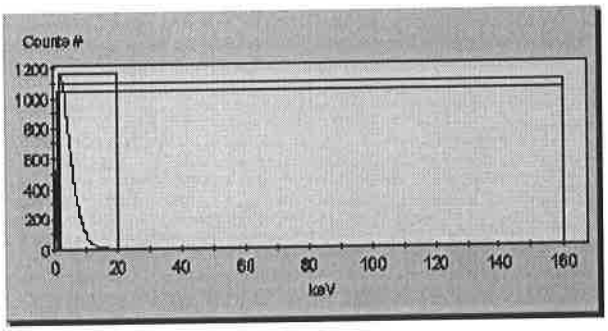
NI63-20120719-N3 6 7/20/12 1748.50 244.9 1754.08 2055.91
4 5 9:22:22 AM 0

SpectraView Block Data



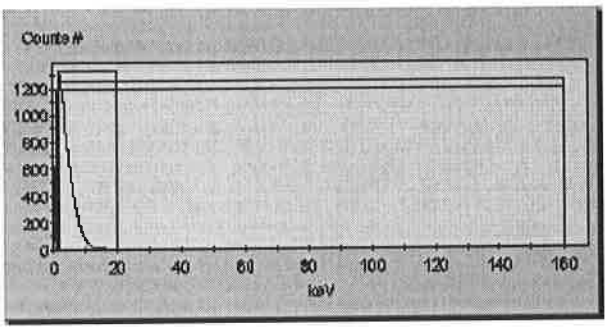
NI63-20120719-N4 6 7/20/12 1753.03 210.9 1756.32 2065.34
5 5 9:29:11 AM 0

SpectraView Block Data



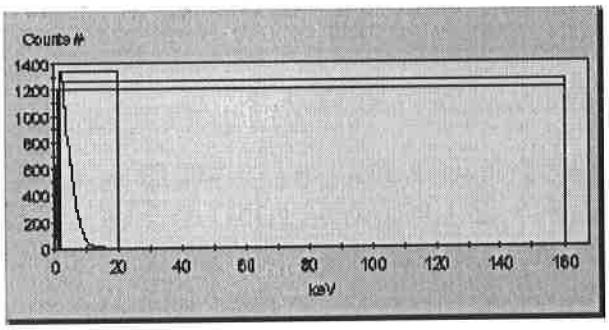
NI63-20120719-N5 6 7/20/12 1573.37 188.9 1575.74 1915.89
6 5 9:35:58 AM 0

SpectraView Block Data



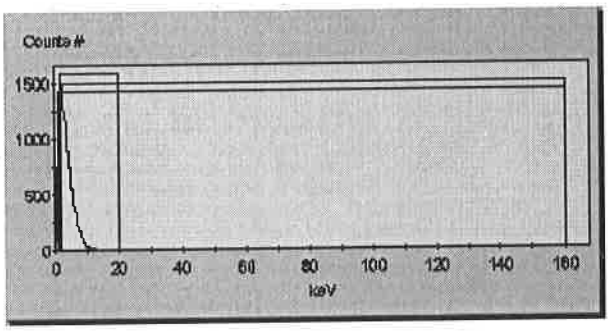
NI63-20120719-N6 7 7/20/12 1456.33 175.8 1458.71 1781.94
7 5 9:43:13 AM 0

SpectraView Block Data



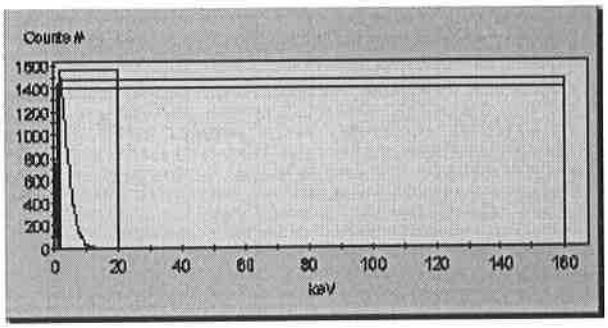
NI63-20120719-N7 3 7/20/12 2818.32 153.5 2821.87 3557.22
8 5 9:50:58 AM 0

SpectraView Block Data



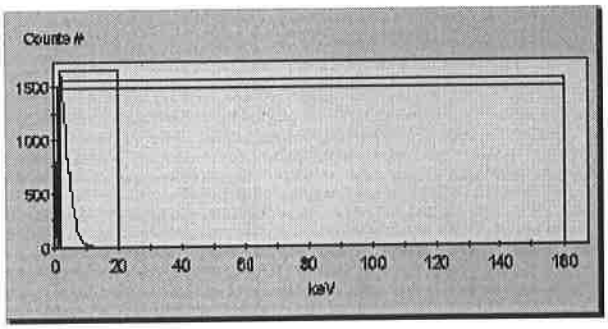
NI63-20120719-N8 4 7/20/12 2526.96 148.3 2529.45 3239.40
9 5 9:55:12 AM 0

SpectraView Block Data



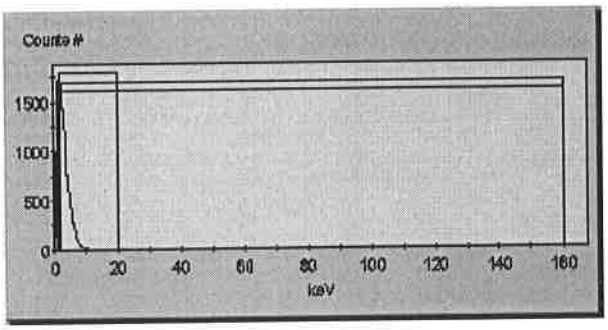
NI63-20120719-N9 4 7/20/12 2389.66 134.2 2392.64 3100.91
10 5 9:59:47 AM 0

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								
PKG								

Run comments: _____

Peer Review: _____

Nickel-63 Efficiency Quench Curve Calibration

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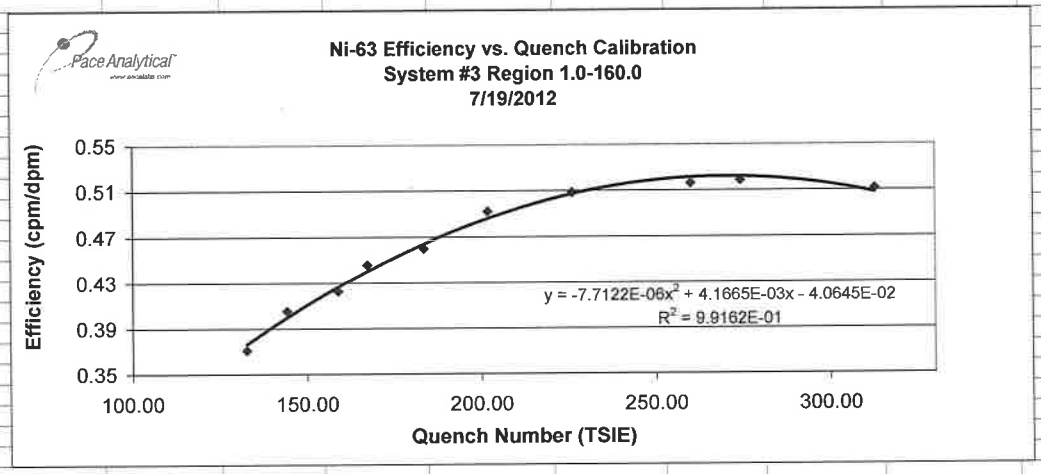
Analyst:	JLK	Detector System Settings	
Calibration Date:	7/19/2012	Count Mode:	Low Level
Ni-63 Standard:	81012-493	Background Subtract:	Off
Standard Bq on Reference Date	3456	Low Level Count Mode:	On
Standard Total Mass (g)	4.99626	Luminescence Correction:	On
System ID:	System #3	Region:	1.0-160.0
Background:	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
Om 7/20/12

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	Swipe H3C14	5	1	7/19/12 1330	7	NA	
N3								
N4								
N5								
N6								
N7								
N8								
N9								
N10								
MB		Swipe 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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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