



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS
RESEARCH LABORATORY
GULF ECOLOGY DIVISION
1 SABINE ISLAND DRIVE • GULF BREEZE, FL 32561-5299
850-934-9200

NMS02

March 14, 2006

U.S. Nuclear Regulatory Commission
ATTN: Sheryl Villar
475 Allendale Rd.
King of Prussia, PA 19406-1415

OFFICE OF
RESEARCH AND DEVELOPMENT

Dear Ms. Villar

03032959

On September 16, 2004, the U.S. EPA Gulf Ecology Division was devastated by Hurricane Ivan. An abbreviated radiological survey was performed one week after the storm with no significant findings. However, the damage to Buildings 15, 16 and 17 was so severe that a decision was made to demolish the aforementioned buildings. We are requesting these buildings be decommissioned and removed from NRC License 09-10672-03.

Attached is a comprehensive Radiological Status Survey Report, dated March 8, 2006, for Buildings 15, 16 and 17. In summary, there was no evidence of radioactive contamination nor an increased gamma exposure rate in the subject areas. We respectfully request permission to remove Buildings 15, 16 and 17 from our NRC License and proceed with the scheduled demolition.

If you have questions or comments, please contact Clay Peacher, Facility Manager, 850-934-9239 or Becky Hemmer, RSO, 850-934-9323.

Sincerely,

William H. Benson

Dr. William H. Benson
Division Director
U.S. EPA Gulf Ecology Division

2006 MAR 16 AM 10:42

RECEIVED
REGION 1

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138579

NMCS/RCM MATERIALS-002

U.S EPA Gulf Ecology Division

Status Survey Report

March 13, 2006

SUBJECT

Nuclear Regulatory Commission Materials License 09-10672-03, Decommissioning of Buildings 15, 16 and 17, U.S. EPA Gulf Ecology Division, Gulf Breeze, Florida

ATTACHMENTS

- (1) Radiological Survey Protocol, U.S. EPA NAREL
- (2) Certificates of Calibration for the Exposure Rate Instruments, dated August 19, 2005
- (3) Contamination Wipe Test Survey Results for Gulf Breeze Sample Test, March 8, 2006
- (4) Sketches of Subject Buildings and Testing Locations

BACKGROUND

On September 16, 2004, the U.S. EPA Gulf Ecology Division was devastated by Hurricane Ivan. Buildings 15, 16 and 17 were flooded and received major structural damage. Due to the extensive damage and after regulatory clearance, the aforementioned buildings will be demolished. The land area will be graded and sodded. It should be noted that all three buildings were not being used for radioisotope work at the time of devastation nor have been used for radioisotope work in several years.

Building 15 was built in 1970 from concrete block and wood trusses. It has 1761 square feet of conditioned space. Over the years, it has been used as a laboratory, office building and most recently (past 5 years) as storage space. Two rooms and 1 transition area have been identified as potential areas for radioactivity. C-14 bicarbonate was used in these rooms, more than 10 years ago. P-32 and P-33 could have been used (prior to record keeping) in these rooms but should not be a concern due to their short half-lives. Part of the roof is missing.

Building 16 was built in 1977 from corrugated metal. It has 577 square feet of conditioned space. Building has been used as a laboratory and most recently (the past 7 years) as an office building. Historically, no radiation work was performed in Building 16. The liquid scintillation counter was stored but not operated in this building more than 10 years ago. Building was flooded during the recent hurricane.

Building 17 was built in 1952 from concrete block and wood trusses. It has 352 feet of conditioned space. Building has been used as a laboratory and most recently (the past 5 years) as an office building. One room has been identified as where all radioisotope work was performed. Specifically, the fume hood in this room is where the radioisotope work took place. H-3 was used in the hood. P-32 and P-33 could have been used (prior to record keeping) but should not be a concern due to their short half-lives. Roof received extensive damage during the recent hurricane.

TECHNIQUES AND INSTRUMENTATION

Attachment (1) Provides survey protocol, the type of equipment used and a brief summary of the on-site results.

The Survey Team used E600/SHP SN 363, 43-89 Beta Probe, SN 145388 and E600/SHP, SN 530, 43-89 Beta Probe, SN 1455390 Exposure Rate Instrumentation. Attachment (2) is the Certificate of Calibration for each instrument

Attachment (3) describes the method and equipment used to analyze the smear swipes.

QUALIFICATIONS

- A. The following individuals performed the sampling and testing at the Gulf Ecology Division:

Sam Poppell

- Health Physicist for USEPA
- 26 years of Radiation Experience
- 13 years as RSO or Deputy RSO
- On NAREL NRC License as User
- EPA Radiological Emergency Response Team Commander

MS in Health Physics

BS in Nuclear Medicine

BS in Biology

AS in Natural Sciences and Mathematics

1988 - Present	HP for USEPA
1987 - 1988	Georgia Tech HP Program
1985 - 1987	Alabama Radiation Health Program
1982 - 1985	Nuclear Medicine Program

David Kappelman

- Nuclear Engineer USEPA
- EPA Radiological Emergency Response Team Deputy Commander

BS EEE (Electrical Electronic Engineer)

11 years experience with USEPA

8 years experience with DoD (US Navy)

- B. Attachment (3) reveals the qualifications of the individuals that interpreted the results of the smear testing.

DISCOVERY

The following is time sequenced information obtained during the radiological survey. Attachment (4) reflects sketches of subject buildings, suspect equipment and their associated test locations.

February 14, 2006

- 0900 **Gamma Exposure Rate Survey** Equipment: E600 Kit #5, SN 363 SPA 6 SN 530, Source Check 230uR/hr, Cs137 Source 703025. Background check was performed away from the suspect buildings with a reading of 1.6 uR/hr.
- 0930 **Building 15.** The outside gamma exposure rate survey ranged from 1.3 - 4 uR/hr and the inside gamma exposure rate survey ranged from 1.0 - 1.7 uR/hr.
- 1100 **Building 16.** The outside gamma exposure rate survey ranged from 1.7 - 2.2 uR/hr and the inside gamma exposure rate survey ranged from 1.2 - 2.0 uR/hr.
- 1115 **Building 17.** The outside gamma exposure rate survey ranged from 2.1 - 3.0 uR/hr and the inside gamma exposure rate survey ranged from 1.8 - 4.8 uR/hr.
- 1200 **100% Beta Survey of Building 17** Using E600, SN 363, 43-89 Beta Probe SN 145388. Source Check 34K, Recheck at the end of day - 34K; Background Reading 2.0Kdpm per 100 cm2.

<u>Location</u>	<u>Range</u> (per 100 cm2)
Floor	1.8K - 3.0Kdpm
Countertop	2.0K - 2.8Kdpm
Fume Hood Bottom	1.8K - 3.0Kdpm
Fume Hood Back	2.3K - 3.0Kdpm
Fume Hood (R)	2.0K - 3.0Kdpm

Fume Hood (L)	2.4K - 3.0Kdpm
East Landing	3Kdpm (highest reading)
West Landing	2.4Kdpm (highest reading)
Inside Room Doorway	2Kdpm (highest reading)
Shower Drain	2Kdpm (highest reading)
Sink	2.3Kdpm(highest reading)
Floor in Front of Sink	2.6Kdpm (highest reading)

Walls, Up to 1 Meter - Highest Reading

West wall	2.7Kdpm
South wall	2.5Kdpm
East wall	2.0Kdpm
North wall	2.0Kdpm

1630 Secured for the Day

February 15, 2006

1100 Prepared Building 15 for 100% Beta Survey

1245 **100% Beta Survey of Building 15** Used E600, SN 383, 43-89 Beta Probe SN 145390, Source Check 40K - Reading at the end of the day - 38K; Background Reading 2.0Kdpm per 100 cm².

2nd Instrument - E600, SN 363, 43-89 Beta Probe SN 145388, Source Check 34K - Reading at the end of the day - 34K, Background Reading 2.0Kdpm per 100 cm².

Building 15 Lab - Narrow Lab

<u>Location</u>	<u>Range</u> (per 100 cm ²)
Floor	1.8 - 3Kdpm
Countertops	1.8 - 3Kdpm
Walls Above Countertops	1.8 - 3Kdpm
Walls up to 1 meter from floor	1.8 - 3Kdpm
Cabinets and Under Cabinet Surfaces	1.8 - 3Kdpm

Building 15 Fume Hood in Narrow Lab

<u>Location</u>	<u>Range</u> (per 100 cm ²)
Inside Hood	1.8 - 3Kdpm
Outside Hood	1.8 - 3Kdpm

Building 15 Transition Area from Narrow Lab to Growth Lab

<u>Location</u>	<u>Range</u> (per 100 cm2)
Floor	1.8 - 3Kdpm
Walls up to 1 meter from floor	1.6 - 2.8Kdpm

Building 15 Growth Lab

<u>Location</u>	<u>Range</u> (per 100 cm2)
Floor	1.6 - 3Kdpm
Sink	1.6 - 2.7Kdpm
Countertops	2 - 3Kdpm
Walls above Countertops up to 18"	1.6 - 2.7Kdpm
Walls up to 1 meter above floor	1.6K - 2.9Kdpm
Cabinets and Under Cabinet Surfaces	1.6 - 2.6Kdpm

1700 Secured for the Day

February 16, 2006

0830 **Building 15 Smear Sampling** Prepared Smear Sample media. See Attachment (4) for detailed smear sample locations.

0930 Building 15 - Narrow Lab

<u>Location</u>	<u>Number of swipes</u>
Fume Hood	4
Countertops	10
Floor	11
Walls - 1 meter up from floor and 18" up from cabinets	10
SUBTOTAL	35

Building 15 - Transition Area from Narrow Lab to Growth Lab

<u>Location</u>	<u>Number of swipes</u>
Floor	20
Wall, Up 1 meter from the floor	10
SUBTOTAL	30

Building 15 - Growth Lab

<u>Location</u>	<u>Number of swipes</u>
Countertops	10
Floor	10
Walls - 1 meter up from floor and 18" up from cabinets	10
Sink	2
SUBTOTAL	32

BUILDING 15 TOTAL

97

1230 **Building 17 Smear Sampling**

<u>Location</u>	<u>Number of swipes</u>
Horizontal Pipe - Fume Hood Exhaust	1
HEPA Filter to Fume Hood Exhaust	2
Fume Hood (Inside)	17
Fume Hood Switch	1
Floor	15
Shower Drain	1
Sink Drain	1
Countertop	10
Walls - 1 meter up from floor and 18" up from cabinets	13
Light switch to room	<u>1</u>
Building 17 TOTAL	62

1530 Prepared Samples for Shipping to Research Triangle Park, NC for analysis by the Radiation Safety Officer.

RESULTS

Attachment (1) provides a brief summary of the on-site results from the radiological survey. In summary, there were no areas with increased gamma exposure rate or evidence of beta contamination.

Attachment (3) provides the results and interpretation of the smear samples provided. In summary, all samples were indistinguishable from the blank or background sample at the 95% confidence level. Therefore, the sample sets did not detect any removable radioactive contamination.

US EPA NAREL Radiological Survey Protocol For US EPA GED Lab Decommissioning

Scope

This procedure describes the methods and techniques used by the US EPA (Environmental Protection Agency) NAREL (National Air and Radiation Environmental Laboratory) personnel to be employed when performing surface contamination surveys and conducting swipe/smear sampling as part of characterization/final status surveys for decommissioning of survey units for the US EPA Gulf Ecology Division (GED) that require radiological clearance prior to demolition.

The purposes of the described survey and sampling effort are:

- To determine the extent and magnitude of contamination (if any) on building and equipment surfaces.
- To ensure that levels of personnel protective equipment (PPE) worn during characterization and any subsequent remediation activities are adequate for the protection of workers based on any identified radiological conditions.
- To ensure the establishment of appropriate site controls, as necessary for communicating the risk to any identified radiological condition.

Applicability

This procedure applies to the characterization/final status survey and sampling activities being conducted by US EPA NAREL personnel to survey units requiring clearance as identified by the GED Facility Manager.

Responsibilities

- The GED Facility Manager will supply swipes and liquid scintillation vials to be used for swipe/smear sampling.
- The GED Facility Manager will coordinate/facilitate sample shipment and any laboratory analyses of samples collected with the US EPA RTP (Research Triangle Park) RSO (Radiation Safety Officer).
- The US EPA NAREL personnel will select and provide proper survey equipment and supply copies of equipment calibration documents of survey instrumentation.

- The US EPA NAREL personnel will conduct 100 percent beta surveys of survey units in the buildings to be decommissioned as directed by the GED Facility Manager based on site history and radiological use.
- The US EPA NAREL personnel will conduct swipe sampling of the survey units after review of the survey results. Swipe samples will be packaged by US EPA NAREL personnel in order to provide Chain of Custody transfer of the samples.

Equipment and Materials

- Preprinted Survey unit maps and data forms (plan view of area, items or equipment to be surveyed).
- Minimum 10 foot metal rule tape measure
- Fine Tip indelible marker (black ink)
- Swipe Smears (as requested by laboratory performing analyses)
- Liquid Scintillation vials (as request by laboratory performing analyses)
- Ziploc or equivalent bags
- Sample Labels
- Chain of Custody Seals
- Chain of Custody Forms
- Tyvek pants
- Steel Toed Boots
- Hard Hats (available for use if required)
- Eberline E-600 with Ludlum 43-89 probe calibrated for beta measurements

Prerequisites

Ensure that all personnel are provided a safety briefing by the GED Facility Manager prior to commencing work.

Ensure Survey/Sampling Team is provided proper PPE for area to be surveyed based on area postings and any GED site control requirements.

Beta Scan Surveys

The Beta Scan surveys will include 100 percent coverage of floors and countertops. A wall/vertical surface survey will be conducted 3 foot up from any floor and 18" up from any countertop that is adjacent to a horizontal surface being surveyed.

The Eberline E-600 Scalar ratemeter coupled to a Ludlum Model 43-89 alpha/beta probe was selected for performing beta scan surveys. This instrument configuration was selected for its general applicability for this type of work. The instrument was operated in the Beta only operating mode to provide the highest efficiency for identifying elevated beta activity concentrations.

Verify the instrument has been calibrated and that the instrument has been response checked to respond to beta radiation.

With the instrument in operation and held at a height not to exceed 2 cm above the area to be surveyed begin scanning surfaces at a rate of speed not to exceed 2 in/sec. Using the audible response of the instrument, stop over areas of increased activity to determine if any area exceeds twice the background/reference count rate/activity. Annotate on survey forms any area exceeding twice background otherwise annotate the range of gross beta concentration in dpm/100cm². Mark the area of increased activity by circling the area with tape/paint/indelible marker, etc. and on the Sampling Survey Map.

NOTE: Areas marked will be used to determine swipe sampling locations.

Beta Swipe/Smear Sampling

- Smear sampling will be conducted after review of the 100 percent Beta Scan Surveys to determine sampling points. Additional swipe survey locations will be randomly selected to provide a minimum of 30 swipe/smear samples per survey unit.
- Survey/Sampling Team member performing swipe/smear sampling will change gloves at each survey unit at a minimum, and as needed thereafter.
- At each sampling point, remove a single smear and wipe the smear over an area of approximately 100 cm² (wipe area of approximately 4 inches by 4 inches or an "S" pattern approximately 16" long).
- Once the swipe/smear is performed, place the swipe in a Liquid Scintillation Vial (LSV) with 1 ml of de-ionized (DI) water. Annotate the sampling location and number on the cap of the liquid scintillation vial and the Swipe/Smear Survey Map.
- Place the liquid scintillation vial in a LSV tray.
- After all swipes are taken and placed in LSVs, package the tray for shipment by encasing the LSV tray in plastic wrap to prevent tampering and attach a Chain of Custody Seal(s) to the wrapped tray that will provide evidence of sample tampering.
- Fill out a Chain of Custody Transfer Form for every 10 or less sample locations per survey unit.

Gamma Scan Survey

A general area gamma scan survey will be conducted in and around the buildings to be demolished. General area exposure rate readings (μR/hr) will be taken and annotated on a Sampling Survey Map.

The Eberline E-600 Scalar rate meter coupled to a Eberline SPA-6 gamma probe was selected for performing general area gamma surveys. This instrument configuration was selected for its general applicability for this type of work. The instrument combination was selected for use in determining if any area had elevated gamma exposure rates $\mu\text{R/hr}$.

Waste Management

Waste streams associated with survey and sampling activities include use PPE (Tyvek and Gloves). If not suspected of being contaminated, these items will be disposed of as refuse/trash. If contamination is suspect, based on survey data, PPE will be bagged as potentially radioactive waste and turned over to the US EPA GED RSO for proper disposition.

Documentation of Surveys and Swipe/Smear Samples

Once a survey is completed, all survey data forms and maps will be reviewed by the sampling team. Upon completion of the review, each individual survey package, one for each survey unit, will be presented to the US EPA Gulf Ecology Division Facility Manager as a documented record of survey and sampling performed. The GED Facility Manager will be provided all chain of custody forms for shipment of Swipe/Smears requiring analyses.

Summary of NAREL Personnel Actions

Gamma exposure rate survey measurements indicated no areas with increased gamma exposure rate above background. Background Gamma exposure rates ranged from 1-5 $\mu\text{R/hr}$. These measurements are consistent with the normal gamma background exposure rate for this area. A minimal detectable gamma exposure rate of twice the background readings is easily distinguishable with this instrument.

Beta contamination survey measurements indicated no areas with increased beta contamination above background. Background Beta contamination was 2,000 $\text{dpm}/100\text{cm}^2$. Beta contamination survey measurements ranged from 1600 – 3000 $\text{dpm}/100\text{cm}^2$. These measurements are consistent with the normal beta activity concentration measurements in the area. A minimum detectable beta contamination survey of twice the background is easily distinguishable with this instrument.

Swipe samples taken were shipped to US EPA Research Triangle Park (RTP), NC for analysis by the Radiation Safety Officer (RSO).

No radioactive waste was generated as a result of these surveys.

ATTACHMENT (2)

CERTIFICATE OF CALIBRATION

(EXPOSURE RATE INSTRUMENT)

#4



RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61
Hebron, Connecticut 06248
(860) 228-0721 Fax (860) 228-4402

Customer and Contact: USEPA/NAREL, Attn: Spencer Hamil (334) 270-3475

Customer Address: 540 South Morris Avenue, Montgomery, AL 36115-2601

Inst. Mfr. & Model Eberline Model E600

Inst. Type Smart Meter

Inst. s/n 00383

Det. Mfr. & Model Eberline SHP290

Det. Type High Range G-M

Det. s/n 00112

Cal. Date 19 August 2005

Due Date 19 August 2006

Cal. Interval 1 year

Environmental conditions: Temperature: 70°F Relative Humidity 48% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

- | | | | |
|--|---|---|--|
| <input checked="" type="checkbox"/> Contamination survey | <input checked="" type="checkbox"/> Battery check | <input checked="" type="checkbox"/> Slow response check | <input checked="" type="checkbox"/> Det. volts 547 Vdc |
| <input checked="" type="checkbox"/> Mechanical check | <input checked="" type="checkbox"/> Audio check | <input checked="" type="checkbox"/> Window operation | |
| <input checked="" type="checkbox"/> Meter zero | <input checked="" type="checkbox"/> Reset check | <input checked="" type="checkbox"/> Plateau check | |
| <input checked="" type="checkbox"/> Geotropism check | <input checked="" type="checkbox"/> Fast response check | <input checked="" type="checkbox"/> Alarm set | <input checked="" type="checkbox"/> Input sens. 10 mV |

☒ Pulse generator s/n 94926

☐ Oscilloscope s/n 171-04928

☒ Voltmeter s/n 57410002

☐ HV Readout (2 points) Ref./Inst. _____ V/ _____ V Ref./Inst. _____ V/ _____ V

Comments:

S/N of source used for precision check #6 Isotope Cs-137 Dedicated Source? ☐ Yes ☒ No
Reading #1 14.54 mR/h Reading #2 15.85 mR/h Reading #3 15.02 mR/h Mean 15.14 mR/h
Precision: ☒ $\pm < 10\%$ ☐ $\pm 10-20\%$ ☐ Out of tolerance

Range	Reference Calibration Point	Instrument Indication
n/a	0.021 mR/h	20.8 μ R/h
n/a	0.052 mR/h	51.9 μ R/h
n/a	0.173 mR/h	172.7 μ R/h
n/a	0.904 mR/h	918 μ R/h
n/a	1.39 mR/h	1.427 mR/h
n/a	8.29 mR/h	8.36 mR/h
n/a	13.9 mR/h	13.99 mR/h
n/a	79.1 mR/h	81.0 mR/h
n/a	136 mR/h	133.4 mR/h
n/a	738 mR/h	736 mR/h
n/a	1770 mR/h	1.776 R/h
n/a	4369 mR/h	4.25 R/h
n/a	*647,000 cpm \approx 10 R/h	9.73 R/h
n/a	*1,510,000 cpm \approx 40 R/h	38.91 R/h
*With dead time compensation		

Over 5 R/h ranges were calibrated electronically.

Sources used: ¹³⁷Cesium 750 mCi s/n KR-6244 and KR-6250, and ¹³⁷Cesium 750 μ Ci s/n 163.

RSA Laboratories Log ID# 9970. Calibration points calculated to center of detector volume unless otherwise specified. Instrument indicates within $\pm 10\%$ of calibration points unless otherwise indicated. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorff

Date: 19 August 2005

CERTIFICATE OF CALIBRATION (COUNT-RATE INSTRUMENT)



RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61
Hebron, Connecticut 06248
(860) 228-0721 Fax (860) 228-4402

Customer and Contact: USEPA/NAREL, Attn: Spencer Hamil (334) 270-3475

Customer Address: 540 South Morris Avenue, Montgomery, AL 36115-2601

Inst. Mfr. & Model Eberline Model E600

Inst. Type Smart Meter

Inst. s/n 00383

Det. Mfr. & Model Eberline SHP360

Det. Type Smart Pancake G-M

Det. s/n 00197

Cal. Date 19 August 2005

Due Date 19 August 2006

Cal. Interval 1 year

Environmental conditions: Temperature: 70°F Relative Humidity 48% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

☒ Contamination survey

☒ Battery check

☒ Slow response check

☒ Det. volts 900 Vdc

☒ Mechanical check

☒ Audio check

☐ Window operation

☒ Meter zero

☒ Reset check

☐ Plateau check

☒ Geotropism check

☒ Fast response check

☒ Alarm set

☒ Input sens. 10 mV

☒ Pulse generator s/n 94926

☐ Oscilloscope s/n 171-04928

☒ Voltmeter s/n 57410002

☐ HV Readout (2 points) Ref./Inst. _____ V/ _____ V Ref./Inst. _____ V/ _____ V

Comments: Pulse calibration performed with dead time set at zero. Dead time set to 100 μ sec. Replaced 3 size "C" batteries.

S/N of source used for precision check #6

Isotope Cs-137

Dedicated Source? ☐ Yes ☒ No

Reading #1 29,200 cpm

Reading #2 28,700 cpm

Reading #3 29,600 cpm

Mean 29,167 cpm

Precision: ☒ $\pm < 10\%$ ☐ $\pm 10-20\%$ ☐ Out of tolerance

Range Multiplier	Reference Calibration Point	Instrument Indication
n/a	800,000 cpm	799 kcpm
n/a	200,000 cpm	200 kcpm
n/a	80,000 cpm	79.9 kcpm
n/a	20,000 cpm	20.0 kcpm
n/a	8,000 cpm	8.00 kcpm
n/a	2,000 cpm	2.00 kcpm
n/a	800 cpm	800 cpm
n/a	200 cpm	200 cpm
n/a	80 cpm	80 cpm
n/a	20 cpm	20 cpm

All ranges calibrated electronically.

Local background (cpm) \approx 44

Range Multiplier	Cal. Source Used (isotope and S/N)	Source Activity (dpm)	Instrument Reading (cpm)	4 π Instrument Efficiency (%)
1 min. count	C-14 #4456	202,100	8090	3.98
1 min. count	Pm-147 #5381	6,765	500	6.74
1 min. count	Tc-99 #D702	23,064	2880	12.30
1 min. count	Cs-137 #2886	17,436	3530	19.99
1 min. count	Cl-36 #D700	23,598	4980	20.92
1 min. count	Sr/Y-90 #D711	43,597	9550	21.80

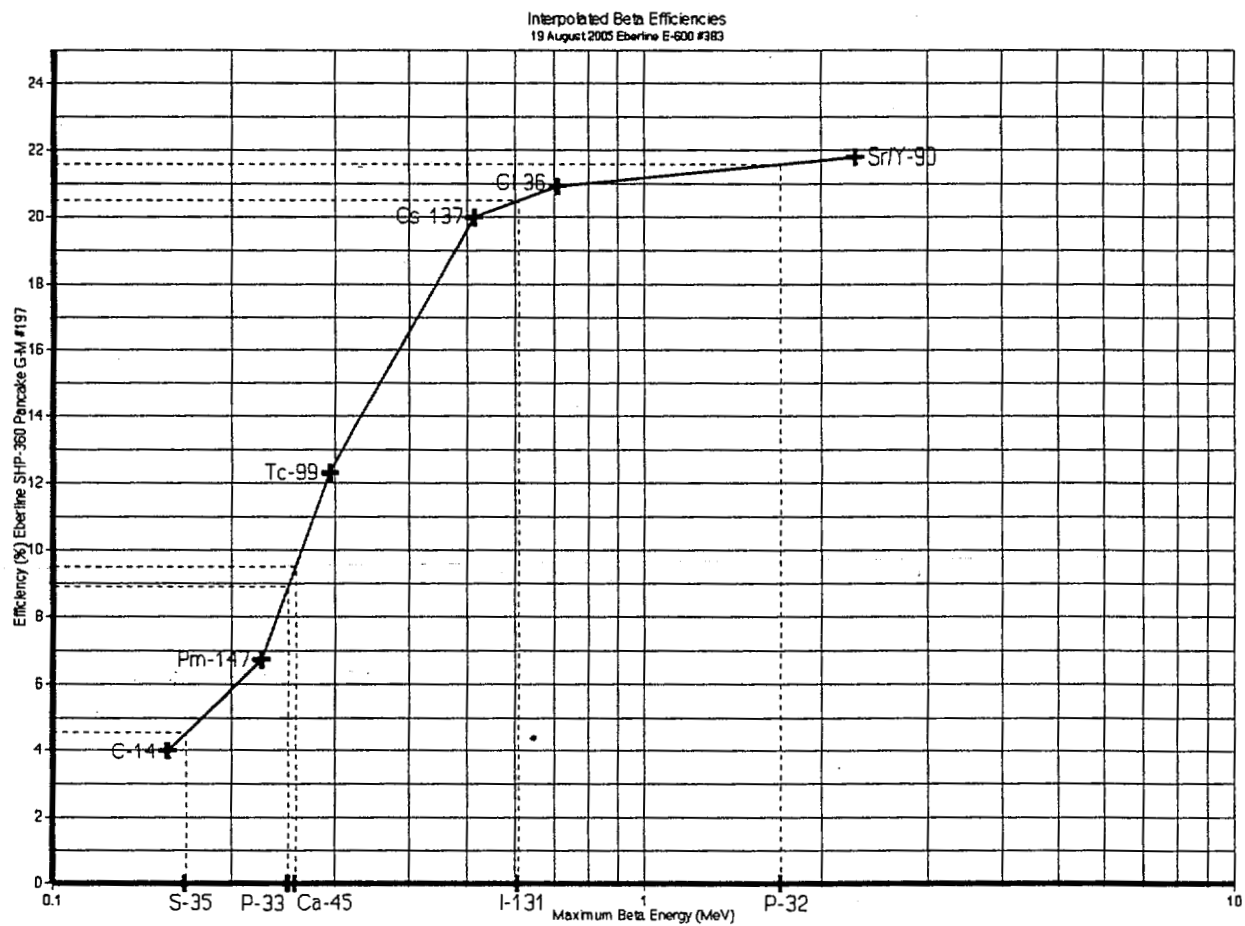
RSA Laboratories ID# 9970. Instrument indicates within $\pm 10\%$ of calibration points unless otherwise indicated. Source-to-detector entry window distance for efficiency determinations is 1 cm unless otherwise specified. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorf

Date: 19 August 2005



RSA Laboratories ID# 9970.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorff

Date: 19 August 2005

CERTIFICATE OF CALIBRATION (DISINTEGRATION RATE INSTRUMENT)



RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61

Hebron, Connecticut 06248

(860) 228-0721 Fax (860) 228-4402

Customer and Contact: USEPA/NAREL, Attn: Spencer Hamil (334) 270-3475

Customer Address: 540 South Morris Avenue, Montgomery, AL 36115-2601

Inst. Mfr. & Model Eberline Model E600

Inst. Type Smart Meter

Inst. s/n 00383

Det. Mfr. & Model Ludlum 43-89

Det. Type Alpha/Beta Scintillator

Det. s/n 145390

Cal. Date 19 August 2005

Due Date 19 August 2006

Cal. Interval 1 year

Environmental conditions: Temperature: 70°F Relative Humidity 48% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

☒ Contamination survey

☒ Battery check

☒ Slow response check

☒ Det. volts 615 Vdc

☒ Mechanical check

☒ Audio check

☐ Window operation

☒ Meter zero

☒ Reset check

☐ Plateau check

☒ Geotropism check

☒ Fast response check

☒ Alarm set

☒ Input sens. see comments mV

☒ Pulse generator s/n 94926

☐ Oscilloscope s/n 171-04928

☒ Voltmeter s/n 57410002

☐ HV Readout (2 points) Ref./Inst. _____ V/ _____ V

Ref./Inst. _____ V/ _____ V

Ref./Inst. _____ V/ _____ V

Comments: Upper window set at 41.6 mV for α , channel 1. Lower window set at 1.60 mV for β , channel 2. Local background \approx 3510 dpm β , 0 dpm α .

S/N of source used for precision check #6

Isotope Cs-137

Dedicated Source? ☐ Yes ☒ No

Reading #1 881,000 dpm

Reading #2 887,000 dpm

Reading #3 875,000 dpm

Mean 881,000 dpm

Precision: ☒ $\pm < 10\%$ ☐ $\pm 10-20\%$ ☐ Out of tolerance

Range Multiplier	Cal. Source Used (isotope and S/N)	Source Activity (dpm)	Instrument Reading (dpm)	4 π Instrument Efficiency (%)
1 min. count	Tc-99 #D702	23,064	26,500(β)	99.7%
1 min. count	Th-230 #91TH2200210	38,900	39,800(α)	100%

RSA Laboratories ID# 9970. Instrument indicates within $\pm 10\%$ of calibration points unless otherwise indicated. Source-to-detector entry window distance for efficiency determinations is 1 cm unless otherwise specified. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorff

Date: 19 August 2005

CERTIFICATE OF CALIBRATION (EXPOSURE RATE INSTRUMENT)

#5



RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61

Hebron, Connecticut 06248

(860) 228-0721 Fax (860) 228-4402

Customer and Contact: USEPA/NAREL, Attn: Spencer Hamil (334) 270-3475

Customer Address: 540 South Morris Avenue, Montgomery, AL 36115-2601

Inst. Mfr. & Model Eberline Model E600

Inst. Type Smart Meter

Inst. s/n 00363

Det. Mfr. & Model Eberline SHP290

Det. Type High Range G-M

Det. s/n 00113

Cal. Date 19 August 2005

Due Date 19 August 2006

Cal. Interval 1 year

Environmental conditions: Temperature: 70°F Relative Humidity 48% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

■ Contamination survey

■ Battery check

■ Slow response check

■ Mechanical check

■ Audio check

■ Window operation

■ Det. volts 547 Vdc

■ Meter zero

■ Reset check

□ Plateau check

■ Geotropism check

■ Fast response check

■ Alarm set

■ Input sens. 10 mV

■ Pulse generator s/n 94926

□ Oscilloscope s/n 171-04928

■ Voltmeter s/n 57410002

□ HV Readout (2 points) Ref./Inst.

V/

V

Ref./Inst.

V/

V

Comments:

S/N of source used for precision check #6

Isotope Cs-137

Dedicated Source? ☐ Yes ☒ No

Reading #1 14.26 mR/h

Reading #2 16.43 mR/h

Reading #3 15.58 mR/h

Mean 15.42 mR/h

Precision: ☒ $\pm < 10\%$ ☐ $\pm 10-20\%$ ☐ Out of tolerance

Range	Reference Calibration Point	Instrument Indication
n/a	0.021 mR/h	22.0 μ R/h
n/a	0.052 mR/h	52.7 μ R/h
n/a	0.173 mR/h	171.2 μ R/h
n/a	0.904 mR/h	902 μ R/h
n/a	1.39 mR/h	1.411 mR/h
n/a	8.29 mR/h	8.32 mR/h
n/a	13.9 mR/h	14.11 mR/h
n/a	79.1 mR/h	80.9 mR/h
n/a	136 mR/h	136.5 mR/h
n/a	738 mR/h	739 mR/h
n/a	1770 mR/h	1.740 R/h
n/a	4369 mR/h	4.16 R/h
n/a	*647,000 cpm \approx 10 R/h	9.52 R/h
n/a	*1,510,000 cpm \approx 40 R/h	38.09 R/h
*With dead time compensation		

Over 5 R/h ranges were calibrated electronically.

Sources used: ¹³⁷Cesium 750 mCi s/n KR-6244 and KR-6250, and ¹³⁷Cesium 750 μ Ci s/n 163.

RSA Laboratories Log ID# 9971. Calibration points calculated to center of detector volume unless otherwise specified. Instrument indicates within $\pm 10\%$ of calibration points unless otherwise indicated. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorf

Date: 19 August 2005

CERTIFICATE OF CALIBRATION (EXPOSURE RATE INSTRUMENT)



RSA Laboratories, Inc.
21 Pendleton Drive, P.O. Box 61
Hebron, Connecticut 06248
(860) 228-0721 Fax (860) 228-4402

Customer and Contact: USEPA/NAREL, Attn: Spencer Hamil (334) 270-3475

Customer Address: 540 South Morris Avenue, Montgomery, AL 36115-2601

Inst. Mfr. & Model Eberline Model E600

Inst. Type Smart Meter

Inst. s/n 00363

Det. Mfr. & Model Eberline SPA-6

Det. Type Gamma Scintillator

Det. s/n 503

Cal. Date 19 August 2005

Due Date 19 August 2006

Cal. Interval 1 year

Environmental conditions: Temperature: 70°F Relative Humidity 48% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

■ Contamination survey

■ Battery check

■ Slow response check

■ Det. volts 1299 Vdc

■ Mechanical check

■ Audio check

■ Window operation

■ Meter zero

■ Reset check

■ Plateau check

■ Input sens. 10 mV

■ Geotropism check

■ Fast response check

■ Alarm set

■ Pulse generator s/n 94926

□ Oscilloscope s/n 171-04928

■ Voltmeter s/n 57410002

□ HV Readout (2 points) Ref./Inst.

V/

V

Ref./Inst.

V/

V

Comments: Tube begins to saturate above 5 mR/h. Alarm level never reached.

S/N of source used for precision check #6

Isotope Cs-137

Dedicated Source? ☐ Yes ☒ No

Reading #1 1.863 mR/h

Reading #2 1.853 mR/h

Reading #3 1.859 mR/h

Mean 1.858 mR/h

Precision: ☒ ± <10% ☐ ± 10-20% ☐ Out of tolerance

Range	Reference Calibration Point	Instrument Indication
n/a	0.025 mR/h	23.9 µR/h
n/a	0.066 mR/h	65.4 µR/h
n/a	0.226 mR/h	230 µR/h
n/a	0.512 mR/h	530 µR/h
n/a	1.17 mR/h	1.230 mR/h
n/a	1.81 mR/h	1.913 mR/h
n/a	4.44 mR/h	4.25 mR/h
n/a	5.57 mR/h	5.06 mR/h
n/a	10.9 mR/h	7.95 mR/h OUT OF TOLERANCE

No ranges were calibrated electronically.

Sources used: ¹³⁷Cesium 750 mCi s/n KR-6244 and KR-6250, and ¹³⁷Cesium 750 µCi s/n 163.

RSA Laboratories Log ID# 9971. Calibration points calculated to center of detector volume unless otherwise specified. Instrument indicates within ±10% of calibration points unless otherwise indicated. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorff

Date: 19 August 2005

CERTIFICATE OF CALIBRATION (COUNT-RATE INSTRUMENT)



RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61
Hebron, Connecticut 06248
(860) 228-0721 Fax (860) 228-4402

Customer and Contact: USEPA/NAREL, Attn: Spencer Hamil (334) 270-3475

Customer Address: 540 South Morris Avenue, Montgomery, AL 36115-2601

Inst. Mfr. & Model Eberline Model E600

Inst. Type Smart Meter

Inst. s/n 00363

Det. Mfr. & Model Eberline SHP360

Det. Type Smart Pancake G-M

Det. s/n 00195

Cal. Date 19 August 2005

Due Date 19 August 2006

Cal. Interval 1 year

Environmental conditions: Temperature: 70°F Relative Humidity 48% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

- | | | | |
|--|---|---|--|
| <input checked="" type="checkbox"/> Contamination survey | <input checked="" type="checkbox"/> Battery check | <input checked="" type="checkbox"/> Slow response check | |
| <input checked="" type="checkbox"/> Mechanical check | <input checked="" type="checkbox"/> Audio check | <input type="checkbox"/> Window operation | <input checked="" type="checkbox"/> Det. volts 900 Vdc |
| <input checked="" type="checkbox"/> Meter zero | <input checked="" type="checkbox"/> Reset check | <input checked="" type="checkbox"/> Plateau check | |
| <input checked="" type="checkbox"/> Geotropism check | <input checked="" type="checkbox"/> Fast response check | <input checked="" type="checkbox"/> Alarm set | <input checked="" type="checkbox"/> Input sens. 10 mV |

☒ Pulse generator s/n 94926

☐ Oscilloscope s/n 171-04928

☒ Voltmeter s/n 57410002

☐ HV Readout (2 points) Ref./Inst. _____ V/ _____ V Ref./Inst. _____ V/ _____ V

Comments: Pulse calibration performed with dead time set at zero. Dead time set to 100 μ sec. Replaced 3 size "C" batteries.

S/N of source used for precision check #6

Isotope Cs-137

Dedicated Source? ☐ Yes ☒ No

Reading #1 27,200 cpm

Reading #2 28,000 cpm

Reading #3 27,500 cpm

Mean 27,567 cpm

Precision: ☒ $\pm < 10\%$ ☐ $\pm 10-20\%$ ☐ Out of tolerance

Range Multiplier	Reference Calibration Point	Instrument Indication
n/a	800,000 cpm	799 kcpm
n/a	200,000 cpm	200 kcpm
n/a	80,000 cpm	79.9 kcpm
n/a	20,000 cpm	20.0 kcpm
n/a	8,000 cpm	8.00 kcpm
n/a	2,000 cpm	2.00 kcpm
n/a	800 cpm	800 cpm
n/a	200 cpm	200 cpm
n/a	80 cpm	80 cpm
n/a	20 cpm	20 cpm

All ranges calibrated electronically.

Local background (cpm) \approx 42

Range Multiplier	Cal. Source Used (isotope and S/N)	Source Activity (dpm)	Instrument Reading (cpm)	4 π Instrument Efficiency (%)
1 min. count	C-14 #4456	202,100	8030	3.95
1 min. count	Pm-147 #5381	6,765	504	6.83
1 min. count	Tc-99 #D702	23,064	2770	11.83
1 min. count	Cs-137 #2886	17,436	3580	20.29
1 min. count	Cl-36 #D700	23,598	5010	21.05
1 min. count	Sr/Y-90 #D711	43,597	9490	21.67

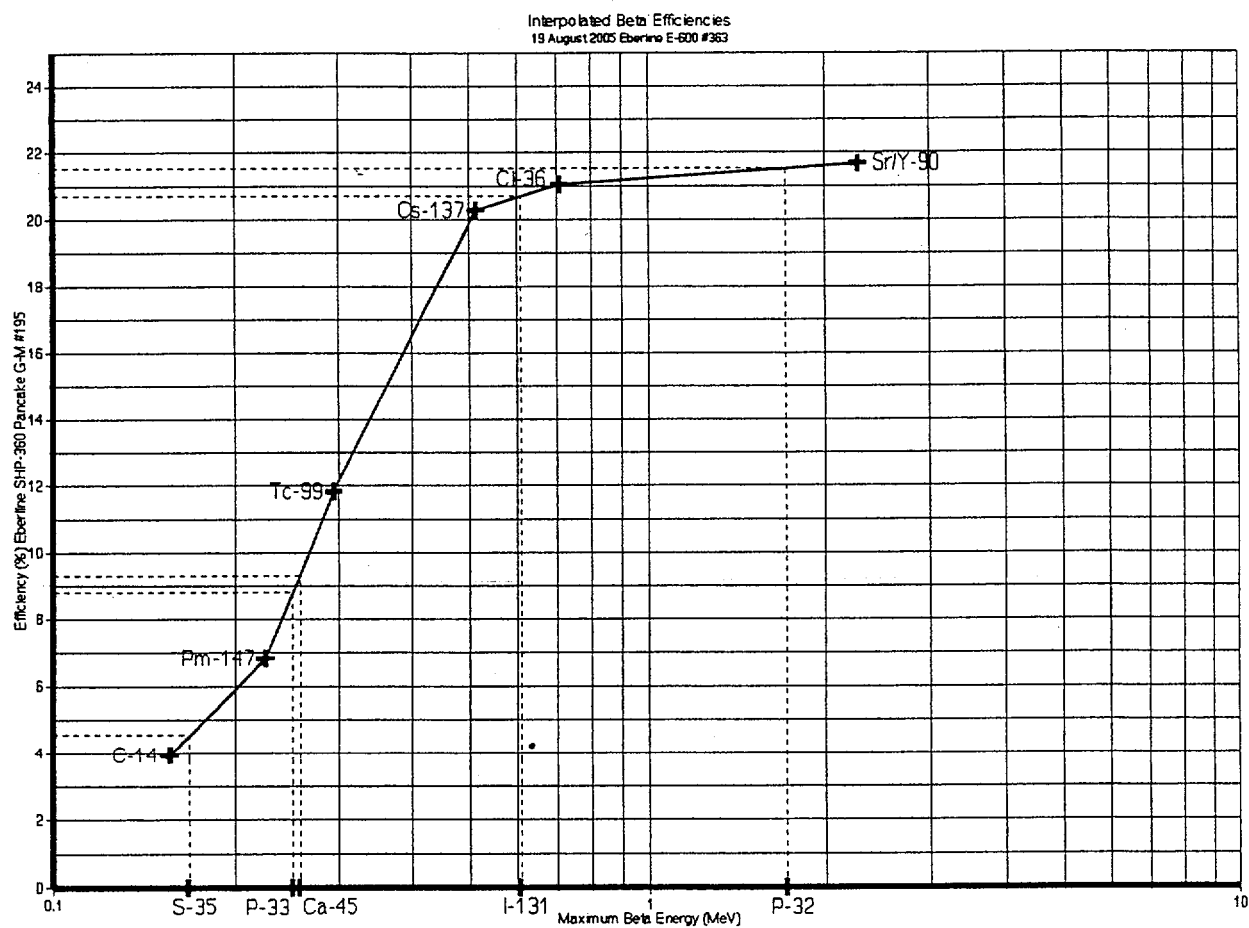
RSA Laboratories ID# 9971. Instrument indicates within $\pm 10\%$ of calibration points unless otherwise indicated. Source-to-detector entry window distance for efficiency determinations is 1 cm unless otherwise specified. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorff

Date: 19 August 2005



RSA Laboratories ID# 9971.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorff

Date: 19 August 2005

CERTIFICATE OF CALIBRATION (DISINTEGRATION RATE INSTRUMENT)



RSA Laboratories, Inc.

21 Pendleton Drive, P.O. Box 61
Hebron, Connecticut 06248
(860) 228-0721 Fax (860) 228-4402

Customer and Contact: USEPA/NAREL, Attn: Spencer Hamil (334) 270-3475

Customer Address: 540 South Morris Avenue, Montgomery, AL 36115-2601

Inst. Mfr. & Model Eberline Model E600

Inst. Type Smart Meter

Inst. s/n 00363

Det. Mfr. & Model Ludlum 43-89

Det. Type Alpha/Beta Scintillator

Det. s/n 145388

Cal. Date 19 August 2005

Due Date 19 August 2006

Cal. Interval 1 year

Environmental conditions: Temperature: 70°F Relative Humidity 48% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

☒ Contamination survey

☒ Battery check

☒ Slow response check

☒ Det. volts 781 Vdc

☒ Mechanical check

☒ Audio check

☐ Window operation

☒ Meter zero

☒ Reset check

☐ Plateau check

☒ Geotropism check

☒ Fast response check

☒ Alarm set

☒ Input sens. see comments mV

☒ Pulse generator s/n 94926

☐ Oscilloscope s/n 171-04928

☒ Voltmeter s/n 57410002

☒ HV Readout (2 points) Ref./Inst. _____ V/ _____ V Ref./Inst. _____ V/ _____ V

Comments: Upper window set at 38.6 mV for α , channel 1. Lower window set at 1.60 mV for β , channel 2. Local background \approx 3280 dpm β , 0 dpm α .

S/N of source used for precision check #6

Isotope Cs-137

Dedicated Source? ☐ Yes ☒ No

Reading #1 710,000 dpm

Reading #2 718,000 dpm

Reading #3 708,000 dpm

Mean 710,000 dpm

Precision: ☒ \pm <10% ☐ \pm 10-20% ☐ Out of tolerance

Range Multiplier	Cal. Source Used (isotope and S/N)	Source Activity (dpm)	Instrument Reading (dpm)	4 π Instrument Efficiency (%)
1 min. count	Tc-99 #D702	23,064	26,600(β)	101%
1 min. count	Th-230 #91TH2200210	38,900	39,000(α)	100%

RSA Laboratories ID# 9971. Instrument indicates within \pm 10% of calibration points unless otherwise indicated. Source-to-detector entry window distance for efficiency determinations is 1 cm unless otherwise specified. RSA Laboratories, Inc. certifies that the above instrument has been calibrated with standards traceable to the National Institute of Standards and Technology, or have been derived from accepted values of natural physical constants, or have been derived by the ratio-type of calibration techniques.

Calibrated by: Kurt D. Newton

Date: 19 August 2005

Reviewed by: Jay R. Dockendorff

Date: 19 August 2005

ATTACHMENT (3)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EXPOSURE RESEARCH LABORATORY
Research Triangle Park, NC 27711

Office of
Research and Development

March 8, 2006

MEMORANDUM

Subject: Contamination Wipe Test Survey Results for Gulf Breeze Sample Sets 15-# and 17-# Sequences

From: Todd W. Baker, MSPH, CHP //Signed//
Radiation Safety Officer
Ext. 919-541-4307 Mail Code D343-02

To: Clayton D. Peacher
US EPA Environmental Effects Research Laboratory
ORD/Gulf Ecology Division
Sabine Island Drive
Gulf Breeze, FL 32561-5299
Telephone: 850-934-9239
FAX: 850-934-2406

This memorandum serves to document and transmit the results obtained by liquid scintillation counting for the contamination wipe test samples collected and submitted by David Kappelman and Sam Poppell from OAR/ORIA/NAREL in Montgomery, Alabama.

Summary: All samples were indistinguishable from the blank or background sample at the 95% confidence level. Therefore, the sample sets did not detect any removable radioactive contamination.

To make this data package complete, the following items are included with this analysis.

1. Individual copies of the Chain of Custody Records for all samples collected, NAREL/Form-1 Revision 2 02/10/00. (The original forms will remain with the samples until final disposal.)
2. Full original instrument report print outs generated by the liquid scintillation counter at the time of the sample batch counting which includes a sub-set of spike samples run with each sample batch.
3. A processed data report in the form of a Microsoft Excel spreadsheet showing complete sample identification correlation, a reprint of individual results and a data validation and discussion report for each batch.

The minimum detectable activities are provided with each processed data report along with any explanation of results and their interpretation. The reports were constructed to satisfy all requirements for reporting this data to the Nuclear Regulatory Commission in support of a

decision regarding the overall contamination characterization of the locations sampled. These results should be incorporated into the final status survey report provided to the NRC.

Ritchie Buschow and I performed the sample analysis. A summary of our qualification follows.

Todd W. Baker is a health physicist and the current Radiation Safety Officer at the US Environmental Protection Agency's facility in Research Triangle Park (<http://www.epa.gov/rtp/>). This facility is a NRC Broad Scope licensee. Mr. Baker holds a BS in Physics from Dickinson College in Carlisle, PA and a MSPH from UNC-Chapel Hill. Mr. Baker was a DOE Operational Health Physics fellow during his graduate studies. His practicum was conducted at Brookhaven National Laboratory where he coordinated a study on neutron dosimetry from data collected at the Alternating Gradient Synchrotron, a 33 GeV proton accelerator. His thesis research was conducted at the Y-12 plant in Oak Ridge, TN performing alpha spectral analysis on liquid scintillation counters. Mr. Baker was first employed after his graduate studies (1992) by the Health & Safety Division of Los Alamos National Laboratories as a technical staff member where he updated administrative and technical quality control procedures for a large (> 500,000 samples/yr.) health physics analysis laboratory for compliance with Federal Regulations and Department of Energy issued orders and provided technical expertise for the analyses of non-conforming or specialized sample matrices to detect levels of radiation contamination in close cooperation with dose assessment personnel. In 1993 Mr. Baker returned to North Carolina as a consultant for A. D. Little, Inc., performing consulting support to the US EPA/RTP. By January of 1994, Mr. Baker assumed the position he currently holds at the US Environmental Protection Agency. In 2001, Mr. Baker became a Certified Health Physicist.

Ritchie D. Buschow is currently employed with the US EPA, Office of Research and Development, RTP, NC in the Safety Health & Environmental Management Office where he functions as the Assistant Radiation Safety Officer and Laser Safety Officer. Mr. Buschow holds a BS in Physics from James Madison University and a Master of Environmental Management (MEM) from Duke University. Over the years, he has also taken a number of post-graduate courses at both the University of North Carolina, Chapel Hill and Oak Ridge Associated Universities (Oak Ridge, Tenn.) in radiation protection and health physics. In his current position as Assistant Radiation Safety Officer at EPA, his duties include records management, radiation safety training, receipts and transfers of radioactive materials, leak testing of sealed radioactive sources, laboratory audits, personnel dosimetry program, management of radioactive and mixed waste streams, radioactive materials license renewals and/or amendments. Recently, Mr. Buschow was approved by the Board of Laser Safety (Orlando, Florida) to sit for the certification in laser safety exam. Mr. Buschow was the former RSO at North Carolina Central University (NCCU). While at NCCU, Mr. Buschow was charged with the entire implementation of the radiation safety program. He was also a safety officer in the Radiation Safety Office at UNC-Chapel Hill for six years. Specific duties included radiation safety surveys of research labs and the hospital nuclear medicine facility, leak tests of sealed sources,

bio-assay analysis, radiation/contamination surveys of radiation therapy patient areas, and surveys of diagnostic x-ray equipment used in both the hospital and dental school.

Enclosures: (As stated in the body of the text)
15 Series - Chain of Custody Forms; 10 pages
15 Series - Liquid Scintillation Counter Instrument Reports; 8 pages.
15 Series - Processed Data Report; 5 pages
17 Series - Chain of Custody Forms; 7 pages
17 Series - Liquid Scintillation Counter Instrument Reports; 4 pages.
17 Series - Processed Data Report; 4 pages

cc: Sam W. Poppell, OAR/ORIA/NAREL-ESB {Electronic Copy Only}
David Kappelman, OAR/ORIA/NAREL-ESB {Electronic Copy Only}
Rebecca L. Hemmer, ORD/NHEERL/GED {Electronic Copy Only}
Stephanie D. Friedman, ORD/NHEERL/GED {Electronic Copy Only}
Bruce Michael, ORD/NHEERL {Electronic Copy Only}
Ritchie D. Buschow, ORD/NERL-IO (SHEM) {Electronic Copy Only}
Reading File
RSO File



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only			
Project Manager Sam Poppell					C-14	H-3									Comments:	
Sampling Team Members																
Sam Poppell (334-546-7214)																
David Kappelman (334-270-7064)																
Requested Completion Date		Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No		LSC	LSC											
Sample Description		Date	Time	Matrix										Comments	Lab Sample ID	
15-1		2/16		Swipe	1	X	X							swipes		
15-2				Swipe	1	X	X							preserved w/		
15-3				Swipe	1	X	X							1ml DI H ₂ O		
15-4				Swipe	1	X	X							in LSC		
15-5				Swipe	1	X	X									
15-6				Swipe	1	X	X									
15-7				Swipe	1	X	X									
15-8				Swipe	1	X	X									
15-9				Swipe	1	X	X									
15-10		2/16		Swipe	1	X	X									
1) Sampled By: <i>[Signature]</i> Date/Time 2/16/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				Internal Container				
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				FedEx UPS Hand Other				Temperature ____ °C				
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page				
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N				1 of 10				

Distribution: White and Yellow Copies accompany sample to laboratory. Pink copy is retained by Samplers. Please use a separate form for each container.

NAREL/FORM-1 Revision 2 02/10/00



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only			
Project Manager Sam Poppell					of C O N T A I N E R S	C-14	H-3									Comments:
Sampling Team Members																
Sam Poppell (334-546-7214)																
David Kappelman (334-270-7064)																
Requested Completion Date		Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No		LSC	LSC											
Sample Description		Date	Time	Matrix											Comments	Lab Sample ID
15-11	2/16		Swipe	1	X	X									Swipes	
15-12	1		Swipe	1	X	X									preserved w/	
15-13			Swipe	1	X	X									1m DI H ₂ O	
15-14			Swipe	1	X	X									in L.S.V.	
15-15			Swipe	1	X	X										
15-16			Swipe	1	X	X										
15-17			Swipe	1	X	X										
15-18			Swipe	1	X	X										
15-19			Swipe	1	X	X										
15-20	2/16		Swipe	1	X	X										
1) Sampled By: <i>David Poppell</i> Date/Time: <i>2/16/06</i>				2) Received By: <i>J. S. Pinn</i> Date/Time: <i>2/16/06</i>				Sample Shipped via <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> FedEx UPS Hand Other				Internal Container Temperature ____ °C				
3) Relinquished By: <i>J. S. Pinn</i> Date/Time: <i>2/16/06</i>				4) Received By: <i>David D. Baker</i> Date/Time: <i>2/21/06</i>				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page <i>2</i> of <i>10</i>				
5) Relinquished By: _____ Date/Time: _____				6) Received By: _____ Date/Time: _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N								
Samples Disposed By: _____ Date/Time: _____				Disposal Method: _____												



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				# of C O N T A I N E R S	ANALYSIS REQUESTED								For Laboratory Use Only							
Project Manager Sam Poppell					C-14	H-3							Comments:							
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)													by	by						
Requested Completion Date		Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No																		
Sample Description	Date	Time	Matrix										Comments	Lab Sample ID						
15-21	2/16		Swipe	1	X	X							SWIPES							
15-22			Swipe	1	X	X							preserved w/							
15-23			Swipe	1	X	X							1ml DI H ₂ O							
15-24			Swipe	1	X	X							IN LSC							
15-25			Swipe	1	X	X							(LIQUID SCINTILLATION)							
15-26			Swipe	1	X	X							VIAL							
15-27			Swipe	1	X	X														
15-28			Swipe	1	X	X														
15-29			Swipe	1	X	X														
15-30	2/16		Swipe	1	X	X														
1) Sampled By: <i>[Signature]</i> Date/Time 2/16/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand Other				Internal Container Temperature _____ °C								
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page 3 of 10								
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N												
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____																



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only										
Project Manager Sam Poppell					of C O N T A I N E R S	G-14	H-3							Comments:									
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)														by	by	LSC	LSC						
Requested Completion Date		Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No																					
Sample Description	Date	Time	Matrix											Comments	Lab Sample ID								
15-31	2/16		Swipe	1	X	X								Swipes									
15-32			Swipe	1	X	X								Preserved w/									
15-33			Swipe	1	X	X								1m DI H ₂ O									
15-34			Swipe	1	X	X								IN L.S.V.									
15-35			Swipe	1	X	X																	
15-36			Swipe	1	X	X																	
15-37			Swipe	1	X	X																	
15-38			Swipe	1	X	X																	
15-39			Swipe	1	X	X																	
15-40	2/16		Swipe	1	X	X																	
1) Sampled By: <i>[Signature]</i> Date/Time 2/16/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand Other				Internal Container Temperature ____ °C											
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page 4 of 10											
5) Relinquished By: Date/Time				6) Received By: Date/Time				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N															
Samples Disposed By: Date/Time				Disposal Method:																			



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only		
Project Manager Sam Poppell					of C O N T A I N E R S	C-14	H-3							Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)															
Requested Completion Date														Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Description		Date	Time	Matrix	LSC	LSC								Comments	Lab Sample ID
15-41		2/16		Swipe	1	X	X							swipes	
15-42				Swipe	1	X	X							Preserved w/	
15-43				Swipe	1	X	X							1ml DI H ₂ O	
15-44				Swipe	1	X	X							in L.S.V.	
15-45				Swipe	1	X	X								
15-46				Swipe	1	X	X								
15-47				Swipe	1	X	X								
15-48				Swipe	1	X	X								
15-49				Swipe	1	X	X								
15-50		2/16		Swipe	1	X	X								
1) Sampled By: <i>[Signature]</i> Date/Time <i>2/20/06</i>				2) Received By: <i>[Signature]</i> Date/Time <i>2/16/06</i>				Sample Shipped via <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				Internal Container			
3) Relinquished By: <i>[Signature]</i> Date/Time <i>2/16/06</i>				4) Received By: <i>[Signature]</i> Date/Time <i>2/21/06</i>				FedEx UPS Hand Other				Temperature ____ °C			
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page			
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N				5 of 10			



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division		# of C O N T A I N E R S	ANALYSIS REQUESTED								For Laboratory Use Only							
Project Manager Sam Poppell			C-14	H-3							Comments:							
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)											by	by	LSC	LSC				
Requested Completion Date																		
Sample Description	Date	Time	Matrix									Comments	Lab Sample ID					
15-51	2/16		Swipe	1	X	X						SWIPES						
15-52			Swipe	1	X	X						PRESERVED w/						
15-53			Swipe	1	X	X						1ml DI H ₂ O						
15-54			Swipe	1	X	X						in L.S.V.						
15-55			Swipe	1	X	X												
15-56			Swipe	1	X	X												
15-57			Swipe	1	X	X												
15-58			Swipe	1	X	X												
15-59			Swipe	1	X	X												
15-60	2/16		Swipe	1	X	X												
1) Sampled By: <i>Sam Poppell</i> Date/Time: <i>2/16/06</i>		2) Received By: <i>CPW</i> Date/Time: <i>2/16/06</i>		Sample Shipped via <input type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other				Internal Container Temperature ____ °C										
3) Relinquished By: <i>CPW</i> Date/Time: <i>2/16/06</i>		4) Received By: <i>CPW</i> Date/Time: <i>2/21/06</i>		Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page 6 of 10										
5) Relinquished By: <i>CPW</i> Date/Time: _____		6) Received By: _____ Date/Time: _____		Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N														
Samples Disposed By: _____ Date/Time: _____		Disposal Method: _____																

Distribution: White and Yellow Copies accompany sample to laboratory. Pink copy is retained by Samplers. Please use a separate form for each container.

NAREL/FORM-1 Revision 2 02/10/00



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

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36115-2601
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Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only			
Project Manager Sam Poppell					C-14 H-3 by by LSC LSC								Comments:			
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)																
Requested Completion Date													Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Sample Description		Date	Time	Matrix									Comments	Lab Sample ID		
15-61		2/16		Swipe	1	X	X						swipe			
15-62				Swipe	1	X	X						preserved w/			
15-63				Swipe	1	X	X						1ml DI H ₂ O			
15-64				Swipe	1	X	X						in 2.5.V.			
15-65				Swipe	1	X	X									
15-66				Swipe	1	X	X									
15-67				Swipe	1	X	X									
15-68				Swipe	1	X	X									
15-69				Swipe	1	X	X									
15-70		2/20		Swipe	1	X	X									
1) Sampled By: <i>[Signature]</i> Date/Time 2/16/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand Other				Internal Container Temperature ____ °C				
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page 7 of 10				
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N								
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____												



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

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Montgomery, AL
36115-2601
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Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				# of C O N T A I N E R S	ANALYSIS REQUESTED								For Laboratory Use Only		
Project Manager Sam Poppell					C-14	H-3								Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)															
Requested Completion Date														by LSC	by LSC
Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No															
Sample Description	Date	Time	Matrix										Comments	Lab Sample ID	
15-71	2/16		Swipe 1	X	X								Swipes		
15-72			Swipe 1	X	X								Preserved w/		
15-73			Swipe 1	X	X								1ml DI H ₂ O		
15-74			Swipe 1	X	X								in L.S.V.		
15-75			Swipe 1	X	X										
15-76			Swipe 1	X	X										
15-77			Swipe 1	X	X										
15-78			Swipe 1	X	X										
15-79			Swipe 1	X	X										
15-80	2/16		Swipe 1	X	X										
1) Sampled By: <i>Sam Poppell</i> Date/Time <i>2/16/06</i>				2) Received By: <i>Ch. Pan</i> Date/Time <i>2/16/06</i>				Sample Shipped via <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				Internal Container			
3) Relinquished By: <i>Ch. Pan</i> Date/Time <i>2/16/06</i>				4) Received By: <i>Thad W. B...</i> Date/Time <i>2/21/06</i>				FedEx UPS Hand Other				Temperature ____ °C			
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page			
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N				8 of 10			



CHAIN OF CUSTODY RECORD
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only				
Project Manager Sam Poppell					of C O N T A I N E R S	C-14	H-3									Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)																	
Requested Completion Date																Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
				LSC	LSC												
Sample Description		Date	Time	Matrix												Comments	Lab Sample ID
15-81		2/16		Swipe	1	X	X									Swipes	
15-82				Swipe	1	X	X									PRESERVED w/	
15-83				Swipe	1	X	X									1m/ DI. H ₂ O	
15-84				Swipe	1	X	X									in L.S.V.	
15-85				Swipe	1	X	X										
15-86				Swipe	1	X	X										
15-87				Swipe	1	X	X										
15-88				Swipe	1	X	X										
15-89				Swipe	1	X	X										
15-90		2/16		Swipe	1	X	X										
1) Sampled By: <i>[Signature]</i> Date/Time <i>2/20/06</i>				2) Received By: <i>[Signature]</i> Date/Time <i>2/16/06</i>				Sample Shipped via <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> FedEx UPS Hand Other				Internal Container Temperature ____ °C					
3) Relinquished By: <i>[Signature]</i> Date/Time <i>2/16/06</i>				4) Received By: <i>[Signature]</i> Date/Time <i>2/21/06</i>				Custody Seal Present? OY ON				Page 9 of 10					
5) Relinquished By: <i>[Signature]</i> Date/Time				6) Received By: Date/Time				Custody Seal Intact? OY ON									
Samples Disposed By: Date/Time				Disposal Method:													

Distribution: White and Yellow Copies accompany sample to laboratory. Pink copy is retained by Samplers. Please use a separate form for each container.



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Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only		
Project Manager Sam Poppell					of C O N T A I N E R S	C-14	H-3							Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)															
Requested Completion Date														Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Description	Date	Time	Matrix											Comments	Lab Sample ID
15-91	2/16		Swipe	1	X	X								swipes	
15-92	2/16		Swipe	1	X	X								preserved w/	
15-93			Swipe	1	X	X								1m DI H ₂ O	
15-94			Swipe	1	X	X								in L.S.V.	
15-95			Swipe	1	X	X									
15-96			Swipe	1	X	X									
15-97			Swipe	1	X	X									
no swipes			Swipe	1	X	X									
	2/16		Swipe	1	X	X									
1) Sampled By: <i>[Signature]</i> Date/Time 2/26/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> FedEx UPS Hand Other				Internal Container Temperature ____ °C			
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				Custody Seal Present? <input type="checkbox"/> Y <input type="checkbox"/> N				Page 10 of 10			
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N							
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____											

Protocol# 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Samples Coded 15-# Series

Todd W. Baker
3-7-06

Assay Definition-

Assay Description:

Dual label H-3 and C-14 DPM assay per request of NAREL.

Assay Type: DPM (Dual)

Report Name: Gulf Breeze Sample Report Analysis Format

Output Data Path: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060301_1838

Raw Results Path: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060301_1838\20060301_1838.results

Comma-Delimited File Name: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060301_1838\Gulf Breeze YYYYMMDD HHMM.csv

Assay File Name: C:\Packard\TriCarb\Assays\Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Count Conditions-

Nuclide: 3H-14C UG

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2s

Pre-Count Delay (min): 0.00

Quench Sets:

Low Energy: 3H-UG

Mid Energy: 14C-UG

Count Time (min): 3.00

Count Mode: Normal

Assay Count Cycles: 1

Repeat Sample Count: 1

#Vials/Sample: 1

Calculate % Reference: Off

Background Subtract: On - 1st Vial

Low CPM Threshold: Off

2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	0.0	0.0	1st Vial

Count Corrections-

Static Controller: On

Luminescence Correction: n/a

Colored Samples: Off

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=Tri-Carb 2900TR

Version=2.06

433693

MODEL=Tri-Carb 2900TR

VERSION=2.06

SERIAL=433693

IPA Block Data

Software Version IC: 2.11

Software Version EC: 2.02

Protocol# 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

User: Todd Baker

Samples Coded 15-# Series

Todd W. Baker
3-7-06

Instrument Model: Tri-Carb 2900TR

Instrument Serial Number: 433693

3H Chi Square: 15.89 Date Processed: 3/1/2006 6:30:18 PM

14C Chi Square: 15.81 Date Processed: 3/1/2006 6:30:18 PM

3H E²/B (1-18.6 keV): 233.14 Date Processed: 3/1/2006 6:30:18 PM14C E²/B (4-156 keV): 481.10 Date Processed: 3/1/2006 6:30:18 PM

3H Efficiency (0-18.6 keV): 63.82 Date Processed: 3/1/2006 6:30:18 PM

14C Efficiency (0-156 keV): 96.24 Date Processed: 3/1/2006 6:30:18 PM

IPA Background Date Processed: 3/1/2006 6:30:18 PM

3H Background CPM (0-18.6 keV): 17.27 Date Processed: 3/1/2006 6:30:18 PM

14C Background CPM (0-156 keV): 24.20 Date Processed: 3/1/2006 6:30:18 PM

3H Calibration DPM: 275600

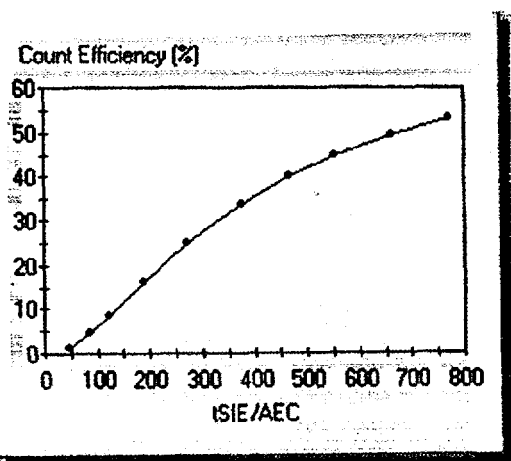
3H Reference Date: 2/11/2005

14C Calibration DPM: 127900

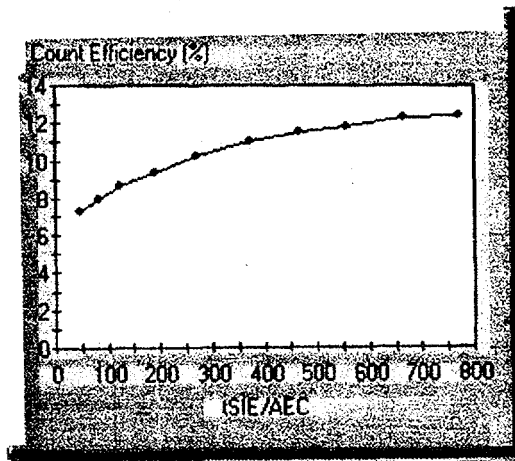
Cycle 1 Results

Quench Curve Block Data

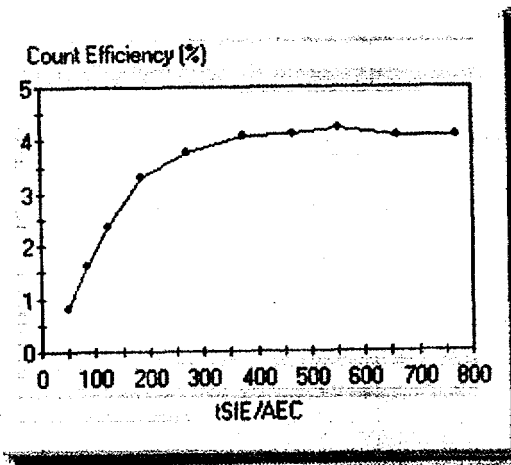
3H-UG in A



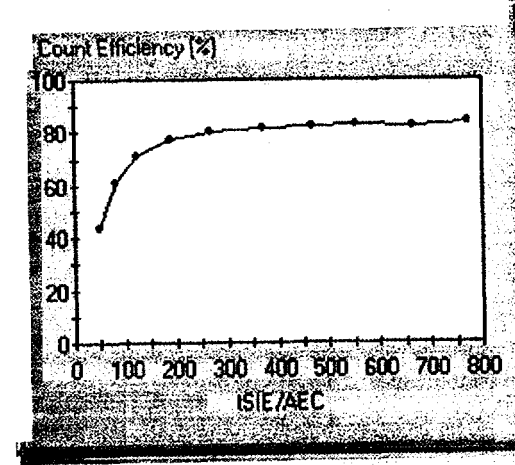
14C-UG in A



3H-UG in B



14C-UG in B



3/2/2006 12:43:32 AM

QuantaSmart (TM) - 2.02 - Serial# 433693

Protocol# 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Samples Coded 15-# Series

Page # 3

User: Todd Baker

Todd W. Baker
3-7-06

Date Acquired: 03/31/2005

Date Acquired: 03/31/2005

Date Modified:

Date Modified: 02/23/2006

3H-UG in A

14C-UG in A

tsIE/AEC	Count	Efficiency (%)	tsIE/AEC	Count	Efficiency (%)
770.14	53.30		772.57	12.41	
661.46	49.30		666.57	12.36	
554.19	44.94		555.90	11.81	
467.04	40.10		468.38	11.54	
376.12	33.70		372.38	11.08	
269.95	24.79		269.73	10.23	
188.33	16.20		191.02	9.38	
122.10	8.62		123.23	8.64	
85.37	4.66		81.51	8.01	
48.80	1.44		48.44	7.25	

3H-UG in B

14C-UG in B

tsIE/AEC	Count	Efficiency (%)	tsIE/AEC	Count	Efficiency (%)
770.14	4.08		772.57	83.70	
661.46	4.07		666.57	82.74	
554.19	4.23		555.90	82.79	
467.04	4.13		468.38	82.54	
376.12	4.08		372.38	81.96	
269.95	3.77		269.73	79.95	
188.33	3.32		191.02	77.13	
122.10	2.36		123.23	70.97	
85.37	1.63		81.51	61.30	
48.80	0.81		48.44	43.37	

PID	S#	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tsIE	MESSAGES
17	1	0:11:02	10	11	0	0	51.02	522.56	B
17	2	0:14:34	0	2	0	3	0.00	375.33	
17	3	0:18:04	0	0	0	0	0.00	304.98	
17	4	0:21:35	0	1	0	2	0.00	512.35	
17	5	0:25:05	1	4	2	4	115.20	531.33	
17	6	0:28:36	0	2	0	3	0.00	394.85	
17	7	0:32:07	4	1	9	1	56.07	457.94	
17	8	0:35:38	0	2	0	3	214.61	472.39	
17	9	0:39:09	0	4	0	5	90.07	495.59	
17	10	0:42:40	1	2	1	2	105.99	462.20	
17	11	0:46:11	0	1	0	1	0.00	480.36	
17	12	0:49:42	0	0	0	0	0.00	484.58	
18	13	0:53:33	0	0	0	1	0.00	417.80	
18	14	0:57:03	0	3	0	4	247.14	479.25	
18	15	1:00:33	0	5	0	6	38.22	344.43	
18	16	1:04:04	0	3	0	3	65.06	423.66	
18	17	1:07:35	0	1	0	2	0.00	444.50	
18	18	1:11:06	0	0	0	0	0.00	449.34	
18	19	1:14:37	0	2	0	3	660.81	460.58	
18	20	1:18:07	0	3	0	4	67.92	435.70	
18	21	1:21:37	0	0	0	0	0.00	473.35	
18	22	1:25:07	1	0	4	0	0.00	451.98	
18	23	1:28:37	0	2	0	2	0.00	435.38	
18	24	1:32:08	1	1	1	1	0.00	481.87	
19	25	1:35:59	2	1	4	1	6.61	477.75	
19	26	1:39:29	0	2	0	2	164.16	451.76	
19	27	1:43:00	1	1	2	2	19.02	512.83	
19	28	1:46:31	0	1	0	2	123.14	524.68	
19	29	1:50:02	0	2	0	2	236.15	529.80	
19	30	1:53:32	2	5	3	6	94.85	521.47	

3/2/2006 12:43:32 AM

QuantaSmart (TM) - 2.02 - Serial# 433693

Page # 4

Protocol# 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

User: Todd Baker

Samples Coded 15-# Series

Todd W. Baker

3-7-06
messages

ID	SN	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	LSIE
19	31	1:57:03	0	3	0	4	569.55	516.68
19	32	2:00:33	0	0	0	0	0.00	504.62
19	33	2:04:04	0	0	0	0	0.00	498.53
19	34	2:07:35	0	3	0	4	136.04	516.70
19	35	2:11:07	0	1	0	1	116.62	498.53
19	36	2:14:38	2	0	4	0	79.45	509.12
20	37	2:18:28	0	0	0	0	0.00	502.55
20	38	2:21:59	0	0	0	0	0.00	514.24
20	39	2:25:30	0	6	0	7	218.14	477.72
20	40	2:29:01	1	1	2	2	53.11	496.56
20	41	2:32:32	0	0	0	1	0.00	483.76
20	42	2:36:02	0	1	0	2	76.58	488.27
20	43	2:39:34	0	5	0	6	133.17	466.89
20	44	2:43:04	1	4	1	5	105.37	497.65
20	45	2:46:35	0	1	0	1	0.00	482.84
20	46	2:50:06	0	4	0	5	157.02	496.92
20	47	2:53:36	0	0	0	1	0.00	313.43
20	48	2:57:07	0	4	0	6	0.00	369.82
1	49	3:00:58	0	3	0	4	220.33	336.46
1	50	3:04:29	0	0	0	0	0.00	432.47
1	51	3:08:00	0	2	0	3	0.00	463.22
1	52	3:11:30	0	0	0	0	1126.71	512.11
1	53	3:15:00	0	1	0	2	0.00	409.00
1	54	3:18:30	0	1	0	2	0.00	360.35
1	55	3:22:01	0	3	0	4	236.99	464.26
1	56	3:25:31	0	0	0	0	0.00	315.77
1	57	3:29:02	0	1	1	1	113.55	495.30
1	58	3:32:34	0	0	2	0	0.00	448.40
1	59	3:36:04	0	0	0	1	0.00	333.07
1	60	3:39:34	0	4	0	6	0.00	262.39
2	61	3:43:26	0	1	0	2	0.00	438.10
2	62	3:46:57	0	0	0	1	0.00	455.32
2	63	3:50:28	0	3	0	4	122.44	449.21
2	64	3:53:59	0	2	0	2	67.98	393.76
2	65	3:57:29	0	0	0	0	0.00	412.85
2	66	4:01:02	0	4	0	5	152.16	428.40
2	67	4:04:33	0	0	0	0	0.00	496.34
2	68	4:08:04	2	4	4	4	92.79	500.96
2	69	4:11:35	0	0	0	0	0.00	493.15
2	70	4:15:05	0	6	0	7	143.75	506.61
2	71	4:18:37	0	3	0	3	138.09	481.41
2	72	4:22:08	1	2	2	2	87.68	483.37
3	73	4:25:58	0	0	2	0	0.00	493.93
3	74	4:29:30	1	4	2	5	30.59	448.61
3	75	4:33:00	0	0	0	0	0.00	462.81
3	76	4:36:30	0	2	0	3	0.00	446.22
3	77	4:40:00	0	0	0	0	0.00	503.23
3	78	4:43:31	2	1	5	1	61.92	503.38
3	79	4:47:01	2	1	5	1	131.20	514.43
3	80	4:50:32	0	0	0	0	0.00	493.49
3	81	4:54:03	2	0	5	0	304.15	513.96
3	82	4:57:34	2	4	5	4	45.04	498.08
3	83	5:01:05	0	3	0	4	292.53	508.03
3	84	5:04:37	1	2	1	2	199.82	515.04
4	85	5:08:28	0	3	0	4	161.55	503.39
4	86	5:11:59	1	4	1	5	82.19	514.75
4	87	5:15:30	0	3	0	6	0.00	187.90
4	88	5:19:00	0	2	0	3	0.00	431.90
4	89	5:22:30	0	0	0	0	0.00	325.54
4	90	5:26:00	0	0	0	0	0.00	466.91
4	91	5:29:31	0	1	0	1	0.00	441.81
4	92	5:33:01	0	1	0	2	0.00	315.53
4	93	5:36:31	0	4	0	4	58.47	443.31

3/2/2006 12:43:32 AM

QuantaSmart (TM) - 2.02 - Serial# 433693

Page # 5

Protocol# 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Samples Coded 15-# Series

User: Todd Baker

Todd W. Baker
3-7-06

Messages

PID	SH	ELTIME	CPMA	CPMB	DPM1	DPM2	STS	LSIE
4	94	5:40:01	0	0	0	0	0.00	274.08
4	95	5:43:33	0	0	0	1	0.00	401.70
4	96	5:47:05	0	7	0	9	79.78	274.57
5	97	5:50:56	1	3	1	3	36.87	384.22
5	98	5:54:26	0	7	0	9	166.53	387.71
Missing vial 99.								
5	100	5:57:58	6047	636	14528	38	11.76	494.00
5	101	6:01:28	1102	7691	50	9307	80.57	494.99
5	102	6:04:59	6044	8793	11494	10057	57.34	508.07

00 GBH-3 Spike

101 GBC-14 Spike

02 GB Dual Label Spike (H-3/C-14)

Todd W. Baker
 3-8-06

Assay Definition-

Assay Description:

Dual label H-3 and C-14 DPM assay per request of NAREL.

Assay Type: DPM (Dual)

Report Name: Gulf Breeze Sample Report Analysis Format

Output Data Path: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060308_1003

Raw Results Path: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060308_1003\20060308_1003.results

Comma-Delimited File Name: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060308_1003\Gulf Breeze_YYYYMMDD_HHMM.csv

Assay File Name: C:\Packard\TriCarb\Assays\Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Count Conditions-

Nuclide: 3H-14C UG

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2s8

Pre-Count Delay (min): 0.00

Quench Sets:

Low Energy: 3H-UG

Mid Energy: 14C-UG

Count Time (min): 3.00

Count Mode: Normal

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: On - 1st Vial

Low CPM Threshold: Off

2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	0.0	0.0	1st Vial

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Luminescence Correction: n/a

Heterogeneity Monitor: n/a

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Instrument Block Data

Machine=Tri-Carb 2900TR

Version=2.06

433693

MODEL=Tri-Carb 2900TR

VERSION=2.06

SERIAL=433693

IPA Block Data

Software Version IC: 2.11

Software Version EC: 2.02

Protocol# 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Recounts of 15-95 and 15-97 with Spike set

User: Todd Baker

Todd W. Baker
3-8-06

Instrument Model: Tri-Carb 2900TR

Instrument Serial Number: 433693

3H Chi Square: 25.17 Date Processed: 3/7/2006 7:32:32 PM

14C Chi Square: 13.62 Date Processed: 3/7/2006 7:32:32 PM

3H E²/B (1-18.6 keV): 229.43 Date Processed: 3/7/2006 7:32:32 PM14C E²/B (4-156 keV): 496.02 Date Processed: 3/7/2006 7:32:32 PM

3H Efficiency (0-18.6 keV): 63.59 Date Processed: 3/7/2006 7:32:32 PM

14C Efficiency (0-156 keV): 96.25 Date Processed: 3/7/2006 7:32:32 PM

IPA Background Date Processed: 3/7/2006 7:32:32 PM

3H Background CPM (0-18.6 keV): 17.63 Date Processed: 3/7/2006 7:32:32 PM

14C Background CPM (0-156 keV): 23.98 Date Processed: 3/7/2006 7:32:32 PM

3H Calibration DPM: 275600

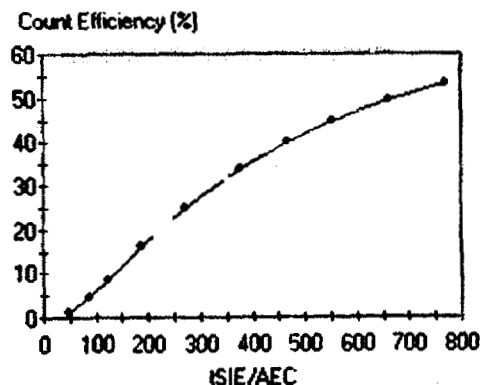
3H Reference Date: 2/11/2005

14C Calibration DPM: 127900

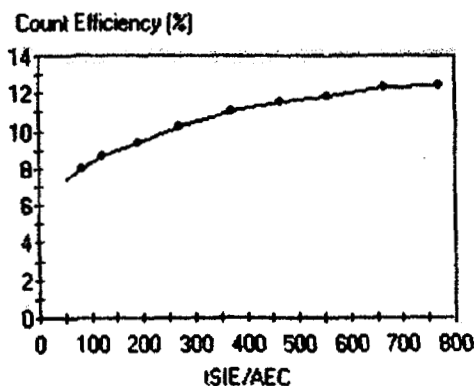
Cycle 1 Results

Quench Curve Block Data

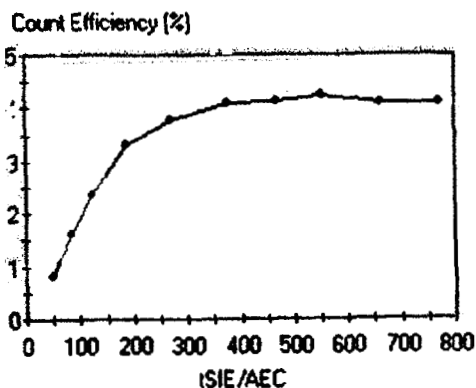
3H-UG in A



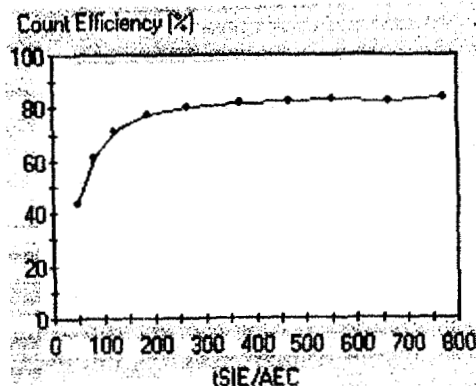
14C-UG in A



3H-UG in B



14C-UG in B



3/8/2006 10:31:57 AM

QuantaSmart (TM) - 2.02 - Serial# 433693

Page # 3

Protocol# 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

User: Todd Baker

Recounts of 15-95 and 15-97 with Spike set.

Todd W. Baker
3-8-06

Date Acquired: 03/31/2005

Date Acquired: 03/31/2005

Date Modified:

Date Modified: 02/23/2006

3H-UG in A

14C-UG in A

tSIE/AEC	Count	Efficiency (%)	tSIE/AEC	Count	Efficiency (%)
770.14	53.30		772.57	12.41	
661.46	49.30		666.57	12.36	
554.19	44.95		555.90	11.81	
467.04	40.10		468.38	11.54	
376.12	33.70		372.38	11.08	
269.95	24.79		269.73	10.23	
188.33	16.20		191.02	9.38	
122.10	8.62		123.23	8.64	
85.37	4.66		81.51	8.01	
48.80	1.44		48.44	7.25	

3H-UG in B

14C-UG in B

tSIE/AEC	Count	Efficiency (%)	tSIE/AEC	Count	Efficiency (%)
770.14	4.08		772.57	83.69	
661.46	4.07		666.57	82.74	
554.19	4.23		555.90	82.78	
467.04	4.13		468.38	82.54	
376.12	4.08		372.38	81.96	
269.95	3.77		269.73	79.95	
188.33	3.32		191.02	77.13	
122.10	2.36		123.23	70.97	
85.37	1.63		81.51	61.30	
48.80	0.81		48.44	43.37	

PID	S#	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE	MESSAGES
5	1	0:10:45	9	14	0	0	63.98	514.32	Blank
5	15-95 2	0:14:17	0	0	0	0	0.00	278.34	
5	15-97 3	0:17:48	0	0	0	0	0.00	374.94	
Missing vial 4.									
5	5	0:21:20	5962	617	14291	26	11.72	495.86	
5	6	0:24:51	1089	7621	42	9223	80.19	494.44	
5	7	0:28:22	6094	8700	11636	9938	57.10	508.66	

5 GB H-3 Spike

6 GB C-14 Spike

7 GB Dual Label Spike (H-3/C-14)

Protocol # 5 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Samples Coded "15-#" Set

User: Todd Baker

Processed Data Report

(For complete raw data including full instrument settings, see the corresponding Report Datasheets)

Regions	LL	UL	Background Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	0.0	0.0	1st Vial

Sample ID	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE MESSAGES
Blank	0:11:02	10	11	0	0	51.02	522.56 Background Vial
15-1	0:14:34	0	2	0	3	0	375.33
15-2	0:18:04	0	0	0	0	0	304.98
15-3	0:21:35	0	1	0	2	0	512.35
15-4	0:25:05	1	4	2	4	115.2	531.33
15-5	0:28:36	0	2	0	3	0	394.85
15-6	0:32:07	4	1	9	1	56.07	457.94
15-7	0:35:38	0	2	0	3	214.61	472.39
15-8	0:39:09	0	4	0	5	90.07	495.59
15-9	0:42:40	1	2	1	2	105.99	462.2
15-10	0:46:11	0	1	0	1	0	480.36
15-11	0:49:42	0	0	0	0	0	484.58
15-12	0:53:33	0	0	0	1	0	417.8
15-13	0:57:03	0	3	0	4	247.14	479.25
15-14	1:00:33	0	5	0	6	38.22	344.43
15-15	1:04:04	0	3	0	3	65.06	423.66
15-16	1:07:35	0	1	0	2	0	444.5
15-17	1:11:06	0	0	0	0	0	449.34
15-18	1:14:37	0	2	0	3	660.81	460.58
15-19	1:18:07	0	3	0	4	67.92	435.7
15-20	1:21:37	0	0	0	0	0	473.35
15-21	1:25:07	1	0	4	0	0	451.98
15-22	1:28:37	0	2	0	2	0	435.38
15-23	1:32:08	1	1	1	1	0	481.87
15-24	1:35:59	2	1	4	1	6.61	477.75
15-25	1:39:29	0	2	0	2	164.16	451.76
15-26	1:43:00	1	1	2	2	19.02	512.83
15-27	1:46:31	0	1	0	2	123.14	524.68
15-28	1:50:02	0	2	0	2	236.15	529.8
15-29	1:53:32	2	5	3	6	94.85	521.47
15-30	1:57:03	0	3	0	4	569.55	516.68
15-31	2:00:33	0	0	0	0	0	504.62
15-32	2:04:04	0	0	0	0	0	498.53
15-33	2:07:35	0	3	0	4	136.04	516.7
15-34	2:11:07	0	1	0	1	116.62	498.53
15-35	2:14:38	2	0	4	0	79.45	509.12
15-36	2:18:28	0	0	0	0	0	502.55
15-37	2:21:59	0	0	0	0	0	514.24
15-38	2:25:30	0	6	0	7	218.14	477.72
15-39	2:29:01	1	1	2	2	53.11	496.56

Sample ID	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE MESSAGES
15-40	2:32:32	0	0	0	1	0	483.76
15-41	2:36:02	0	1	0	2	76.58	488.27
15-42	2:39:34	0	5	0	6	133.17	466.89
15-43	2:43:04	1	4	1	5	105.37	497.65
15-44	2:46:35	0	1	0	1	0	482.84
15-45	2:50:06	0	4	0	5	157.02	496.92
15-46	2:53:36	0	0	0	1	0	313.43
15-47	2:57:07	0	4	0	6	0	369.82
15-48	3:00:58	0	3	0	4	220.33	336.46
15-49	3:04:29	0	0	0	0	0	432.47
15-50	3:08:00	0	2	0	3	0	463.22
15-51	3:11:30	0	0	0	0	1126.71	512.11
15-52	3:15:00	0	1	0	2	0	409
15-53	3:18:30	0	1	0	2	0	360.35
15-54	3:22:01	0	3	0	4	236.99	464.26
15-55	3:25:31	0	0	0	0	0	315.77
15-56	3:29:02	0	1	1	1	113.55	495.3
15-57	3:32:34	0	0	2	0	0	448.4
15-58	3:36:04	0	0	0	1	0	333.07
15-59	3:39:34	0	4	0	6	0	262.39
15-60	3:43:26	0	1	0	2	0	438.1
15-61	3:46:57	0	0	0	1	0	455.32
15-62	3:50:28	0	3	0	4	122.44	449.21
15-63	3:53:59	0	2	0	2	67.98	393.76
15-64	3:57:29	0	0	0	0	0	412.85
15-65	4:01:02	0	4	0	5	152.16	428.4
15-66	4:04:33	0	0	0	0	0	496.34
15-67	4:08:04	2	4	4	4	92.79	500.96
15-68	4:11:35	0	0	0	0	0	493.15
15-69	4:15:05	0	6	0	7	143.75	506.61
15-70	4:18:37	0	3	0	3	138.09	481.41
15-71	4:22:08	1	2	2	2	87.68	483.37
15-72	4:25:58	0	0	2	0	0	493.93
15-73	4:29:30	1	4	2	5	30.59	448.61
15-74	4:33:00	0	0	0	0	0	462.81
15-75	4:36:30	0	2	0	3	0	446.22
15-76	4:40:00	0	0	0	0	0	503.23
15-77	4:43:31	2	1	5	1	61.92	503.38
15-78	4:47:01	2	1	5	1	131.2	514.43
15-79	4:50:32	0	0	0	0	0	493.49
15-80	4:54:03	2	0	5	0	304.15	513.96
15-81	4:57:34	2	4	5	4	45.04	498.08
15-82	5:01:05	0	3	0	4	292.53	508.03
15-83	5:04:37	1	2	1	2	199.82	515.04
15-84	5:08:28	0	3	0	4	161.55	503.39
15-85	5:11:59	1	4	1	5	82.19	514.75
15-86	5:15:30	0	3	0	6	0	187.9
15-87	5:19:00	0	2	0	3	0	431.9
15-88	5:22:30	0	0	0	0	0	325.54
15-89	5:26:00	0	0	0	0	0	466.91
15-90	5:29:31	0	1	0	1	0	441.81

Sample ID	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE MESSAGES
15-91	5:33:01	0	1	0	2	0	315.53
15-92	5:36:31	0	4	0	4	58.47	443.31
15-93	5:40:01	0	0	0	0	0	274.08
15-94	5:43:33	0	0	0	1	0	401.7
15-95	5:47:05	0	7	0	9	79.78	274.57
15-96	5:50:56	1	3	1	3	36.87	384.22
15-97	5:54:26	0	7	0	9	166.53	387.71
[Position Skipped to Set Off Spikes Runs with sample batch]							
GB H-3							
Spike	5:57:58	6047	636	14528	38	11.76	494
GB C-14							
Spike	6:01:28	1102	7691	50	9307	80.57	494.99
GB Dual							
Label Spike							
(H-3/C-14)	6:04:59	6044	8793	11494	10057	57.34	508.07

Data Validation:

		CPMA	CPMB Comments				
Blank		10	11 Acceptable ranges; 10 minute stabilized count.				
	H-3 dpm	LSC Result	% Difference	C-14 dpm	LSC	% Difference	Comments
	Actual			Actual	Result		
GB H-3 Spike	13552	14528	7.2%	NA	NA	NA	Excellent agreement
GB C-14 Spike	NA	NA	NA	7456	9307	25%	Good agreement
GB Dual Label Spike (H-3/C-14)	8624	11494	33%	8854	10057	14%	Fair agreement; H-3 biased high?

Minimum Detection Count Rate Limit:

H-3 +6.85 cpm above blank/background

C-14 +7.18 cpm above blank/background

Calculated as follows: $(k_a + k_b) * \text{SQRT}[(\text{Sigma}_{\text{background}})^2 + (\text{Sigma}_{\text{sample}})^2]$ $= (k_a + k_b) * \text{SQRT}[(\text{BCR}/\text{BT}) + (\text{SCR}/\text{ST})]$

Where:

 k_a = Type I error (False positive) = 0.05 or 5%; therefore Normal table distribution value = 1.645 k_b = Type II error (False negative) = 0.05 or 5%; therefore Normal table distribution value = 1.645

SQRT = Square root function

 $\text{Sigma}_{\text{background}}$ = Standard deviation of the blank/background count $\text{Sigma}_{\text{sample}}$ = Standard deviation of the gross sample count

BCR = Background count rate

BT = Background time = 10 minutes

SCR = Sample count rate which approaches background; therefore set SCR=BCR

ST = Sample count time = 3 minutes

Nominal Minimum Detection Activities

	Efficiency	DPM	Bq	μCi
H-3	41.6%	16.47	0.27	7.42E-06
C-14	87.4%	8.94	0.15	4.03E-06

Calculated using H-3 Spike applied quench curve efficiency

Calculated using C-14 Spike applied quench curve efficiency

Comments:

1. The tSIE was the Quench indicating Parameter used to apply efficiency and calculate DPM values.

All sample tSIE values fell within the valid range of the stored curve.

Minimum: 187.9 Maximum: 531.33

2. 17 mL of Ultima Gold liquid scintillation cocktail was used to dissolve the sample media and promote complete homogenous solutions.

3. A few samples had visible particulate loading which was allowed to settle out before actual counting but after the samples were vortexed vigorously.

4. The first vial blank/background option automatically subtracted background from all sample results in positions from "2" forward.

5. The three spiked samples had adequate agreement with their respective expected or 'true' DPM rates. Therefore, the quench curves and

the efficiency corrections applied were valid. Recall from comment note 2, 17 mL of cocktail was used which could be the reason for the positive bias. This positive bias, if it truly exists would only tend to OVER estimate actual DPM and is therefore protective or conservative in terms of this analysis.

6. Sample 15-95 and 15-97 approached the C-14 minimum detection count rate. A recount of these two samples shows this to be statistical variation in the shorter 3 minute background rate acquired during sample counting times.

3/8/2006 10:31:49 AM Recounts of 15-95 and 15-97 with Spike Set							
Sample ID	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE MESSAGES
Blank	0:10:45	9	14	0	0	63.98	514.32 Background Vial
15-95	0:14:17	0	0	0	0	0	278.34
15-97	0:17:48	0	0	0	0	0	374.94
[Position Skipped to Set Off Spikes Runs with sample batch]							
GB H-3							
Spike	0:21:20	5962	617	14291	26	11.72	495.86
GB C-14							
Spike	0:24:51	1089	7621	42	9223	80.19	494.44
GB Dual							
Label Spike							
(H-3/C-14)	0:28:22	6094	8700	11636	9938	57.1	508.66

Conclusion:

All samples: No detectable activity - essentially indistinguishable from background/blank rate.

Analysis Performed by: Todd W. Baker

Verified by: Ritchie D. Buschow

//Signature On File//

Signature and Date:

//Signature On File//

Signature and Date:



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only			
Project Manager Sam Poppell					of C O N T A I N E R S	C-14	H-3								Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)																
Requested Completion Date															Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Description		Date	Time	Matrix											Comments	Lab Sample ID
17X6-1		2/16		Swipe	1	X	X								SWIPES	
17X6-2		2/16		Swipe	1	X	X								PRESERVED w/	
17X6-3				Swipe	1	X	X								1ml DI H ₂ O	
17X6-4				Swipe	1	X	X								in L.S.V.	
17X6-5				Swipe	1	X	X								2/16/06	
17X6-6				Swipe	1	X	X									
17X6-7				Swipe	1	X	X									
17X6-8				Swipe	1	X	X									
17X6-9				Swipe	1	X	X									
17X6-10		2/20		Swipe	1	X	X									
1) Sampled By: <i>[Signature]</i> Date/Time 2/20/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other				Internal Container Temperature _____ °C				
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				Custody Seal Present? <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF				Page 1 of 7				
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Intact? <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF								
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____												



CHAIN OF CUSTODY RECORD
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only		
Project Manager Sam Poppell					of C O N T A I N E R S	C-14	H-3							Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)															
Requested Completion Date														Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Description		Date	Time	Matrix										Comments	Lab Sample ID
1716-11		2/26		Swipe	1	X	X							SWIPES	
1716-12				Swipe	1	X	X							PRESERVED W/	
1716-13				Swipe	1	X	X							1ml DI H ₂ O	
1716-14				Swipe	1	X	X							in L.S.V.	
1716-15				Swipe	1	X	X							2/16/06	
1716-16				Swipe	1	X	X								
1716-17				Swipe	1	X	X								
1716-18				Swipe	1	X	X								
1716-19				Swipe	1	X	X								
1716-20		2/26		Swipe	1	X	X								
1) Sampled By: <i>[Signature]</i> Date/Time 2/26/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other				Internal Container Temperature _____ °C			
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				Custody Seal Present? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N				Page 2 of 7			
5) Relinquished By: _____ Date/Time _____				6) Received By: _____ Date/Time _____				Custody Seal Intact? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N							
Samples Disposed By: _____ Date/Time _____				Disposal Method: _____											



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Container #

Project Name US EPA Ecology Division				# of C O N T A I N E R S	ANALYSIS REQUESTED								For Laboratory Use Only		
Project Manager Sam Poppell					C-14	H-3								Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)															
Requested Completion Date														by	by
Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No														LSC	LSC
Sample Description		Date	Time	Matrix										Comments	Lab Sample ID
17X-21		2/26		Swipe	1	X	X							SWIPES	
17X-22				Swipe	1	X	X							PRESERVED w/	
17X-23				Swipe	1	X	X							1 ml DI H ₂ O	
17X-24				Swipe	1	X	X							in L.S.V.	
17X-25				Swipe	1	X	X							2/16/06	
17X-26				Swipe	1	X	X								
17X-27				Swipe	1	X	X								
17X-28				Swipe	1	X	X								
17X-29				Swipe	1	X	X								
17X-30		2/26		Swipe	1	X	X								
1) Sampled By: <i>Sam Poppell</i> Date/Time: <i>2/26/06</i>				2) Received By: <i>John P. ...</i> Date/Time: <i>2/16/06</i>				Sample Shipped via <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other				Internal Container Temperature: _____ °C			
3) Relinquished By: <i>David Kappelman</i> Date/Time: <i>2/15/06</i>				4) Received By: <i>John P. ...</i> Date/Time: <i>2/21/06</i>				Custody Seal Present? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N				Page <i>3</i> of <i>7</i>			
5) Relinquished By: _____ Date/Time: _____				6) Received By: _____ Date/Time: _____				Custody Seal Intact? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N							
Samples Disposed By: _____ Date/Time: _____				Disposal Method: _____											



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
36115-2601
(334) 270-3400
Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division				# of C O N T A I N E R S	ANALYSIS REQUESTED								For Laboratory Use Only				
Project Manager Sam Poppell					C-14	B-3								Comments:			
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)														by	by		
Requested Completion Date																LSC	LSC
Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No																	
Sample Description		Date	Time	Matrix										Comments	Lab Sample ID		
17X-31		2/26/06		Swipe	1	X	X							swipes			
17X-32				Swipe	1	X	X							preserved w/			
17X-33				Swipe	1	X	X							1 ml. DI. H ₂ O			
17X-34				Swipe	1	X	X							in L.S.V.			
17X-35				Swipe	1	X	X							2/16/06			
17X-36				Swipe	1	X	X										
17X-37				Swipe	1	X	X										
17X-38				Swipe	1	X	X										
17X-39				Swipe	1	X	X										
17X-40		2/26/06		Swipe	1	X	X										
1) Sampled By: <i>[Signature]</i> Date/Time 2/26/06				2) Received By: <i>[Signature]</i> Date/Time 2/16/06				Sample Shipped via <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand Other				Internal Container Temperature ____ °C					
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06				4) Received By: <i>[Signature]</i> Date/Time 2/21/06				Custody Seal Present? <input checked="" type="checkbox"/> <input type="checkbox"/> ON				Page 4 of 7					
5) Relinquished By: Date/Time				6) Received By: Date/Time				Custody Seal Intact? <input checked="" type="checkbox"/> <input type="checkbox"/> ON									
Samples Disposed By: Date/Time				Disposal Method:													

Distribution: White and Yellow Copies accompany sample to laboratory. Pink copy is retained by Samplers. Please use a separate form for each container.

NAREL/FORM-1 Revision 2 02/10/00



CHAIN OF CUSTODY RECORD

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

540 South Morris Ave.
Montgomery, AL
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Fax (334) 270-3454

Container #

Project Name US EPA Ecology Division		#	ANALYSIS REQUESTED								For Laboratory Use Only			
Project Manager Sam Poppell			of C O N T A I N E R S	C-14	H-3							Comments:		
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)														
Requested Completion Date													Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Description		Date	Time	Matrix								Comments	Lab Sample ID	
17X6-41		2/16		Swipe	1	X	X						Swipes	
17X6-43				Swipe	1	X	X						preserved w/	
17X6-43				Swipe	1	X	X						1ml D.I. H ₂ O	
17X6-44				Swipe	1	X	X						in L.S.V.	
17X6-45				Swipe	1	X	X						2/16/06	
17X6-46				Swipe	1	X	X							
17X6-47				Swipe	1	X	X							
17X6-48				Swipe	1	X	X							
17X6-49				Swipe	1	X	X							
17X6-50		2/16		Swipe	1	X	X							
1) Sampled By: <i>[Signature]</i> Date/Time <i>2/20/06</i>		2) Received By: <i>[Signature]</i> Date/Time <i>2/16/06</i>		Sample Shipped via <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other		Internal Container Temperature _____ °C								
3) Relinquished By: <i>[Signature]</i> Date/Time <i>2/16/06</i>		4) Received By: <i>[Signature]</i> Date/Time <i>2/21/06</i>		Custody Seal Present? <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		Page <i>5</i> of <i>7</i>								
5) Relinquished By: _____ Date/Time _____		6) Received By: _____ Date/Time _____		Custody Seal Intact? <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF										
Samples Disposed By: _____ Date/Time _____		Disposal Method: _____												

Distribution: White and Yellow Copies accompany sample to laboratory. Pink copy is retained by Samplers. Please use a separate form for each container.

NAREL/FORM-1 Revision 2 02/10/00



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Container #

Project Name US EPA Ecology Division				#	ANALYSIS REQUESTED								For Laboratory Use Only		
Project Manager Sam Poppell					of C O N T A I N E R S	C-14	H-3							Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)															
Requested Completion Date														Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Description		Date	Time	Matrix										Comments	Lab Sample ID
17X-51		2/16/06		Swipe 1	X	X								Swipes	
17X-52				Swipe 1	X	X								PRESERVED w/	
17X-53				Swipe 1	X	X								1 ml DI H ₂ O	
17X-54				Swipe 1	X	X								in L.S.V.	
17X-55				Swipe 1	X	X								2/16/06	
17X-56				Swipe 1	X	X									
17X-57				Swipe 1	X	X									
17X-58				Swipe 1	X	X									
17X-59				Swipe 1	X	X									
17X-60		2/16/06		Swipe 1	X	X									
1) Sampled By: <i>[Signature]</i> Date/Time: 2/16/06				2) Received By: <i>[Signature]</i> Date/Time: 2/16/06				Sample Shipped via <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other				Internal Container Temperature: _____ °C			
3) Relinquished By: <i>[Signature]</i> Date/Time: 2/16/06				4) Received By: <i>[Signature]</i> Date/Time: 2/21/06				Custody Seal Present? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				Page 6 of 7			
5) Relinquished By: <i>[Signature]</i> Date/Time: _____				6) Received By: _____ Date/Time: _____				Custody Seal Intact? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO							
Samples Disposed By: _____ Date/Time: _____				Disposal Method: _____											



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Container #

Project Name US EPA Ecology Division			#	ANALYSIS REQUESTED								For Laboratory Use Only		
Project Manager Sam Poppell				of C O N T A I N E R S	C-14	H-3							Comments:	
Sampling Team Members Sam Poppell (334-546-7214) David Kappelman (334-270-7064)														
Requested Completion Date													Notify Project Manager Upon Receipt? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Description	Date	Time	Matrix										Comments	Lab Sample ID
17-61	2/16/06		Swipe	1	X	X							SWIPES	
17-62	2/16/06		Swipe	1	X	X							PRESERVED w/	
			Swipe	1	X	X							1m/DI. H ₂ O	
			Swipe	1	X	X							in. L.S.V.	
			Swipe	1	X	X							2/16/06	
			Swipe	1	X	X								
			Swipe	1	X	X								
			Swipe	1	X	X								
			Swipe	1	X	X								
			Swipe	1	X	X								
			Swipe	1	X	X								
1) Sampled By: <i>[Signature]</i> Date/Time 2/16/06			2) Received By: <i>[Signature]</i> Date/Time 2/16/06			Sample Shipped via <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other			Internal Container Temperature ____ °C					
3) Relinquished By: <i>[Signature]</i> Date/Time 2/16/06			4) Received By: <i>[Signature]</i> Date/Time 2/21/06			Custody Seal Present? <input checked="" type="checkbox"/> ON			Page 7 of 7					
5) Relinquished By: Date/Time			6) Received By: Date/Time			Custody Seal Intact? <input checked="" type="checkbox"/> ON								
Samples Disposed By: Date/Time			Disposal Method:											

Protocol# 13 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

User: Todd Baker

Samples Coded 17-# Set

Todd W. Baker
2/27/06 *HLB*

Assay Definition-

Assay Description:

Dual label H-3 and C-14 DPM assay per request of NAREL.

Assay Type: DPM (Dual)

Report Name: Gulf Breeze Sample Report Analysis Format

Output Data Path: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060224_1819

Raw Results Path: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060224_1819\20060224_1819.results

Comma-Delimited File Name: C:\Packard\Tricarb\Results\Todd Baker\Gulf Breeze H-3, C-14 Dual Label DPM\20060224_1819\Gulf_Breeze_YYYYMMDD_HHMM.csv

Assay File Name: C:\Packard\TriCarb\Assays\Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Count Conditions-

Nuclide: 3H-14C UG

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2st

Pre-Count Delay (min): 0.00

Quench Sets:

Low Energy: 3H-UG

Mid Energy: 14C-UG

Count Time (min): 3.00

Count Mode: Normal

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: On - 1st Vial

Low CPM Threshold: Off

2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	0.0	0.0	1st Vial

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Luminescence Correction: n/a

Heterogeneity Monitor: n/a

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Instrument Block Data

Machine=Tri-Carb 2900TR

Version=2.06

433693

MODEL=Tri-Carb 2900TR

VERSION=2.06

SERIAL=433693

IPA Block Data

Software Version IC: 2.11

Software Version EC: 2.02

PLS Printer
error
→→→→→→→→→→

Todd W. Baker
2/27/06

Instrument Model: Tri-Carb 2900TR

Instrument Serial Number: 433693

3H Chi Square: 19.84 Date Processed: 2/24/2006 4:16:27 PM

14C Chi Square: 9.49 Date Processed: 2/24/2006 4:16:27 PM

3H E²/B (1-18.6 keV): 241.11 Date Processed: 2/24/2006 4:16:27 PM14C E²/B (4-156 keV): 525.80 Date Processed: 2/24/2006 4:16:27 PM

3H Efficiency (0-18.6 keV): 64.15 Date Processed: 2/24/2006 4:16:27 PM

14C Efficiency (0-156 keV): 96.39 Date Processed: 2/24/2006 4:16:27 PM

IPA Background Date Processed: 2/24/2006 4:16:27 PM

3H Background CPM (0-18.6 keV): 16.95 Date Processed: 2/24/2006 4:16:27 PM

14C Background CPM (0-156 keV): 23.17 Date Processed: 2/24/2006 4:16:27 PM

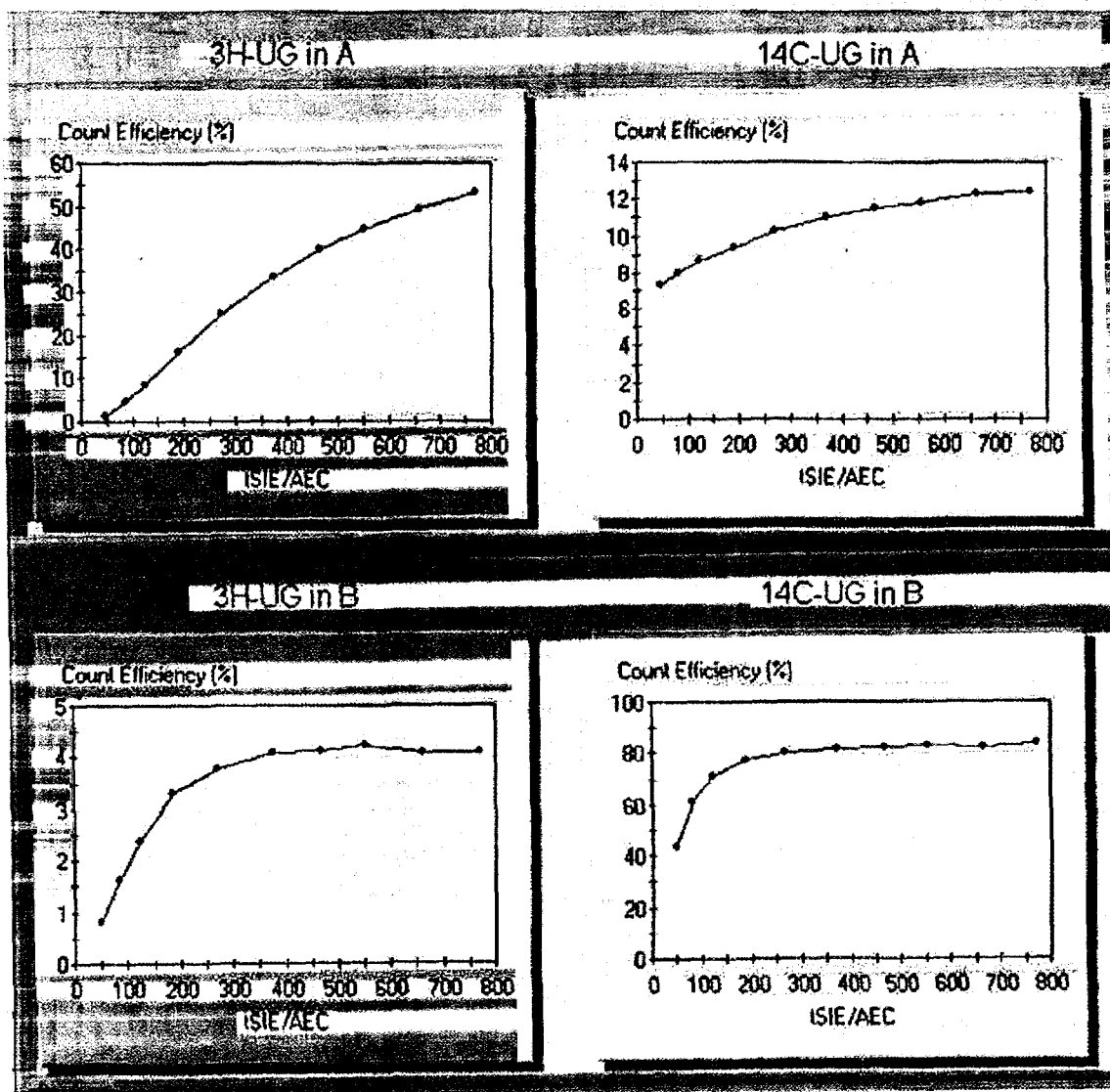
3H Calibration DPM: 275600

3H Reference Date: 2/11/2005

14C Calibration DPM: 127900

Cycle 1 Results

Quench Curve Block Data



2/24/2006 10:21:49 PM

QuantaSmart (TM) - 2.02 - Serial# 433693

Page # 3

Protocol# 13 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

User: Todd Baker

Samples Coded 17-# Set

Todd W. Baker

2-27-06

Date Acquired: 03/31/2005

Date Acquired: 03/31/2005

Date Modified:

Date Modified: 02/23/2006

3H-UG in A

14C-UG in A

tsIE/AEC	Count	Efficiency (%)	tsIE/AEC	Count	Efficiency (%)
770.14	53.30		772.57	12.41	
661.46	49.30		666.57	12.36	
554.19	44.94		555.90	11.81	
467.04	40.10		468.38	11.54	
376.12	33.70		372.38	11.08	
269.95	24.79		269.73	10.23	
188.33	16.20		191.02	9.38	
122.10	8.62		123.23	8.64	
85.37	4.66		81.51	8.01	
48.80	1.44		48.44	7.25	

3H-UG in B

14C-UG in B

tsIE/AEC	Count	Efficiency (%)	tsIE/AEC	Count	Efficiency (%)
770.14	4.08		772.57	83.69	
661.46	4.07		666.57	82.74	
554.19	4.23		555.90	82.78	
467.04	4.13		468.38	82.54	
376.12	4.08		372.38	81.96	
269.95	3.77		269.73	79.95	
188.33	3.32		191.02	77.13	
122.10	2.36		123.23	70.97	
85.37	1.63		81.51	61.30	
48.80	0.81		48.44	43.37	

PID	S#	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tsIE	MESSAGES
11	1	0:10:46	10	13	0	0	68.40	572.22	B
11	2	0:14:16	0	0	0	0	0.00	413.45	
11	3	0:17:48	0	0	0	0	0.00	543.70	
11	4	0:21:20	1	0	2	0	284.94	536.15	
11	5	0:24:51	0	3	0	4	0.00	498.10	
11	6	0:28:22	0	0	0	1	0.00	533.72	
11	7	0:31:54	0	0	1	0	0.00	432.68	
11	8	0:35:24	2	3	5	3	0.00	350.51	
11	9	0:38:55	0	1	0	1	73.79	501.90	
11	10	0:42:27	2	0	5	0	0.00	513.65	
11	11	0:45:59	0	4	0	5	82.72	500.09	
11	12	0:49:29	0	0	2	0	0.00	493.61	
12	13	0:53:23	0	0	0	0	0.00	432.59	
12	14	0:56:54	2	1	5	1	0.00	520.35	
12	15	1:00:25	0	0	0	0	0.00	464.95	
12	16	1:03:56	1	0	4	0	0.00	465.32	
12	17	1:07:28	5	0	11	0	78.40	566.94	
12	18	1:10:58	2	0	4	0	0.00	561.25	
12	19	1:14:28	0	2	0	2	0.00	557.77	
12	20	1:17:58	4	0	9	0	0.00	561.45	
12	21	1:21:29	1	0	2	0	0.00	562.07	
12	22	1:25:00	3	1	6	1	4.21	551.34	
12	23	1:28:30	2	0	6	0	0.00	558.25	
12	24	1:32:02	0	0	0	0	0.00	554.62	
13	25	1:35:57	3	0	8	0	0.00	545.94	
13	26	1:39:30	0	1	0	2	0.00	552.71	
13	27	1:43:01	0	2	0	3	0.00	550.40	
13	28	1:46:32	3	1	7	0	0.00	543.14	
13	29	1:50:03	4	0	9	0	0.00	546.82	
13	30	1:53:35	1	1	3	1	70.57	545.56	

Protocol# 13 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

User: Todd Baker

Samples Coded 17-# Set

Todd W. Baker
2-27-06

PID	S#	ELTime	CPMA	CPMB	DPN1	DPN2	STS	LSIE
13	31	1:57:06	5	0	11	0	2.35	513.66
13	32	2:00:36	0	4	0	4	63.23	548.00
13	33	2:04:08	1	0	4	0	0.00	467.65
13	34	2:07:39	1	0	3	0	0.00	488.92
13	35	2:11:11	0	0	0	0	0.00	513.54
13	36	2:14:42	0	0	0	0	0.00	531.48
14	37	2:18:37	0	0	0	0	0.00	539.77
14	38	2:22:09	1	0	2	0	0.00	515.19
14	39	2:25:41	0	0	0	0	0.00	478.31
14	40	2:29:13	0	0	0	1	0.00	451.98
14	41	2:32:44	3	4	6	4	22.45	440.28
14	42	2:36:15	0	0	0	0	0.00	396.87
14	43	2:39:46	0	0	0	0	0.00	433.46
14	44	2:43:18	0	0	0	0	0.00	499.17
14	45	2:46:49	0	0	1	0	0.00	462.35
14	46	2:50:21	0	0	0	0	0.00	480.51
14	47	2:53:52	4	0	10	0	0.00	489.65
14	48	2:57:24	0	0	0	0	0.00	502.08
15	49	3:01:17	0	0	0	0	0.00	407.59
15	50	3:04:49	0	1	0	1	0.00	485.97
15	51	3:08:21	0	1	0	1	0.00	437.97
15	52	3:11:53	0	0	0	0	0.00	430.28
15	53	3:15:24	0	0	2	0	0.00	513.94
15	54	3:18:56	1	0	2	0	0.00	500.78
15	55	3:22:28	0	0	0	0	0.00	548.66
15	56	3:25:58	0	0	0	0	0.00	391.12
15	57	3:29:28	0	0	0	0	0.00	556.90
15	58	3:32:59	0	0	0	0	0.00	530.80
15	59	3:36:31	4	0	9	0	0.00	560.68
15	60	3:40:03	0	4	0	5	210.25	555.60
16	61	3:43:59	1	0	2	0	0.00	576.67
16	62	3:47:31	0	0	0	0	0.00	531.46
16	63	3:51:03	0	3	0	4	129.99	545.78
Missing vial 64.								
16	65	3:54:36	6074	636	14227	49	11.94	512.98
16	66	3:58:06	1087	7704	0	9320	82.73	510.19
16	67	4:01:39	6292	8756	11643	9991	59.41	536.53

65 GB H-3 Spike
 66 GB C-14 Spike
 67 GB Dual Label Spike
 H3/C14

Protocol # 13 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Samples Coded "17-##" Set

User: Todd Baker

Processed Data Report

(For complete raw data including full instrument settings, see the corresponding Report Datasheets)

Regions	LL	UL	Background Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	0.0	0.0	1st Vial

Sample ID	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE MESSAGES
Blank	0:10:46	10	13	0	0	68.4	572.22 Background Vial
17-1	0:14:16	0	0	0	0	0	413.45
17-2	0:17:48	0	0	0	0	0	543.7
17-3	0:21:20	1	0	2	0	284.94	536.15
17-4	0:24:51	0	3	0	4	0	498.1
17-5	0:28:22	0	0	0	1	0	533.72
17-6	0:31:54	0	0	1	0	0	432.68
17-7	0:35:24	2	3	5	3	0	350.51
17-8	0:38:55	0	1	0	1	73.79	501.9
17-9	0:42:27	2	0	5	0	0	513.65
17-10	0:45:59	0	4	0	5	82.72	500.09
17-11	0:49:29	0	0	2	0	0	493.61
17-12	0:53:23	0	0	0	0	0	432.59
17-13	0:56:54	2	1	5	1	0	520.35
17-14	1:00:25	0	0	0	0	0	464.95
17-15	1:03:56	1	0	4	0	0	465.32
17-16	1:07:28	5	0	11	0	78.4	566.94
17-17	1:10:58	2	0	4	0	0	561.25
17-18	1:14:28	0	2	0	2	0	557.77
17-19	1:17:58	4	0	9	0	0	561.45
17-20	1:21:29	1	0	2	0	0	562.07
17-21	1:25:00	3	1	6	1	4.21	551.34
17-22	1:28:30	2	0	6	0	0	558.25
17-23	1:32:02	0	0	0	0	0	554.62
17-24	1:35:57	3	0	8	0	0	545.94
17-25	1:39:30	0	1	0	2	0	552.71
17-26	1:43:01	0	2	0	3	0	550.4
17-27	1:46:32	3	1	7	0	0	543.14
17-28	1:50:03	4	0	9	0	0	546.82
17-29	1:53:35	1	1	3	1	70.57	545.56
17-30	1:57:06	5	0	11	0	2.35	513.66
17-31	2:00:36	0	4	0	4	63.23	548
17-32	2:04:08	1	0	4	0	0	467.65
17-33	2:07:39	1	0	3	0	0	488.92
17-34	2:11:11	0	0	0	0	0	513.54
17-35	2:14:42	0	0	0	0	0	531.48
17-36	2:18:37	0	0	0	0	0	539.77
17-37	2:22:09	1	0	2	0	0	515.19
17-38	2:25:41	0	0	0	0	0	478.31
17-39	2:29:13	0	0	0	1	0	451.98

Sample ID	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE MESSAGES
17-40	2:32:44	3	4	6	4	22.45	440.28
17-41	2:36:15	0	0	0	0	0	396.87
17-42	2:39:46	0	0	0	0	0	433.46
17-43	2:43:18	0	0	0	0	0	499.17
17-44	2:46:49	0	0	1	0	0	462.35
17-45	2:50:21	0	0	0	0	0	480.51
17-46	2:53:52	4	0	10	0	0	489.65
17-47	2:57:24	0	0	0	0	0	502.08
17-48	3:01:17	0	0	0	0	0	407.59
17-49	3:04:49	0	1	0	1	0	485.97
17-50	3:08:21	0	1	0	1	0	437.97
17-51	3:11:53	0	0	0	0	0	430.28
17-52	3:15:24	0	0	2	0	0	513.94
17-53	3:18:56	1	0	2	0	0	500.78
17-54	3:22:28	0	0	0	0	0	548.66
17-55	3:25:58	0	0	0	0	0	391.12
17-56	3:29:28	0	0	0	0	0	556.9
17-57	3:32:59	0	0	0	0	0	530.8
17-58	3:36:31	4	0	9	0	0	560.68
17-59	3:40:03	0	4	0	5	210.25	555.6
17-60	3:43:59	1	0	2	0	0	576.67
17-61	3:47:31	0	0	0	0	0	531.46
17-62	3:51:03	0	3	0	4	129.99	545.78
[Position Skipped to Set Off Spikes Runs with sample batch]							
GB H-3							
Spike	3:54:36	6074	636	14227	49	11.94	512.98
GB C-14							
Spike	3:58:06	1087	7704	0	9320	82.73	510.19
GB Dual							
Label Spike							
(H-3/C-14)	4:01:39	6292	8756	11643	9991	59.41	536.53

Data Validation:

Data Validation:	CPMA		CPMB Comments				
	Blank	10	13 Acceptable ranges; 10 minute stabilized count.				
	H-3 dpm	LSC Result	% Difference	C-14 dpm	LSC	% Difference	Comments
	Actual			Actual	Result		
GB H-3 Spike	13552	14227	5.0%	NA	NA		NA Excellent agreement
GB C-14 Spike	NA	NA	NA	7456	9320	25%	Good agreement
GB Dual Label Spike (H-3/C-14)	8624	11643	35%	8854	9991	13%	Fair agreement; H-3 biased high?

Minimum Detection Count Rate Limit:

H-3 +6.85 cpm above blank/background

C-14 +7.81 cpm above blank/background

Calculated as follows: $(k_a + k_b) * \text{SQRT}[(\text{Sigma}_{\text{background}})^2 + (\text{Sigma}_{\text{sample}})^2]$ $= (k_a + k_b) * \text{SQRT}[(\text{BCR}/\text{BT}) + (\text{SCR}/\text{ST})]$

Where:

 k_a = Type I error (False positive) = 0.05 or 5%; therefore Normal table distribution value = 1.645 k_b = Type II error (False negative) = 0.05 or 5%; therefore Normal table distribution value = 1.645

SQRT = Square root function

 $\text{Sigma}_{\text{background}}$ = Standard deviation of the blank/background count $\text{Sigma}_{\text{sample}}$ = Standard deviation of the gross sample count

BCR = Background count rate

BT = Background time = 10 minutes

SCR = Sample count rate which approaches background; therefore set SCR=BCR

ST = Sample count time = 3 minutes

Nominal Minimum Detection Activities

	Efficiency	DPM	Bq	μCi	
H-3	42.7%	16.04215	0.27	7.23E-06	Calculated using H-3 Spike applied quench curve efficiency
C-14	82.7%	9.443773	0.16	4.25E-06	Calculated using C-14 Spike applied quench curve efficiency

Comments:

1. The tSIE was the Quench indicating Parameter used to apply efficiency and calculate DPM values.
All sample tSIE values fell within the valid range of the stored curve. **Minimum: 350.51 Maximum: 576.67**
2. 17 mL of Ultima Gold liquid scintillation cocktail was used to dissolve the sample media and promote complete homogenous solutions.
3. A few samples had visible particulate loading which was allowed to settle out before actual counting but after the samples were vortexed vigorously.
4. The first vial blank/background option automatically subtracted background from all sample results in positions from "2" forward.
5. Sample 17-1 had a persistent milky appearance attributed to additional aqueous loading.

Therefore sample 17-1 differed and bordered on being a sample which was not homogenous. Nevertheless, sample counting was not adversely effected as evidenced by a tSIE value of 413.5 which is about average. After greater time elapsed, 17-1 reverted to the appearance of all the other samples in this batch.

6. The three spiked samples had adequate agreement with their respective expected or 'true' DPM rates. Therefore, the quench curves and the efficiency corrections applied were valid. Recall from comment note 2, 17 mL of cocktail was used which could be the reason for the positive bias. This positive bias, if it truly exists would only tend to OVER estimate actual DPM and is therefore protective or conservative in terms of this analysis.

Conclusion:

All samples: No detectable activity - essentially indistinguishable from background/blank rate.

Analysis Performed by: Todd W. Baker

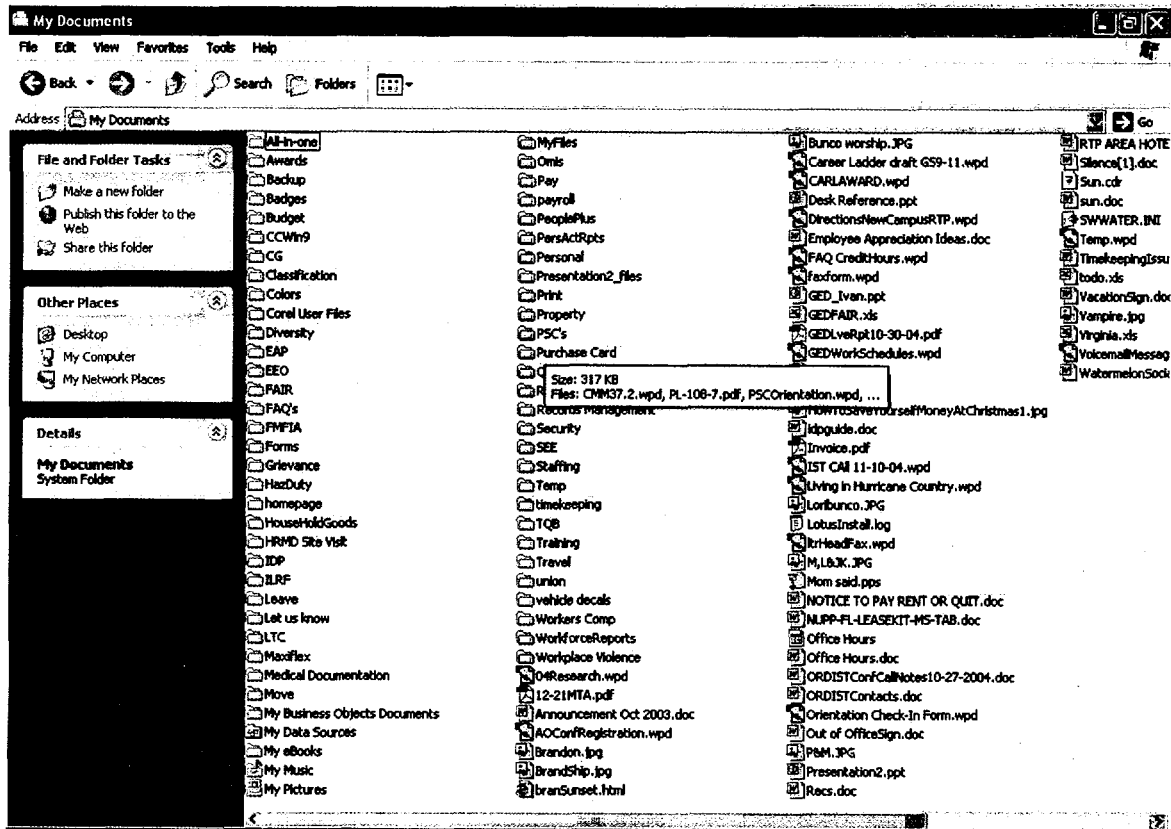
Verified by: Ritchie D. Buschow

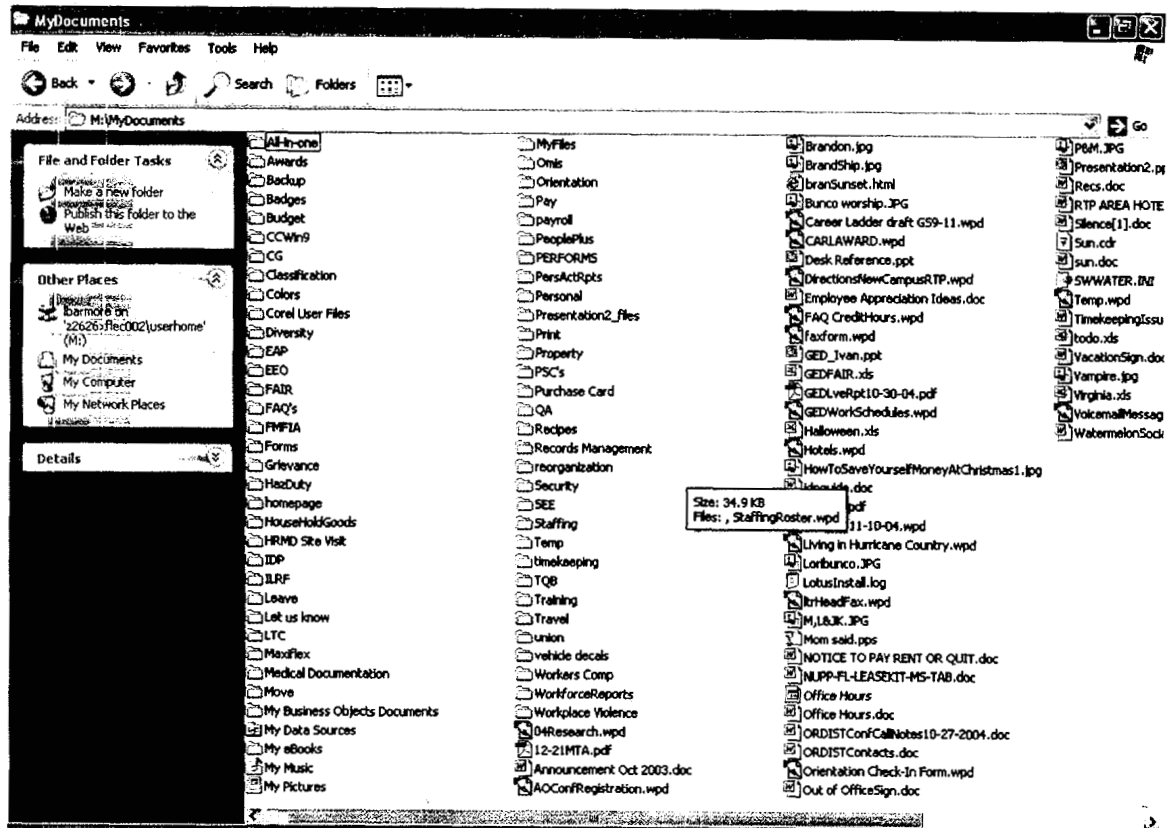
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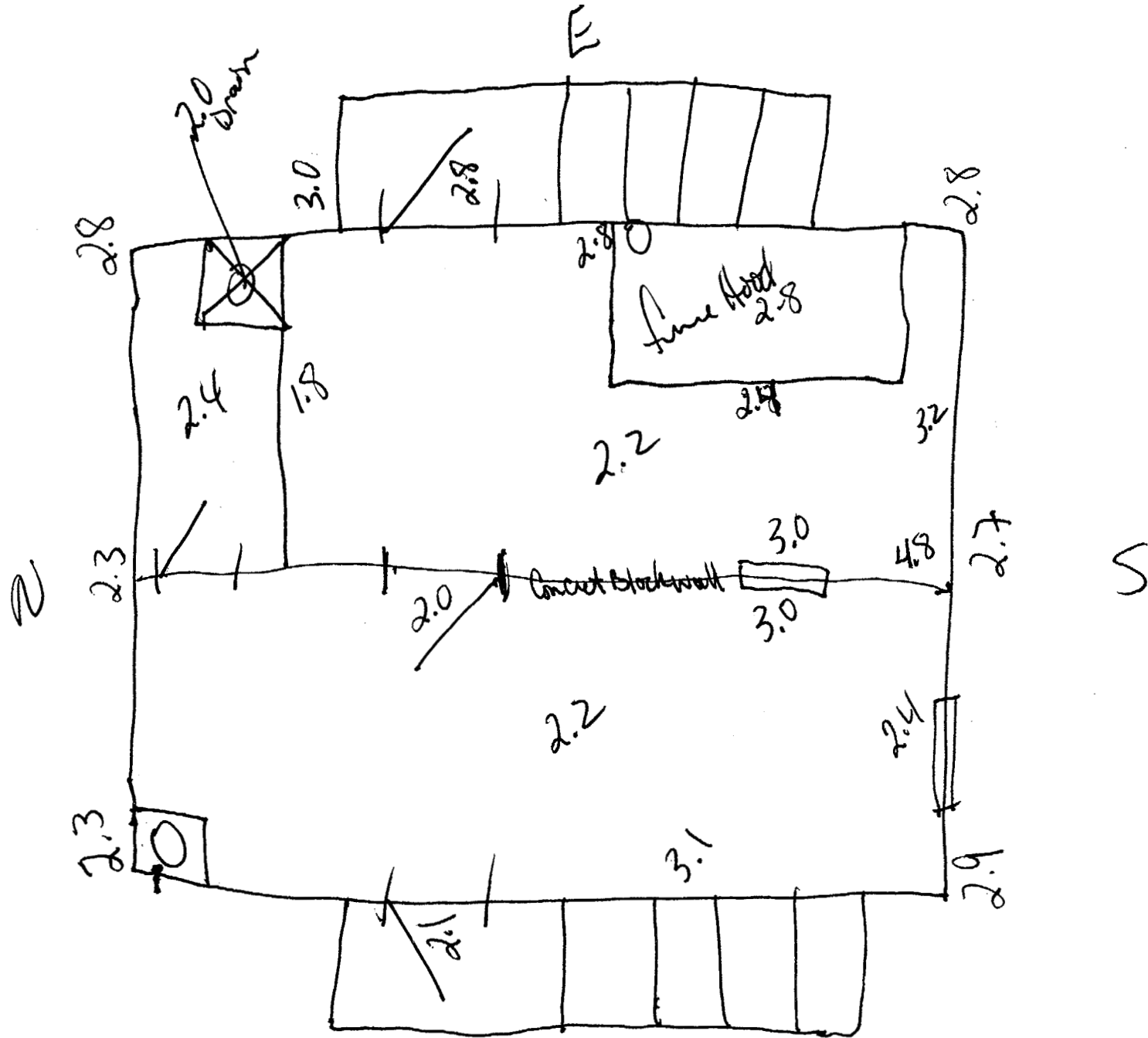
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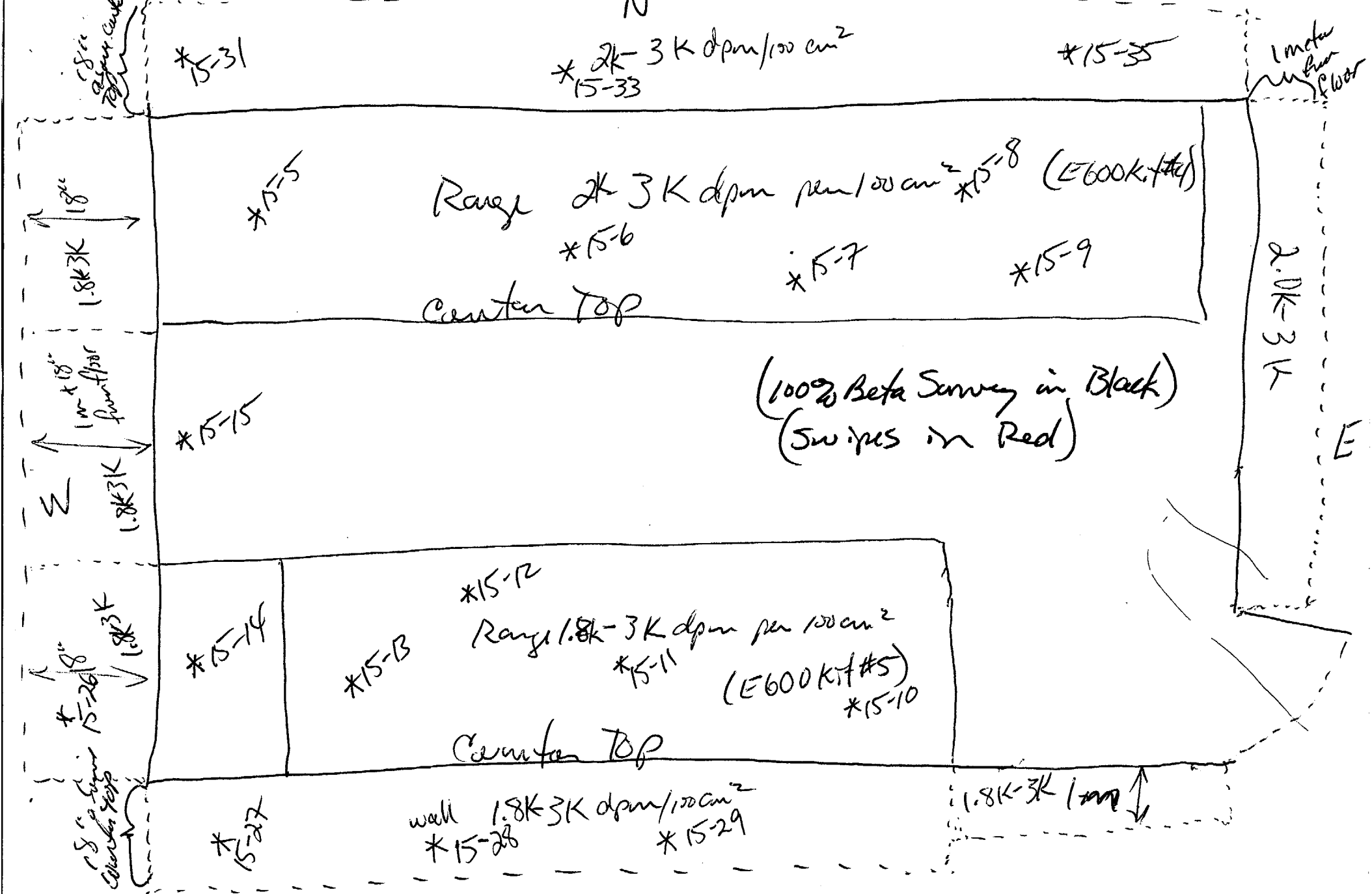
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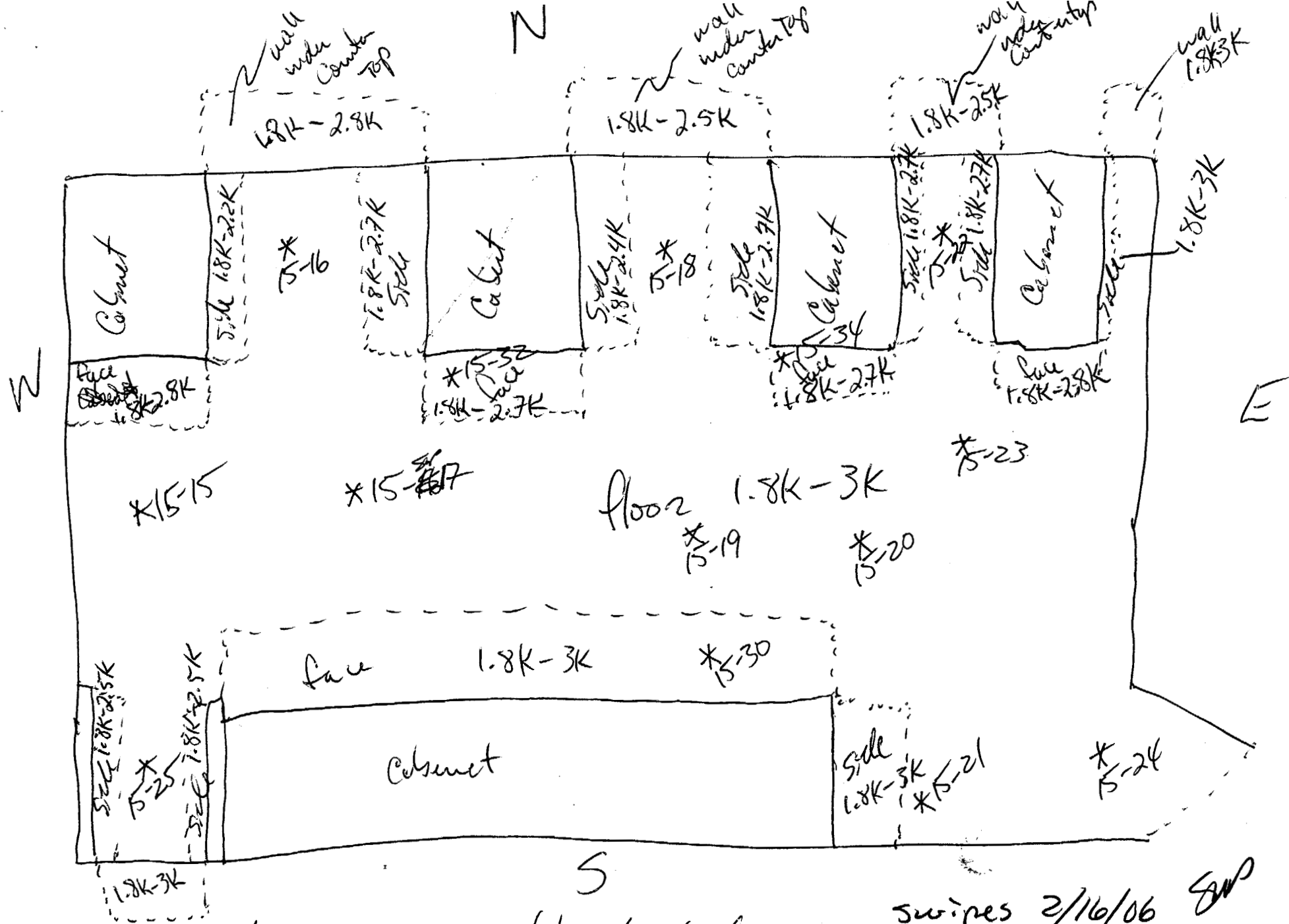
Bldg 17 Camera Survey W 2/14/06 JWP



Bldg 15

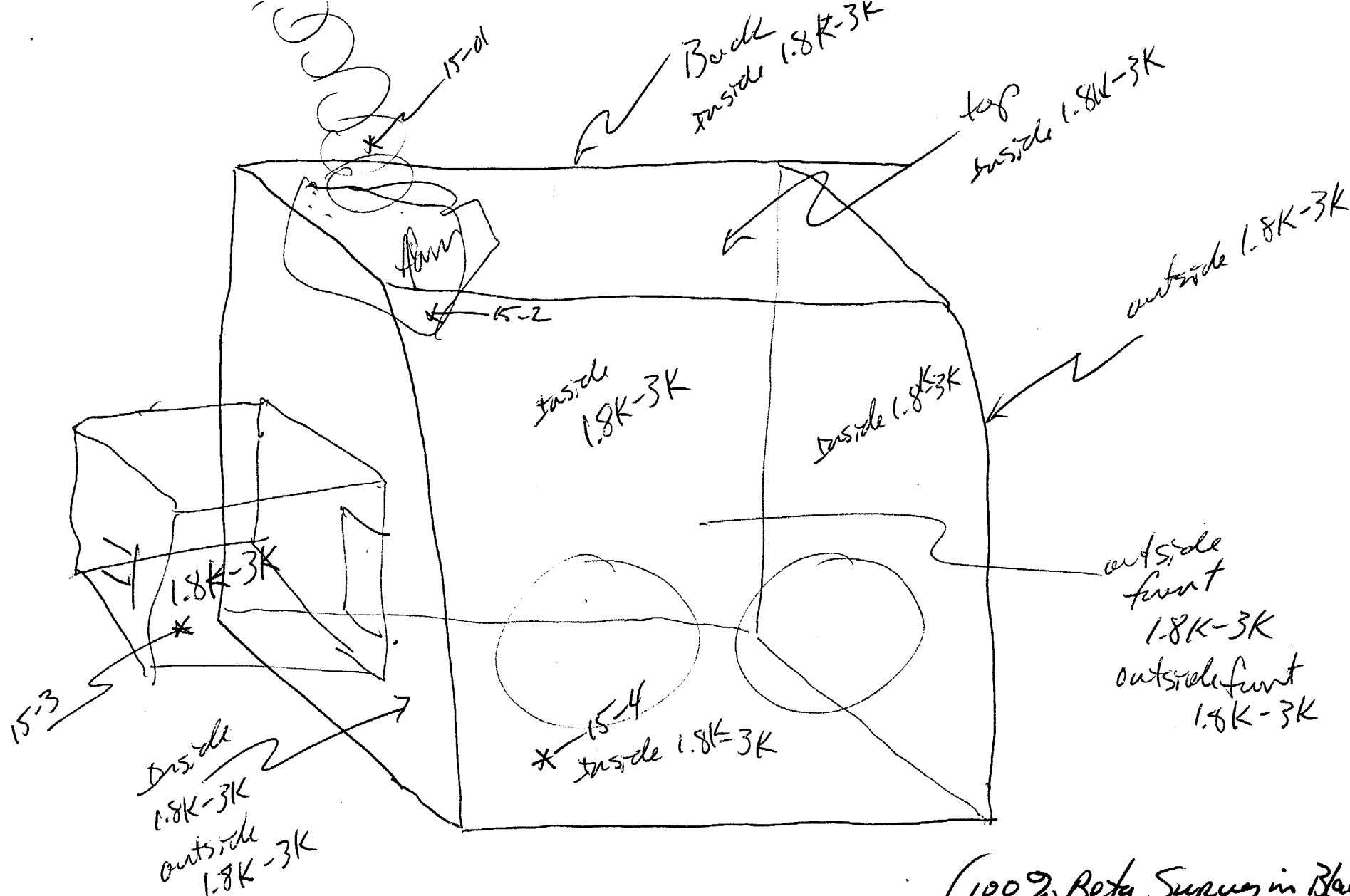
Wrublesk hab
Narrow room
S

100% Survey 2/15/06
Swipes 2/16/06 GJP



Bldg 15 N cable sk has
NARROW ROOM

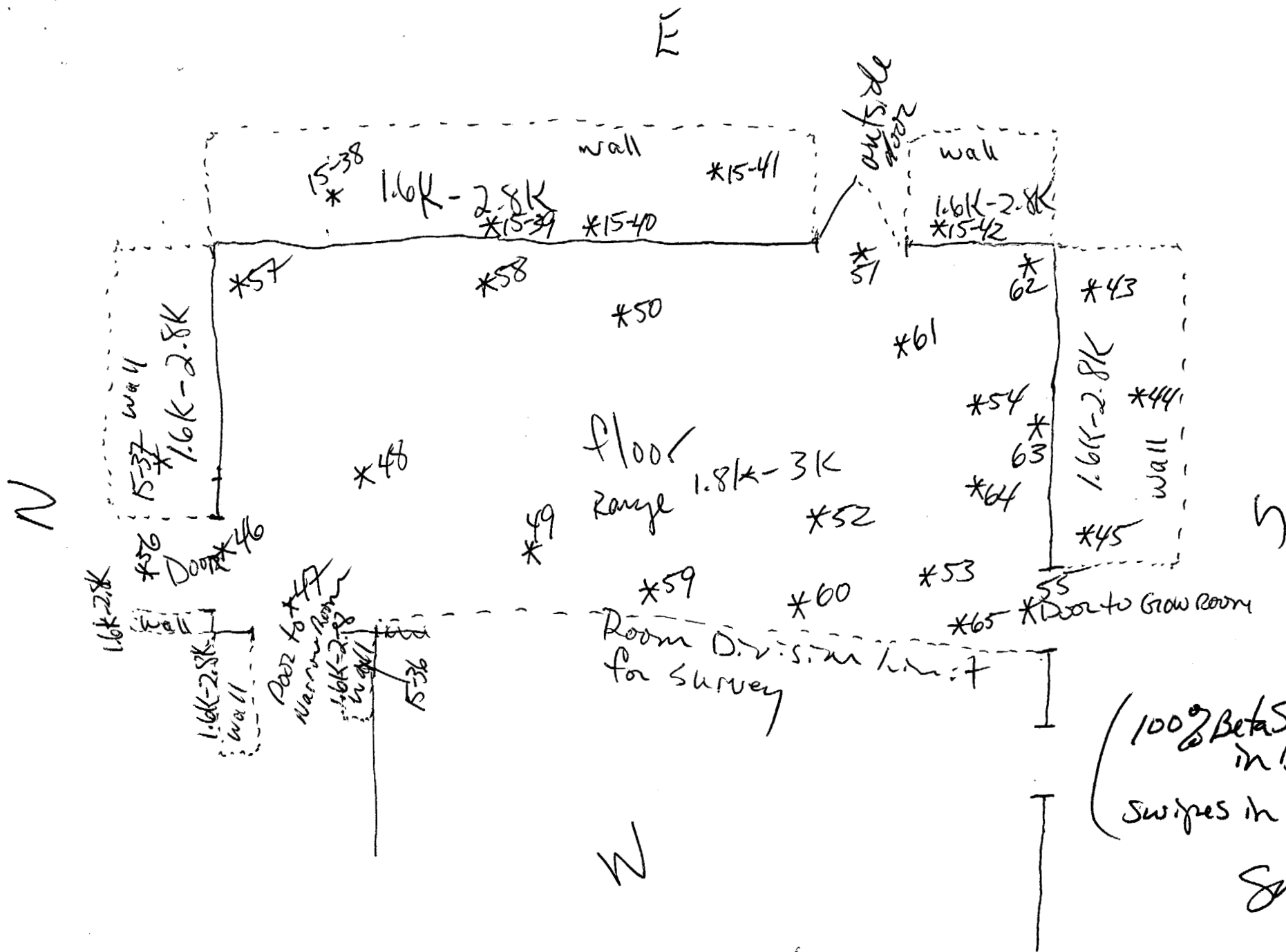
swipes 2/16/06 GWP
100% SURV 2/15/06
(100% Beta Survey in Black)
Swipes in Red



Bbs 15

Warbler sk has
Narrow Room

100% Sunray 2/15/06 SWP
Swipes 2/16/06



Bldg 15

Worblest; has
Large middle room

100% Survey 2/15/00
Swipes 2/16/06

S



Blue IT Swipes Samples (In Red)

2/16/06

SWD



This is to acknowledge the receipt of your letter/application dated

3/14/2006, and to inform you that the initial processing which includes an administrative review has been performed.

☒ AMEND. 09-10672-03 There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 138579.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.