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

Br. 2

September 3, 2008

OFFICE OF
RESEARCH AND DEVELOPMENT

RECEIVED
REGION 1
2008 SEP 15 PM 1:23

U.S. Nuclear Regulatory Commission
Attn: Mr. Bryan A. Parker
USNRC Region I
Division of Nuclear Materials Safety
475 Allendale Road
King of Prussia, PA 19406-1415

Dear Mr. Parker:

03032959

A small laboratory room, located at a NOAA facility in Key Largo, FL, has not been occupied by US EPA scientists since the 1990's. Following a decommission of this laboratory, we respectfully request permission to remove the Key Largo facility located at 512 Caribbean Avenue, from NCR License 09-10672-03.

Enclosed are a comprehensive Radiological Survey Report, Certificates of Calibration, Instrument QC checks, copies of notebook pages recorded during decommission, copies of room diagrams with swipe (vial number), copies of scintillation vial numbers, and Contamination Wipe Test Survey Results.

Please contact Dr. Stephanie Friedman, RSO, at 850-934-2468. Thank you for your attention to this matter.

Sincerely,

William H. Benson

William H. Benson, Ph.D.
Director

142003

Report for decommissioning of the NOAA laboratory at Key Largo, FL
29 August 2008

US EPA contacts:
Dr. Stephanie Friedman, RSO
Gulf Ecology Division, Gulf Breeze, FL
850-934-2468
friedman.stephanie@epa.gov

The purpose of this report is to remove, from our NRC license (Lic No 09-10672-03), the following statement from item 10, "...at 512 Caribbean Avenue, Key Largo, Florida" regarding the use of licensed material.

I. Facility to be decommissioned:

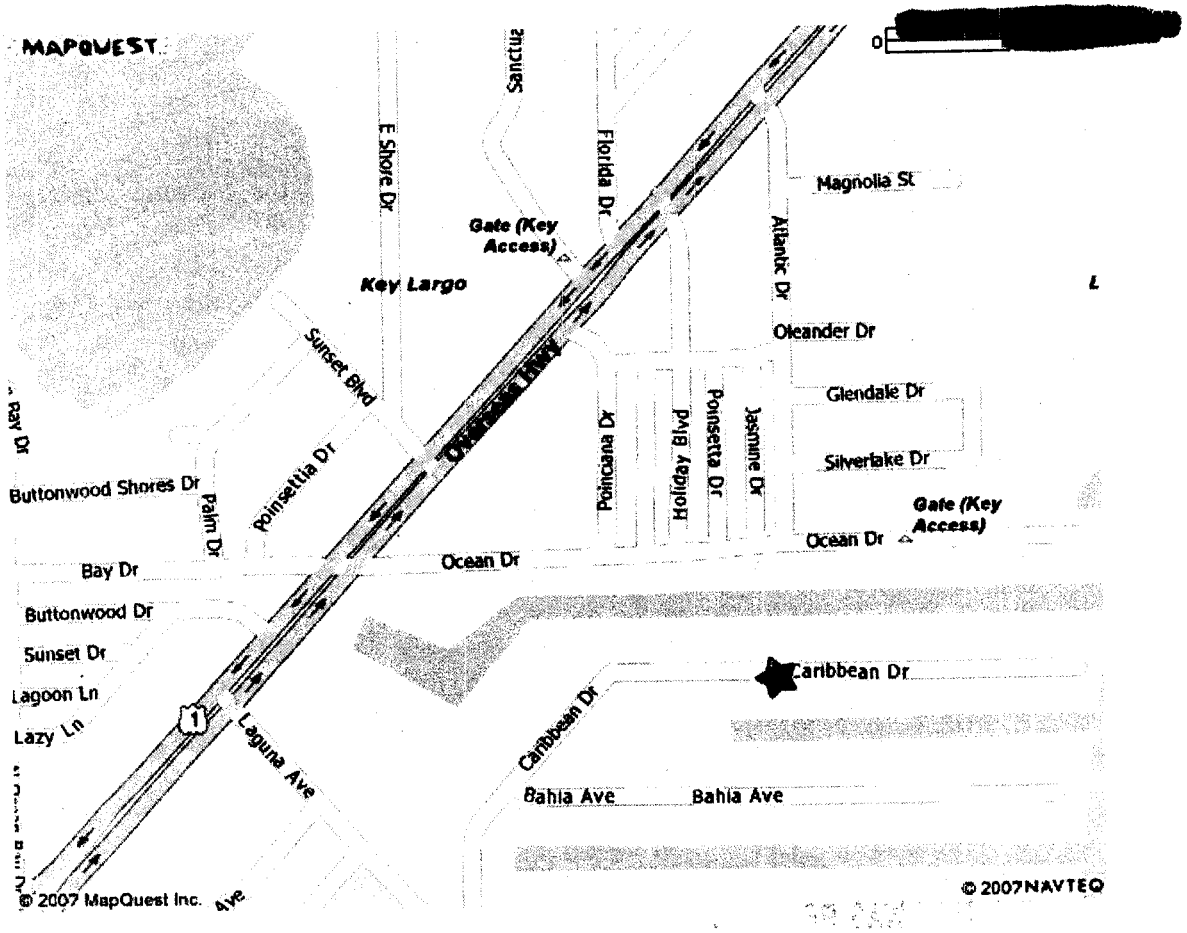
NOAA
National Underseas Research Program
514 Caribbean Drive
Key Largo, FL 33037

Dr Otto Rutten, Associate Director
305-451-0233 X202
[redacted]

II. Laboratory/building information:

- the building is located at the above NOAA address in Key Largo, FL
- the laboratory is a room located on the first floor, underneath the housing area, and is referred to as a "chemistry lab" (see attached photo)
- no room number available
- room map and dimensions were prepared during a site-visit (enclosed in package)
- no additional rooms were used to store radioactive material
- material was transported by the user to this facility and then removed upon completion of the stay in Key Largo and returned to the Gulf Breeze EPA facility


Google


MAPQUEST
E Shore Dr
Sanctua
Florida Dr
Magnolia St
Gate (Key Access)
Key Largo
Atlantic Dr
Oleander Dr
Sunset Blvd
Glendale Dr
Silverlake Dr
Buttonwood Shores Dr
Palm Dr
Poinsettia Dr
Poinciana Dr
Holiday Blvd
Poinsetta Dr
Jasmine Dr
Gate (Key Access)
Ocean Dr
Bay Dr
Ocean Dr
Buttonwood Dr
Sunset Dr
Lagoon Ln
Lazy Ln
Caribbean Dr
Caribbean Dr
Laguna Ave
Bahia Ave
Bahia Ave
© 2007 MapQuest Inc.
© 2007NAVTEQ

- 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 building in question to be decommissioned. 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.

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 Facilities Manager as a documented record of survey and sampling performed. The GED RSO will be provided all chain of custody forms for shipment of Swipe/Smears requiring analyses.

III. GED licensed isotope information and other chemicals used at the Key Largo facility:

- ^{3}H in the form of ^{3}H-methyl thymidine (approx 5 mCi total)
- ^{14}C in the form of ^{14}C bicarbonate (approx 25 mCi).
- any possible additional chemicals used may have been in the form of organics and not radioactive

IV. The EPA, Gulf Breeze, used this facility in the 1990's by the following investigators:

- Dr Wade Jeffrey
- Dr Rick Coffin
- both investigators were interviewed in 2007 as to isotope use, room, quantities, concentrations, etc.
- both investigators no longer work at EPA, Gulf Breeze, FL.

V. Decommissioning approach:

- The GED RSO will supply swipes and liquid scintillation vials to be used for swipe sampling.
- The GED RSO will coordinate sample shipment and any laboratory analyses of samples collected and submitted to US EPA RSO (Todd Baker) at Research Triangle Park (RTP), NC.
- Qualified radiation decommissioning personnel will provide proper survey equipment and supply copies of equipment calibration documents of survey instrumentation.
- The decommissioning staff will conduct 100% beta surveys of survey units in the buildings to be decommissioned as directed by the Montgomery EPA and/or NOAA staff based on site history and radiological use.
- The decommissioning staff will conduct swipe sampling of the survey units after review of the survey results. Swipe samples will be packaged by the decommissioning staff 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 NOAA 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 ratementer 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/100cm^2. 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 cm^2 (wipe area of approximately 4 inches by 4 inches or an "S" pattern approximately 16" long).

US EPA NAREL
Radiological Survey Protocol
For US EPA GED – Key Largo, FL 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) Key Largo laboratory (NOAA Facility) that require radiological clearance prior to removal from NRC license (License No. 09-10672-03).

The purposes of the described survey and sampling effort are:

- To determine the extent and magnitude of contamination (if any) on laboratory 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 Radiation Safety Officer (RSO).

Responsibilities

- The GED RSO will supply swipes and liquid scintillation vials to be used for swipe/smear sampling.
- The GED RSO will coordinate/facilitate sample shipment and any laboratory analyses of samples collected with the US EPA Research Triangle Park (RTP) RSO.
- 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 beta surveys of survey units in the buildings to be decommissioned as directed by the GED RSO 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

- 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
- Eberline E-600 with Eberline SPA-6 gamma probe calibrated for gamma measurements

Prerequisites

Ensure that all personnel are provided a safety briefing by the NOAA 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/NOAA 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 ratementer 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 will be

operated in the Beta only operating mode to provide the highest efficiency for identifying elevated beta activity concentrations.

NAREL personnel will verify survey instruments have been calibrated and that the instruments have 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/100cm^2. 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 cm^2 (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 identified laboratory and NOAA Facility. 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 an 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 in determining if any area has elevated gamma exposure rates μR/hr.

Waste Management

Waste streams associated with survey and sampling activities include the use of PPE (Tyvek and Gloves). If not suspected of being contaminated, these items will be disposed of as refuse/trash. If radiological contamination is suspect, based on survey data, PPE will be bagged as potentially radioactive waste and turned over to the 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 GED RSO as a documented record of survey and sampling performed. The GED RSO will be provided all chain of custody forms for shipment of Swipe/Smears requiring analyses to US EPA RTP.

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 1.6 – 4.2 μR/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 measurements ranged from 2,200 – 2,700 dpm/100cm^2. Beta survey measurements ranged from 2,000 – 5,200 dpm/100cm^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.

QUALIFICATIONS

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

Sam Poppell

- Health Physicist for USEPA
- 28 years of Radiation Experience
- 15 years as RSO or Deputy RSO
- On NAREL NRC License as User (NRC License No. 01-07317-01)
- 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)

13 years experience with USEPA
8 years experience with DoD (US Navy)

Stephanie Friedman

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

(100% Beta Survey of GED Lab in NOAA Building Continued)

Location	Range (per 100 cm2)
Floor	2.9K – 5.2K dpm
Countertop	2.0K – 3.4K dpm
Doorway Entry	3.2 – 4.7K dpm
Sink	3.2K dpm
Floor in Front of Sink	4.25K dpm
Left wall (including cabinets/doors)	2.3K – 3.8K dpm
Right wall (including cabinets/doors)	2.2K – 3.8K dpm
Back wall (including cabinets/doors)	2.7K – 3.4K dpm
Front wall (including cabinets/doors)	2.5K – 3.1K dpm

January 9, 2008

Smear / Swipe Sampling of GED Lab in NOAA Building

Location	Number of swipes
Floor	21
Countertop	21
Doorway Entry	2
Sink	1
Floor in Front of Sink	1
Left wall (including cabinets/doors)	15
Right wall (including cabinets/doors)	16
Back wall (including cabinets/doors)	3
Front wall (including cabinets/doors)	3
Field QA Blanks	5
TOTAL	**88**

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. **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.**

DISCOVERY

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

January 8, 2008

Gamma Exposure Rate Survey

Equipment: E600 Kit #3, SN 387 SPA 6 SN 494, Source Check 229 uR/hr, Cs137 Source 3294/703019. Background check was performed away from the suspect buildings with a reading of 2.61 uR/hr.

Equipment: E600 Kit #5, SN 363 SPA 6 SN 503, Source Check 200 uR/hr, Cs137 Source 3288/703015. Background check was performed away from the suspect buildings with a reading of 2.56 uR/hr.

NOAA Building. The outside gamma exposure rate survey ranged from 1.6 – 4.2 uR/hr and the inside gamma exposure rate survey ranged from 2.6 – 2.8 uR/hr.

100% Beta Survey of GED Lab in NOAA Building

E600 Kit #3 used in survey.

AM Equipment Check: E600 Kit #3, SN 387, Ludlum 43-89 Beta Probe SN 130516. Source Check 33.7K dpm, Pu239 Source 3295/703018. Source Check 32.5K dpm, Sr90 Source 3293/703020. Background Beta reading 2.7K dpm per 100 cm2.

PM Equipment Check: E600 Kit #3, SN 387, Ludlum 43-89 Beta Probe SN 130516. Source Check 34.9K dpm, Pu239 Source 3295/703018. Source Check 30.1K dpm, Sr90 Source 3293/703020. Background Beta reading 2.4K dpm per 100 cm2.

E600 Kit #5 was available as a backup.

AM Equipment Check: E600 Kit #5, SN 363, Ludlum 43-89 Beta Probe SN 145388. Source Check 24.8K dpm, Pu239 Source 3289/703009. Source Check 31.9K dpm, Sr90 Source 3287/703011. Background Beta reading 2.56K dpm per 100 cm2.

PM Equipment Check: E600 Kit #5, SN 363, Ludlum 43-89 Beta Probe SN 14388. Source Check 24.3K dpm, Pu239 Source 3289/703009. Source Check 32.3K dpm, Sr90 Source 3287/703011. Background Beta reading 2.2K dpm per 100 cm2.

Attachment 2

EPA GED/ORD - NOAA Facility
Rad Decommissioning

01/06/08 - Travel from Mom to Pensacola, FL to pick up Stephanie Fuderman, GED RSO

- Continue traveling to work site - NOAA Facility Key Largo, FL

- Stopped overnight in Orlando, FL

01/07/08 - Continued travel to Key Largo, FL

- Arrived Key Largo, FL
- Drove to NOAA Facility to see where it was

01/08/08 - Arrived at NOAA facility met with Mr Otto ____ 08:45 AM EST

- Briefed on NOAA facility logistics and H&S

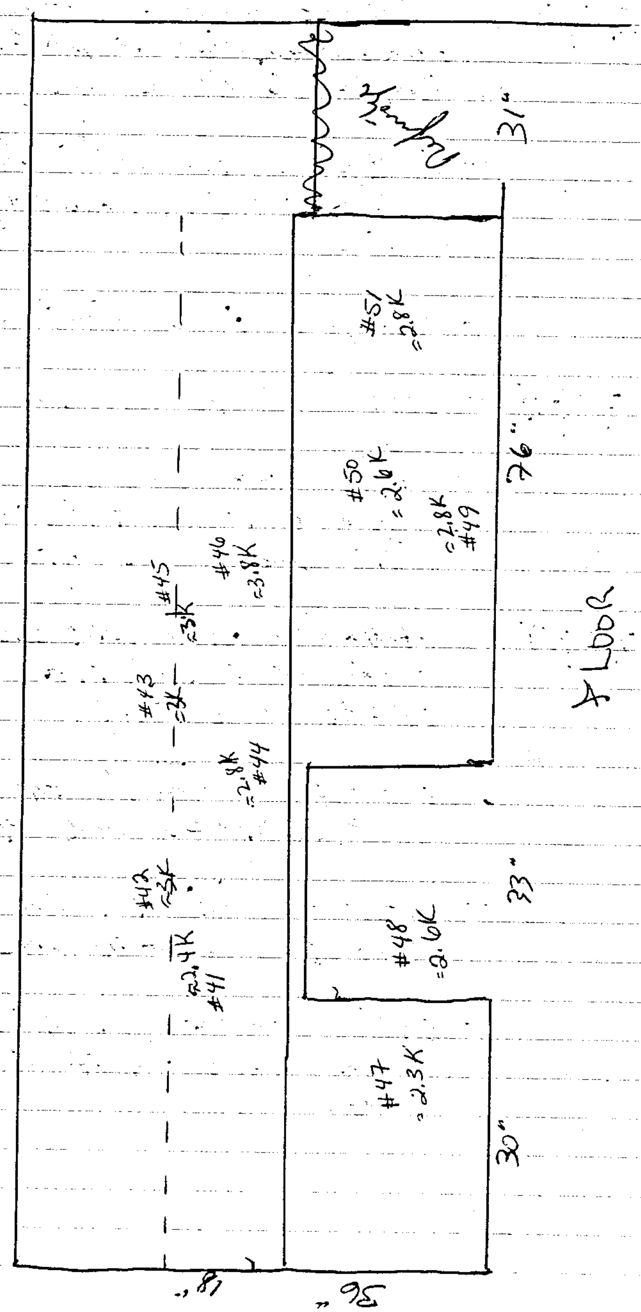
- Looked at the lab room used for GED use

- 0900 Started staging equipment and removing items from Room

- 0915 - 1015 cleaned / swept, removed debris & measured room; floor plan diagram

 Vial #'s= 41,42,43,44,45,46,47,48,49,50,51

~~Dimensions~~ Surf Left wall



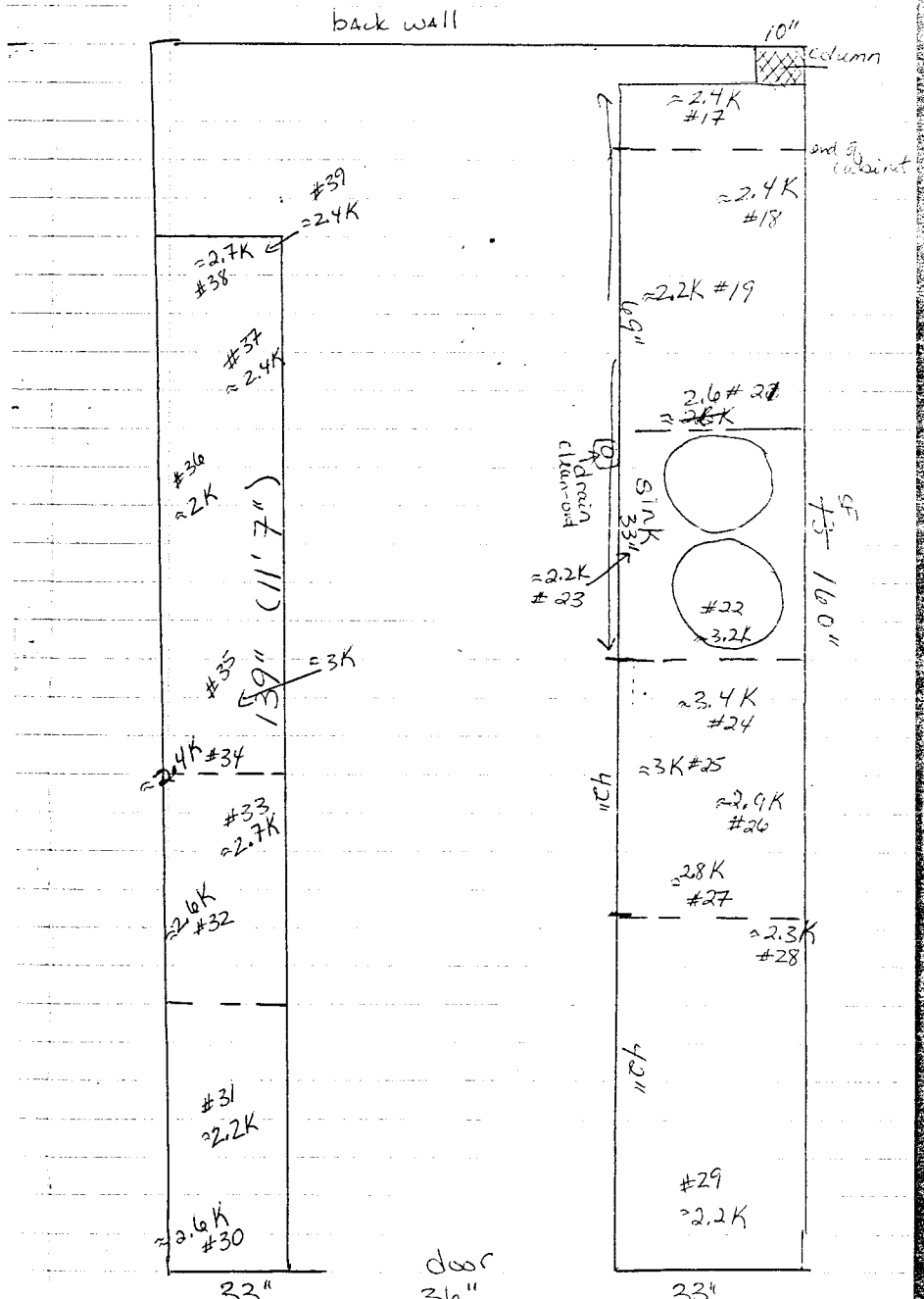
= vial number (swipe) along with dpm count

vial #'s = 17, 18, 14, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39

top view

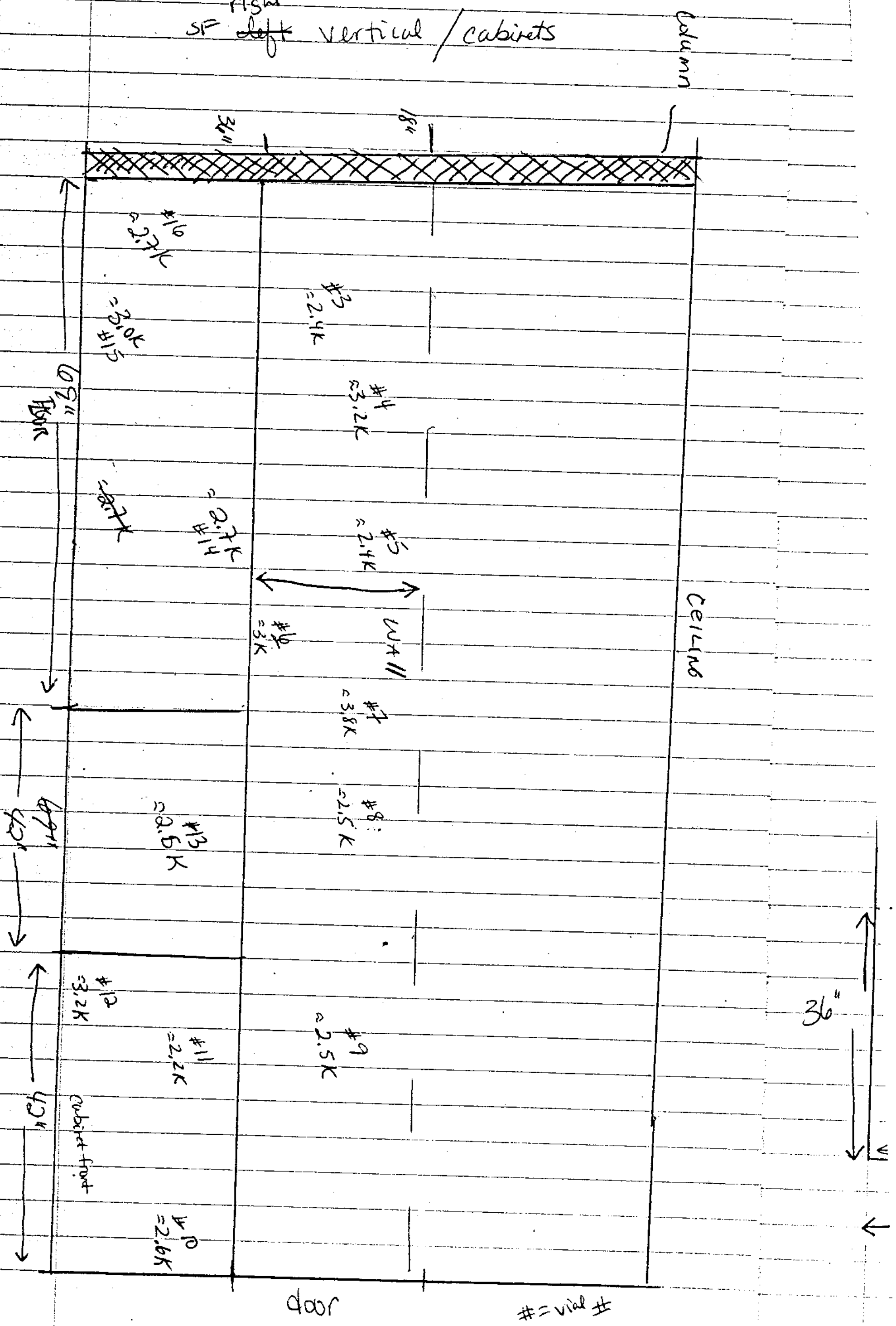
floor

kit #3 room 100% survey



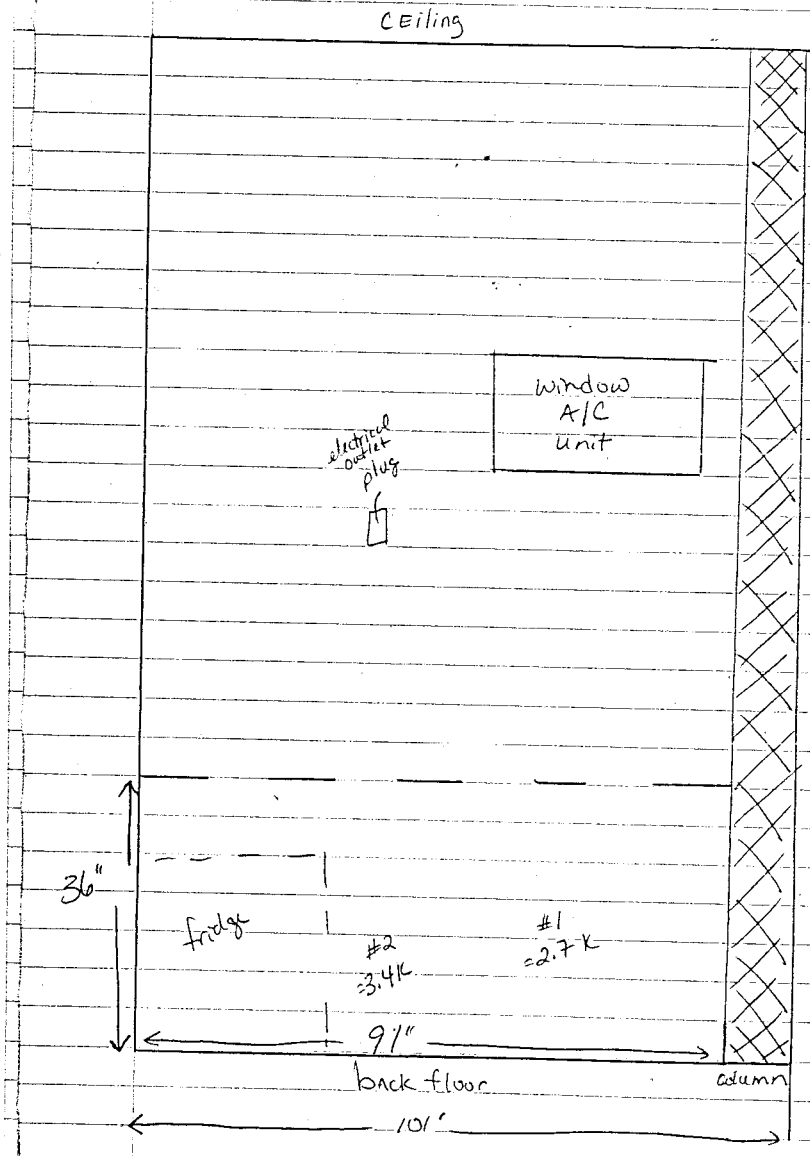
..., 10, 11, 12, 13, 14, 15, 16

SF ~~left~~ right vertical / cabinets



Vial #1,2

SF ~~right~~ back wall
~~left cabinet / counter top~~

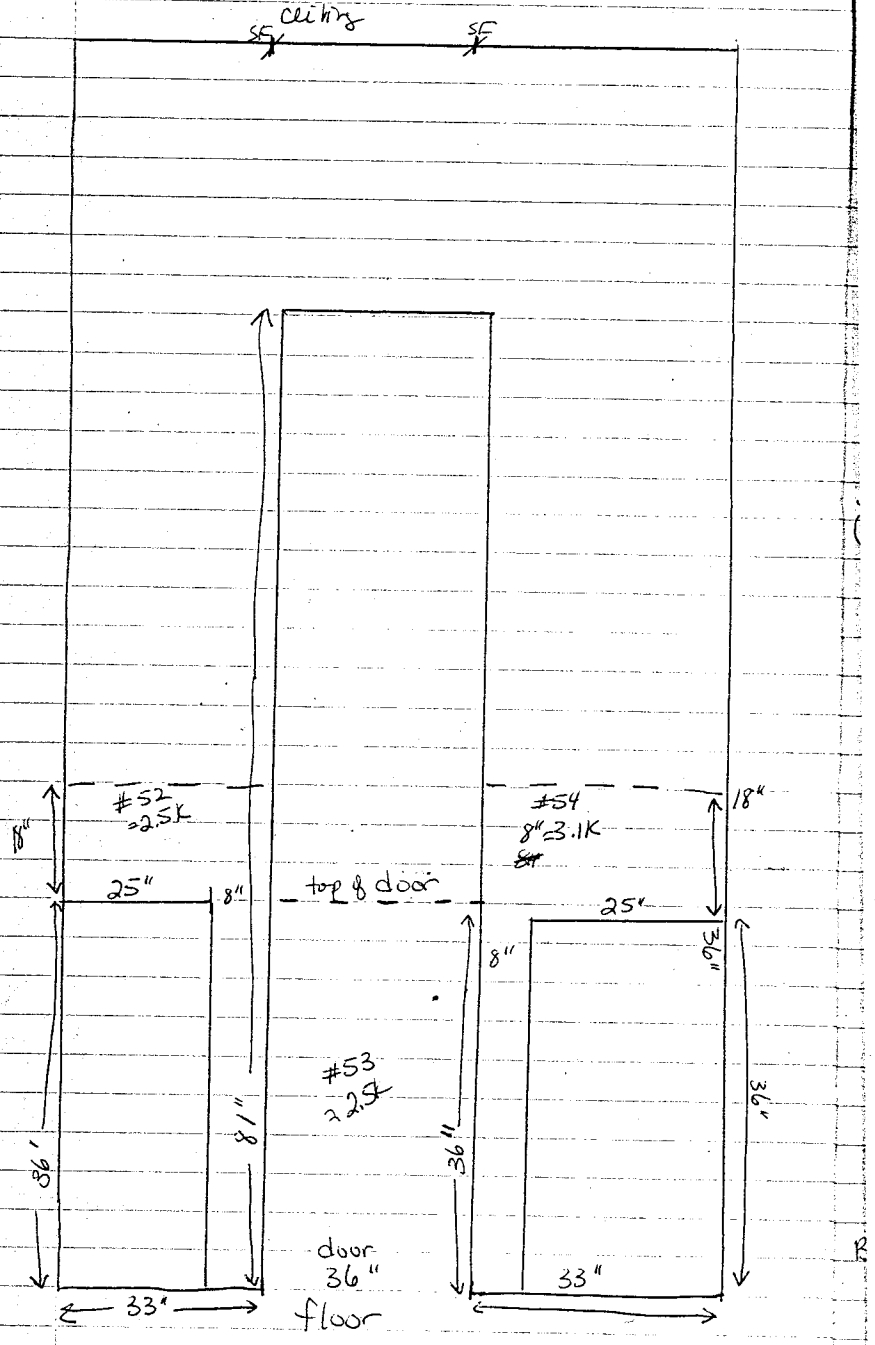


#= vial number 1,2

20.

100% room survey #s

front door wall



Survey Team:
Sam Poppell
David Kappelman
Stephanie Friedman

performed dimensional measurements of room for survey

1015 - check instruments / survey equipment
(see data sheets)

Kit #5 Gamma survey of room ~2.6 μR/hr
Kit #3 " " 2.8 μR/hr

time (1610) PM survey to re-check instrument calibration:
Kit #5 (see data sheets)
Kit #3 (")

QC Instrument check:

43-89 Kit #5 AM = 0930 PM = 1610

	AM	PM
Backgrd (Beta)	2.56 K	2.2 K
Pu-239	24.8 K	24.3 K
Sr-90	31.9 K	32.3 K

SPA-6

gamma (bkg)	2.56
Cs 137	200

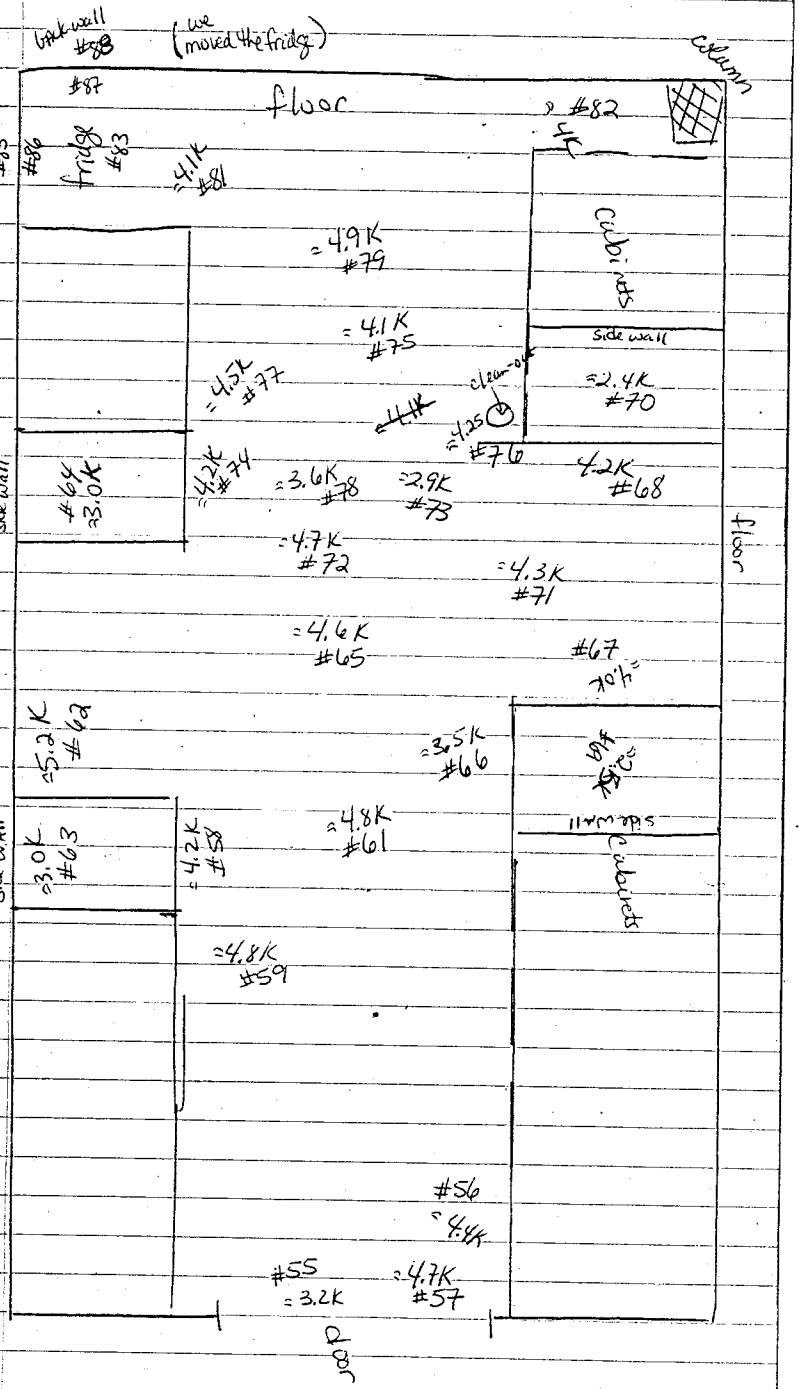
43-89
Kit #3

	AM	PM
Backgrd (beta)	2.7 K	2.4 K
Plu-239	33.7 K	34.9 K
Sr 90	32.5 K	30.1 K
SPA-6 bkg	2.61 μR/hr	

22.

View #s 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 81, 82, 83, 84, 85, 86, 87, 88

floor view



1630 PM Outside survey 1.6 - 4.2 μR/hr

January 9, 2008

0900 Begin swiping surfaces identified in yesterdays survey.

Swipes placed in 5 vials as noted in work plan.

Samples and Room secured for the day.

January 10, 2008

Replaced items removed from room when/before work started.

Secured samples in box for transport back to GGD, Gulf Breeze, FL.

Packed remaining equipment/supplies for travel.

Tried meeting with NOAA facility manager/POC but he was not in office at this time. Left message with him that our work was complete and that if analysis showed something we would keep him informed.

Began travel back.

January 11 2008

24

BLK	Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
BLK 20	Blank
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	

Vial #'s

Blanks were introduced every 20th Sample

36
37
38
39
BK 40 ~~Background sample~~ Blank
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
BK 60 ~~Background sample~~ Blank
61
62
63
64
65
66
67
68
69
70
71

72
73
74
75
76
77
78
79
BCK 80 ~~Background sample~~ Blank
81
82
83
84
85
86
87
88

KBRT #3

CERTIFICATE OF CALIBRATION
(EXPOSURE RATE INSTRUMENT)

#3

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 **387**
Det. Mfr. & Model **Eberline SPA-6**	Det. Type **Gamma Scintillator**	Det. s/n **494**
Cal. Date **26 November 2007**	Due Date **26 November 2008**	Cal. Interval **1 year**

Environmental conditions: Temperature: **72°F** Relative Humidity **36%** Atmospheric Pressure **29.90** inches Hg

Pre-calibration Checks:

☒ Contamination survey	☒ Battery check	☒ Slow response check	
☒ Mechanical check	☒ Audio check	☒ Window operation	☒ Det. volts **1191** 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: **DT = 10.0 μsec, CC = 2.05E+10. Tube begins to saturate above 6 mR/h. Alarm level never reached.**

S/N of source used for precision check #6 Isotope **Cs-137** Dedicated Source? ☐Yes ☒No
Reading #1 **1.518** mR/h Reading #2 **1.514** mR/h Reading #3 **1.522** mR/h Mean **1.518** mR/h
Precision: ☒± <10% ☐± 10-20% ☐Out of tolerance

Range	Reference Calibration Point	Instrument Indication
n/a	0.021 mR/h	21.0 μR/h
n/a	0.079 mR/h	79.7 μR/h
n/a	0.265 mR/h	271 μR/h
n/a	0.586 mR/h	605 μR/h
n/a	0.89 mR/h	968 μR/h
n/a	2.22 mR/h	2.38 mR/h
n/a	5.29 mR/h	5.50 mR/h
n/a	8.94 mR/h	7.73 mR/h OUT OF TOLERANCE

No ranges were calibrated electronically.

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

RSA Laboratories Log ID# **11544**. 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: **26 November 2007**

RERT #3

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 **387**
Det. Mfr. & Model **Ludlum 43-89**	Det. Type **Alpha/Beta Scintillator**	Det. s/n **130516**
Cal. Date **26 November 2007**	Due Date **26 November 2008**	Cal. Interval **1 year**

Environmental conditions: Temperature: 72°F Relative Humidity 36% Atmospheric Pressure 29.90 inches Hg

Pre-calibration Checks:

☒ Contamination survey	☒ Battery check	☒ Slow response check	
☒ Mechanical check	☒ Audio check	☐ Window operation	☒ Det. volts 752 Vdc
☒ 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: **DT = 10.0 μsec. Upper window set at 38.4 mV for α, channel 1. Lower window set at 1.60 mV for β, channel 2. Local background ≈ 4770 dpm β, 0 dpm α.**

S/N of source used for precision check #6 Isotope Cs-137 Dedicated Source? ☐Yes ☒No
Reading #1 705,000 dpm Reading #2 715,000 dpm Reading #3 710,000 dpm Mean 710,000 dpm
Precision: ☒± < 10% ☐± 10-20% ☐Out of tolerance

Range Multiplier	Cal. Source Used (isotope and S/N)	Source Activity (dpm)	Instrument Reading (dpm)	4π Instrument Efficiency (%)
1 min. count	Tc-99 #D702	23,064	27,900(β)	100%
1 min. count	Th-230 #91TH2200210	38,900	38,900(α)	100%

RSA Laboratories ID# 11544. Instrument indicates within ±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: 26 November 2007

KEET TS

CERTIFICATE OF CALIBRATION #5
(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 **363**
Det. Mfr. & Model **Eberline SPA-6**	Det. Type **Gamma Scintillator**	Det. s/n **503**
Cal. Date **26 November 2007**	Due Date **26 November 2008**	Cal. Interval **1 year**

Environmental conditions: Temperature: **72°F** Relative Humidity **36%** Atmospheric Pressure **29.90** inches Hg

Pre-calibration Checks:

☒ Contamination survey	☒ Battery check	☒ Slow response check	
☒ Mechanical check	☒ Audio check	☒ Window operation	☒ Det. volts **1299** 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: **DT = 5.0 μsec, CC = 2.05E+10. Tube begins to saturate above 6 mR/h. Alarm level never reached.**

S/N of source used for precision check **#6** Isotope **Cs-137** Dedicated Source? ☐Yes ☒No
Reading #1 **1.335 mR/h** Reading #2 **1.324 mR/h** Reading #3 **1.349 mR/h** Mean **1.336 mR/h**
Precision: ☒± < 10% ☐± 10-20% ☐Out of tolerance

Range	Reference Calibration Point	Instrument Indication
n/a	0.021 mR/h	19.55 μR/h
n/a	0.079 mR/h	79.6 μR/h
n/a	0.265 mR/h	268 μR/h
n/a	0.586 mR/h	618 μR/h
n/a	0.89 mR/h	961 μR/h
n/a	2.22 mR/h	2.33 mR/h
n/a	5.29 mR/h	4.91 mR/h
n/a	8.94 mR/h	6.40 mR/h OUT OF TOLERANCE

No ranges were calibrated electronically.

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

RSA Laboratories Log ID# **11546**. 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: **26 November 2007**

RERT #5

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 **363**
Det. Mfr. & Model **Ludlum 43-89**	Det. Type **Alpha/Beta Scintillator**	Det. s/n **145388**
Cal. Date **26 November 2007**	Due Date **26 November 2008**	Cal. Interval **1 year**

Environmental conditions: Temperature: **72°F** Relative Humidity **36%** Atmospheric Pressure **29.90** inches Hg

Pre-calibration Checks:

☒ Contamination survey	☒ Battery check	☒ Slow response check	
☒ Mechanical check	☒ Audio check	☐ Window operation	☒ Det. volts 771 Vdc
☒ 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: **DT = 8.0 μsec. Upper window set at 38.6 mV for α, channel 1. Lower window set at 1.60 mV for β, channel 2. Local background ≈ 4910 dpm β, 0 dpm α.**

S/N of source used for precision check **#6** Isotope **Cs-137** Dedicated Source? ☐Yes ☒No
Reading #1 **714,000 dpm** Reading #2 **709,000 dpm** Reading #3 **711,000 dpm** Mean **711,333 dpm**
Precision: ☒± < 10% ☐± 10-20% ☐Out of tolerance

Range Multiplier	Cal. Source Used (isotope and S/N)	Source Activity (dpm)	Instrument Reading (dpm)	4π Instrument Efficiency (%)
1 min. count	Tc-99 #D702	23,064	28,100(β)	100%
1 min. count	Th-230 #91TH2200210	38,900	38,800(α)	99.7%

RSA Laboratories ID# **11546**. Instrument indicates within ±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: **26 November 2007**

Instrument QC Checks #5
(Acceptable Operating Ranges)

	DATE Performed	12/12/07	12/12/07	12/12/07		12/12/07	
	RERT E600 Kit #	**5**	**5**	**5**	**5**	**5**	**5**
	E600 S/N	**363**	**363**	**363**	**363**	**363**	**363**
	Source Kit #5	**38**	**38**	**38**	**38**	**38**	**38**
	Source	alpha	beta	beta	gamma	gamma	gamma
	Nucliide	Pu-239	Sr90	Sr90	Cs137	Cs137	Cs137
	NAREL S/N	703009	703011	703011	703015	703015	703015
	Source S/N	3289	3287	3287	3288	3288	3288
	Detector	43-89	43-89	SHP-360	SHP-300A	SPA-6	SHP-290
	S/N	145388	145388	195	10005	503	113
	Source	alpha	beta	beta	gamma	gamma	gamma
	Units	K dpm	K dpm	K cpm	uR/hr	uR/hr	uR/hr
	1	24.0	30.2	3.54		211	
	2	23.9	31.2	3.54		210	
	3	23.7	30.9	3.50		211	
	4	22.9	31.8	3.48		209	
	5	23.1	32.0	3.51		210	
	6	23.9	31.6	3.44		214	
	7	22.8	31.3	3.43		215	
	8	23.6	32.1	3.44		214	
	9	23.8	30.2	3.34		214	
	10	23.9	31.0	3.30		213	
	11	22.4	31.5	3.43		216	
	12	23.4	32.0	3.41		215	
	13	23.6	32.4	3.39		206	
	14	23.3	31.7	3.36		206	
	15	23.0	31.1	3.26		205	
	16	22.9	31.3	3.41		214	
	17	23.9	31.7	3.30		214	
	18	23.3	30.7	3.43		214	
	19	23.2	30.9	3.28		213	
	20	23.8	30.5	3.33		212	
	Average Gross	23.4	31.3	3.4		211.8	
	Background	0	2.07	0.033		1.475	
	Standard Deviation	0.5	0.6	0.1		3.2	
	Upper Control Limit	24.8	31.1	3.6		220.0	
	Upper Warning Limit	24.3	30.5	3.5		216.8	
	Average Net	**23.4**	**29.2**	**3.4**		**210.3**	
	Lower Warning Limit	22.5	28.0	3.2		203.8	
	Lower Control Limit	22.0	27.4	3.1		200.6	
	(+/- 20%-BKG PM	18.7-28.1	23.4-35.0	2.7-4.1		168.2-252.4	

13-89)
Scan 08
BKG (beta) 2.56K (2.2K) AM 24.8K (SF 24.3K) PM
Pu-~~239~~
Sr-90 AM 31.9K (SF ~~35~~ 32.3K) PM
PA-6
gAmma (BACK)
Cs137 (background 2.56) 200

AM = 0930
PM = 1610

SMP 1/8/08

Attachment 2

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

Office of
Research and Development

February 21, 2008

MEMORANDUM

Subject: Contamination Wipe Test Survey Results for Gulf Breeze Samples Numbers 1-88

From: Ritchie D. Buschow, MEM, CLSO //Signed//
Assistant Radiation Safety Officer
Ext. 919-541-0550 Mail Code D343-02

To: Stephanie Friedman
US EPA Environmental Effects Research Laboratory
ORD/Gulf Ecology Division
Sabine Island Drive
Gulf Breeze, FL 32561-5299
Telephone: 850-934-2468
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 Record 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 the sample batch.

The minimum detectable activities are provided with the 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.

Todd Baker 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. 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. In 2007, Mr. Buschow became a Certified Laser Safety Officer (CLSO) by the Board of Laser Safety (BLS).

Enclosures: (As stated in the body of the text)
Swipe Sample #'s 1-88 - Chain of Custody Form; 1 page
Swipe Sample #'s 1-88 - Liquid Scintillation Counter Instrument Reports; 7 pages.
Swipe Sample #'s 1-88 - 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}
Bruce Michael, ORD/NHEERL {Electronic Copy Only}
Todd W. Baker, ORD/NERL-IO (SHEM) {Electronic Copy Only}
Asst. RSO Reading File
RSO File

CHAIN OF CUSTODY RECORD

EPA

NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY

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

Container #

Project Name G.E.D. Key Large

Project Manager Stephanie Friedman

Sampling Team Members
Stephanie Friedman
David Kappelman
Sam Poppell

Requested Completion Date

Notify Project Manager Upon Receipt? ☒ Yes ☐ No

Sample Description	Date	Time	Matrix	# of CONTAINERS	ANALYSIS REQUESTED: H-1 3	ANALYSIS REQUESTED: C-14	Comments	Lab Sample ID
SWIPES IN LSC VIALS	1/9/08	0930	SWIPE	88	✓	✓		

For Laboratory Use Only

Comments:

H-3 & C-14 ANALYSES BY LIQUID SCINTILLATION.

1) Sampled By: Poppell	Date/Time 1/9/2008 9:30	2) Received By: Ruth A. Robertson	Date/Time 1/31/08 10:00AM
3) Relinquished By: Friedman	Date/Time 28 JAN 08 11:05	4) Received By:	Date/Time
5) Relinquished By:	Date/Time	6) Received By:	Date/Time
Samples Disposed By:	Date/Time	Disposal Method:	

Sample Shipped via ☐ FedEx ☐ UPS ☐ Hand ☐ Other

Internal Container Temperature ____°C

Custody Seal Present? ☐Y ☐N

Custody Seal Intact? ☐Y ☐N

Page ____ of ____

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

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\RDB\Gulf Breeze H-3, C-14 Dual Label DPM\20080205_1730
Raw Results Path: C:\Packard\Tricarb\Results\RDB\Gulf Breeze H-3, C-14 Dual Label DPM\20080205_1730\20080205_1730.results
Comma-Delimited File Name: C:\Packard\Tricarb\Results\RDB\Gulf Breeze H-3, C-14 Dual Label DPM\20080205_1730\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

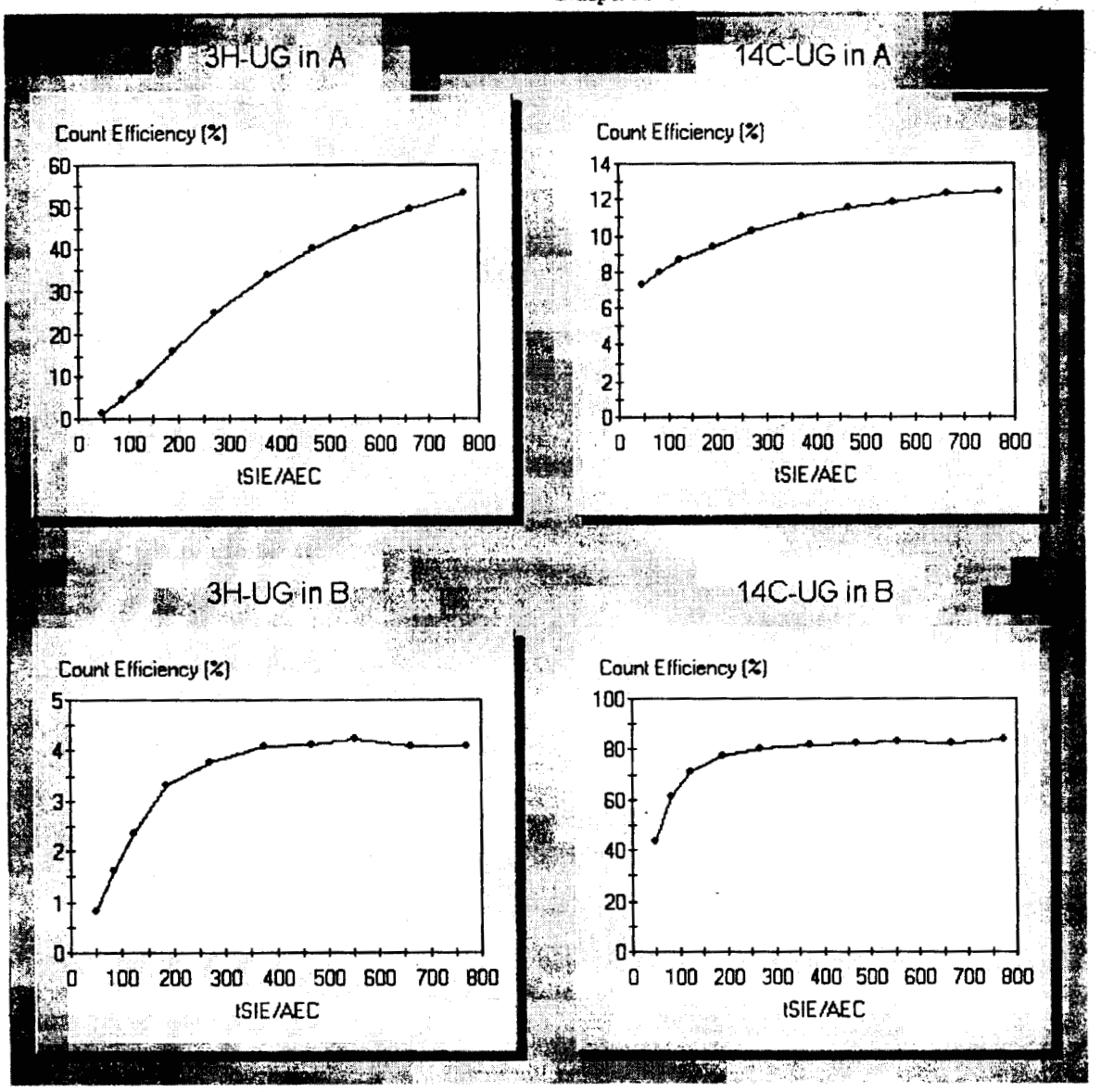
Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

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

NOTE: All samples reviewed By
Ruth D. Rhea 2/6/08

Instrument Model: Tri-Carb 2900TR
Instrument Serial Number: 433693
3H Chi Square: 24.72 Date Processed: 2/5/2008 5:30:48 PM
14C Chi Square: 17.23 Date Processed: 2/5/2008 5:30:48 PM
3H E^2/B (1-18.6 keV): 255.01 Date Processed: 2/5/2008 5:30:48 PM
14C E^2/B (4-156 keV): 554.73 Date Processed: 2/5/2008 5:30:48 PM
3H Efficiency (0-18.6 keV): 63.71 Date Processed: 2/5/2008 5:30:48 PM
14C Efficiency (0-156 keV): 96.31 Date Processed: 2/5/2008 5:30:48 PM
IPA Background Date Processed: 2/5/2008 5:30:48 PM
3H Background CPM (0-18.6 keV): 16.05 Date Processed: 2/5/2008 5:30:48 PM
14C Background CPM (0-156 keV): 22.50 Date Processed: 2/5/2008 5:30:48 PM
3H Calibration DPM: 275600
3H Reference Date: 2/11/2005
14C Calibration DPM: 127900

Cycle 1 Results
Quench Curve Block Data



Samples Labeled 1-88

Date Acquired: 03/31/2005
Date Modified: 03/15/2006
3H-UG in A

tSIE/AEC	Count Efficiency (%)
770.14	53.30
661.46	49.30
554.19	44.95
467.04	40.10
376.12	33.70
269.95	24.80
188.33	16.20
122.10	8.62
85.37	4.66
48.80	1.44

Date Acquired: 03/31/2005
Date Modified: 02/23/2006
14C-UG in A

tSIE/AEC	Count Efficiency (%)
772.57	12.42
666.57	12.36
555.90	11.81
468.38	11.54
372.38	11.08
269.73	10.23
191.02	9.38
123.23	8.64
81.51	8.01
48.44	7.25

3H-UG in B

tSIE/AEC	Count Efficiency (%)
770.14	4.08
661.46	4.07
554.19	4.23
467.04	4.13
376.12	4.08
269.95	3.77
188.33	3.32
122.10	2.36
85.37	1.63
48.80	0.81

14C-UG in B

tSIE/AEC	Count Efficiency (%)
772.57	83.70
666.57	82.74
555.90	82.78
468.38	82.54
372.38	81.96
269.73	79.95
191.02	77.13
123.23	70.97
81.51	61.30
48.44	43.37

PID	S#	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE	MESSAGES
Blank 14	1	0:10:45	8	12	0	0	50.79	411.39	B
1 14	2	0:14:15	5	0	13	0	63.11	432.19	
2 14	3	0:17:46	0	0	3	0	0.00	434.55	
3 14	4	0:21:18	2	0	7	0	41.17	417.90	
4 14	5	0:24:49	0	1	0	1	139.44	434.54	
5 14	6	0:28:19	5	0	15	0	0.00	440.44	
6 14	7	0:31:51	2	0	8	0	0.00	430.75	
7 14	8	0:35:23	4	3	9	3	40.73	429.62	
8 14	9	0:38:54	0	0	3	0	0.00	414.96	
9 14	10	0:42:26	2	0	7	0	741.51	412.42	
10 14	11	0:45:58	1	0	4	0	0.00	433.49	
11 14	12	0:49:30	2	0	5	0	83.01	441.68	
12 11	13	0:53:05	0	0	0	0	0.00	441.16	
13 11	14	0:56:36	1	1	1	2	209.14	436.28	
14 11	15	1:00:07	4	0	12	0	0.00	440.63	
15 11	16	1:03:38	0	0	3	0	0.00	441.88	
16 11	17	1:07:10	1	0	4	0	37.86	429.88	
17 11	18	1:10:41	0	0	0	0	0.00	443.12	
18 11	19	1:14:12	2	0	6	0	104.02	435.21	
19 11	20	1:17:43	0	0	2	0	0.00	439.07	
20 11	21	1:21:14	2	2	3	2	63.25	461.69	
21 11	22	1:24:46	1	0	4	0	0.00	410.84	
22 11	23	1:28:16	3	0	11	0	0.00	420.49	
23 11	24	1:31:47	0	0	2	0	0.00	426.64	
24 11	25	1:35:24	3	0	9	0	0.00	439.97	
25 11	26	1:38:54	5	0	15	0	0.00	419.61	
26 11	27	1:42:25	2	0	4	0	0.00	432.67	
27 11	28	1:45:56	2	0	6	0	0.00	448.87	
28 11	29	1:49:27	0	0	0	0	0.00	439.85	
29 11	30	1:52:59	2	0	6	0	24.80	421.83	

Protocol# 22 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa User: RDB

Samples Labeled 1-88

			CpmA	CpmB	DPM1	DPM2		
30 11	31	1:56:30	3	2	6	2	41.36	438.74
31 11	32	2:00:02	0	0	1	0	0.00	440.23
32 11	33	2:03:33	0	0	1	0	0.00	432.77
33 11	34	2:07:05	3	0	9	0	0.00	438.11
34 11	35	2:10:37	0	0	0	0	0.00	431.95
35 11	36	2:14:08	4	0	11	0	0.00	436.37
36 4	37	2:17:44	4	0	11	0	62.00	420.46
37 4	38	2:21:16	3	0	9	0	36.65	444.32
38 4	39	2:24:47	5	1	13	1	70.00	434.89
39 4	40	2:28:18	0	2	0	2	198.68	438.59
40 4	41	2:31:50	0	1	0	2	95.12	463.95
41 4	42	2:35:21	1	0	2	0	0.00	421.06
42 4	43	2:38:52	2	0	5	0	235.94	423.22
43 4	44	2:42:24	3	0	10	0	0.00	438.91
44 4	45	2:45:55	8	0	22	0	12.43	433.63
45 4	46	2:49:26	3	0	8	0	4.61	444.90
46 4	47	2:52:57	0	0	1	0	0.00	427.77
47 4	48	2:56:29	4	0	10	0	7.07	417.95
48 19	49	3:00:05	2	0	8	0	0.00	407.63
49 50 19	50	3:03:37	0	0	0	0	0.00	442.37
50 19	51	3:07:08	2	0	6	0	38.29	448.06
51 19	52	3:10:39	4	0	11	0	65.11	413.88
52 19	53	3:14:10	2	1	4	1	79.45	443.95
53 54 19	54	3:17:41	2	0	6	0	0.00	437.98
54 55 19	55	3:21:12	0	0	2	0	0.00	445.68
55 56 19	56	3:24:43	0	2	0	3	44.80	423.53
56 57 19	57	3:28:14	2	2	4	2	117.53	426.77
57 58 19	58	3:31:46	4	0	12	0	0.00	436.26
58 59 19	59	3:35:17	0	0	1	0	0.00	423.26
59 60 19	60	3:38:49	2	2	6	2	65.83	418.67
60 2	61	3:42:25	0	0	0	0	0.00	425.97
61 62 2	62	3:45:56	2	0	7	0	25.95	424.94
62 63 2	63	3:49:28	3	0	10	0	0.00	417.57
63 64 2	64	3:52:59	3	0	7	0	58.90	427.25
64 65 2	65	3:56:30	0	0	2	0	0.00	436.03
65 66 2	66	4:00:02	7	2	17	2	29.23	425.41
66 2	67	4:03:33	0	0	0	0	0.00	415.28
67 2	68	4:07:04	3	0	10	0	0.00	430.27
68 2	69	4:10:35	1	0	3	0	228.27	444.44
69 2	70	4:14:06	0	0	1	0	0.00	439.12
70 2	71	4:17:38	6	0	16	0	64.66	440.26
71 2	72	4:21:10	0	0	2	0	0.00	426.27
72 1	73	4:24:47	6	0	16	0	1.49	434.24
73 1	74	4:28:18	1	0	3	0	96.96	422.97
74 1	75	4:31:50	3	1	8	0	58.68	420.63
75 1	76	4:35:21	6	2	14	2	39.11	428.46
76 1	77	4:38:51	4	3	10	3	67.95	427.87
77 1	78	4:42:23	0	0	2	0	0.00	425.58
78 1	79	4:45:55	3	0	10	0	0.00	396.64
79 1	80	4:49:27	3	0	8	0	0.00	410.90
80 1	81	4:52:58	3	1	6	1	97.54	453.58
81 1	82	4:56:29	1	0	4	0	0.00	405.95
82 1	83	5:00:01	2	0	8	0	1788.77	416.52
83 1	84	5:03:32	0	3	0	4	203.61	414.01
84 17	85	5:07:08	5	2	14	2	47.42	420.08
85 17	86	5:10:40	0	0	1	0	0.00	428.99
86 17	87	5:14:12	3	0	9	0	6.30	420.57
87 17	88	5:17:44	3	3	7	3	56.46	410.61
88 17	89	5:21:15	0	0	1	0	0.00	419.43
Missing vial 90.								
17	91	5:24:48	16582	1933	41152	1282	11.48	469.16 -GA N-3 spl hr
17	92	5:28:19	1148	8736	0	10604	79.19	453.32 -GB C-14 spl hr
17	93	5:31:51	16745	7864	39801	7539	29.97	464.08 -GA N-3/C-14 spl hr

Protocol# 22 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa **User: RDB**
Recount of Sample #s 44, 65, 70, 72, 75

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\RDB\Gulf Breeze H-3, C-14 Dual Label DPM \20080207_1833
Raw Results Path: C:\Packard\Tricarb\Results\RDB\Gulf Breeze H-3, C-14 Dual Label DPM \20080207_1833\20080207_1833.results
Comma-Delimited File Name: C:\Packard\Tricarb\Results\RDB\Gulf Breeze H-3, C-14 Dual Label DPM\20080207_1833\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

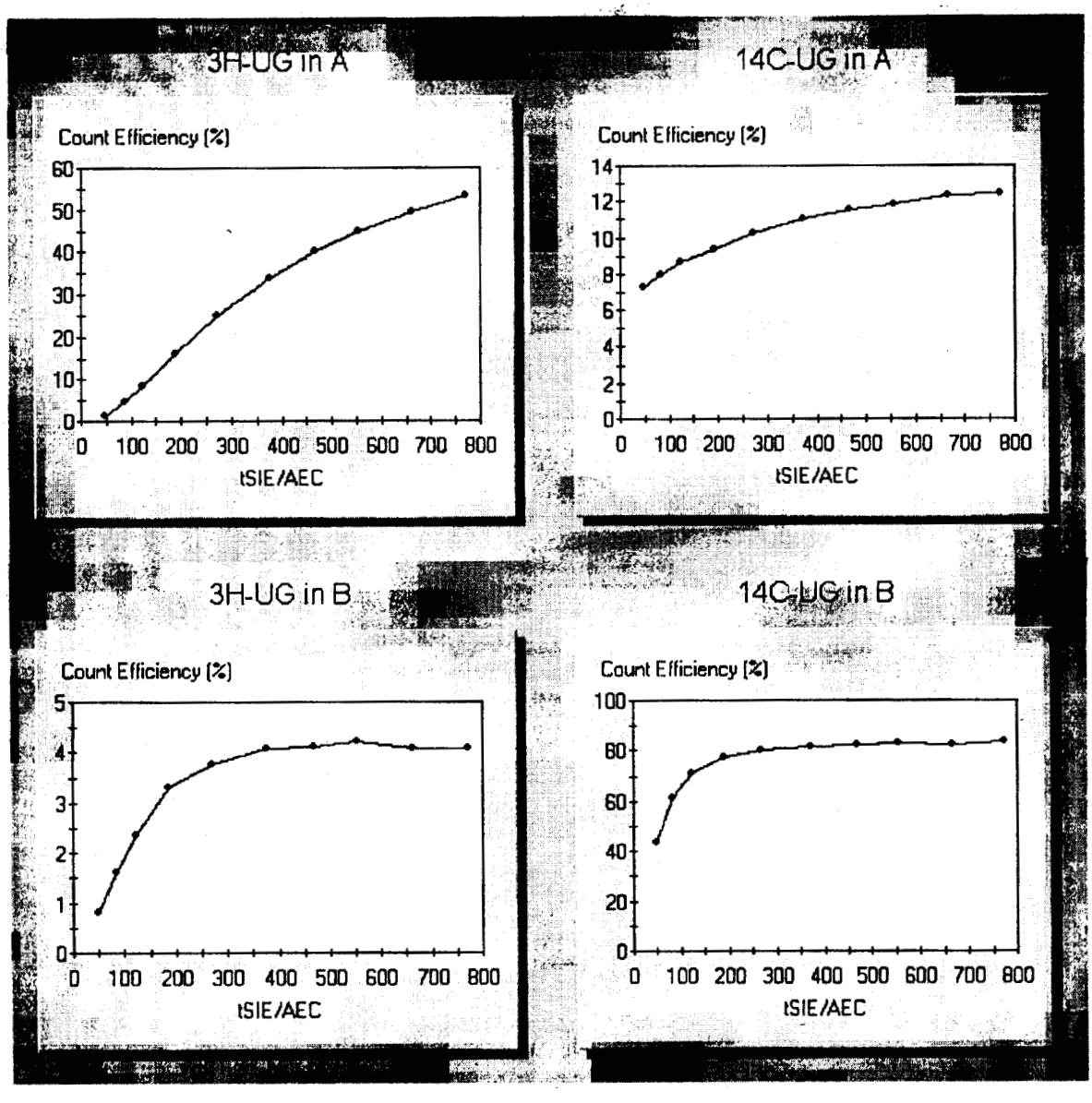
Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

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

Recount of Sample #s 44, 65, 70, 72, 75

Instrument Model: Tri-Carb 2900TR
Instrument Serial Number: 433693
3H Chi Square: 23.84 Date Processed: 2/7/2008 6:33:41 PM
14C Chi Square: 18.07 Date Processed: 2/7/2008 6:33:41 PM
3H E^2/B (1-18.6 keV): 240.28 Date Processed: 2/7/2008 6:33:41 PM
14C E^2/B (4-156 keV): 514.41 Date Processed: 2/7/2008 6:33:41 PM
3H Efficiency (0-18.6 keV): 63.32 Date Processed: 2/7/2008 6:33:41 PM
14C Efficiency (0-156 keV): 96.12 Date Processed: 2/7/2008 6:33:41 PM
IPA Background Date Processed: 2/7/2008 6:33:41 PM
3H Background CPM (0-18.6 keV): 16.88 Date Processed: 2/7/2008 6:33:41 PM
14C Background CPM (0-156 keV): 23.67 Date Processed: 2/7/2008 6:33:41 PM
3H Calibration DPM: 275600
3H Reference Date: 2/11/2005
14C Calibration DPM: 127900

Cycle 1 Results
Quench Curve Block Data



Recount of Sample #s 44, 65, 70, 72, 75

Date Acquired: 03/31/2005
Date Modified: 03/15/2006
3H-UG in A

tSIE/AEC	Count Efficiency (%)
770.14	53.30
661.46	49.30
554.19	44.94
467.04	40.10
376.12	33.70
269.95	24.79
188.33	16.20
122.10	8.62
85.37	4.66
48.80	1.44

Date Acquired: 03/31/2005
Date Modified: 02/23/2006
14C-UG in A

tSIE/AEC	Count Efficiency (%)
772.57	12.41
666.57	12.36
555.90	11.81
468.38	11.54
372.38	11.08
269.73	10.23
191.02	9.38
123.23	8.64
81.51	8.01
48.44	7.25

3H-UG in B

tSIE/AEC	Count Efficiency (%)
770.14	4.08
661.46	4.07
554.19	4.23
467.04	4.13
376.12	4.08
269.95	3.77
188.33	3.32
122.10	2.36
85.37	1.63
48.80	0.81

14C-UG in B

tSIE/AEC	Count Efficiency (%)
772.57	83.70
666.57	82.74
555.90	82.79
468.38	82.54
372.38	81.96
269.73	79.95
191.02	77.13
123.23	70.97
81.51	61.30
48.44	43.37

	PID	S#	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE	MESSAGES
BLANK	20	1	0:10:45	10	11	0	0	48.27	408.53	B
44	20	2	0:14:16	0	0	2	0	0.00	429.60	
65	20	3	0:17:48	1	3	3	3	48.93	424.44	
70	20	4	0:21:19	0	3	0	3	70.94	437.07	
72	20	5	0:24:51	0	1	0	1	0.00	434.23	
75	20	6	0:28:23	0	0	0	0	0.00	430.03	
	Missing vial 7.									
	20	8	0:31:56	16808	1956	41715	281	11.48	469.19	
	20	9	0:35:28	1155	8650	0	10496	79.02	456.18	
	20	10	0:38:59	16685	7899	39706	7586	30.19	463.14	

Reviewed By
Kathleen Rhea
2/8/08

GB H-3 Spike
GB C-14 Spike
GB - H-3/C-14 Spike

Protocol # 22 - Gulf Breeze H-3, C-14 Dual Label DPM.lsa

Samples Coded "1-88"

User: Ritchie Buschow

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	0:10:45	8	12	0	0	50.79	411.39	Background Vial
1	0:14:15	5	0	13	0	63.11	432.19	
2	0:17:46	0	0	3	0	0	434.55	
3	0:21:18	2	0	7	0	41.17	417.9	
4	0:24:49	0	1	0	1	139.44	434.54	
5	0:28:19	5	0	15	0	0	440.44	
6	0:31:51	2	0	8	0	0	430.75	
7	0:35:23	4	3	9	3	40.73	429.62	
8	0:38:54	0	0	3	0	0	414.96	
9	0:42:26	2	0	7	0	741.51	412.42	
10	0:45:58	1	0	4	0	0	433.49	
11	0:49:30	2	0	5	0	83.01	441.68	
12	0:53:05	0	0	0	0	0	441.16	
13	0:56:36	1	1	1	2	209.14	436.28	
14	1:00:07	4	0	12	0	0	440.63	
15	1:03:38	0	0	3	0	0	441.88	
16	1:07:10	1	0	4	0	37.86	429.88	
17	1:10:41	0	0	0	0	0	443.12	
18	1:14:12	2	0	6	0	104.02	435.21	
19	1:17:43	0	0	2	0	0	439.07	
20	1:21:14	2	2	3	2	63.25	461.69	
21	1:24:46	1	0	4	0	0	410.84	
22	1:28:16	3	0	11	0	0	420.49	
23	1:31:47	0	0	2	0	0	426.64	
24	1:35:24	3	0	9	0	0	439.97	
25	1:38:54	5	0	15	0	0	419.61	
26	1:42:25	2	0	4	0	0	432.67	
27	1:45:56	2	0	6	0	0	448.87	
28	1:49:27	0	0	0	0	0	439.85	
29	1:52:59	2	0	6	0	24.8	421.83	
30	1:56:30	3	2	6	2	41.36	438.74	
31	2:00:02	0	0	1	0	0	440.23	
32	2:03:33	0	0	1	0	0	432.77	
33	2:07:05	3	0	9	0	0	438.11	
34	2:10:37	0	0	0	0	0	431.95	
35	2:14:08	4	0	11	0	0	436.37	
36	2:17:44	4	0	11	0	62	420.46	
37	2:21:16	3	0	9	0	36.65	444.32	
38	2:24:47	5	1	13	1	70	434.89	
39	2:28:18	0	2	0	2	198.68	438.59	
40	2:31:50	0	1	0	2	95.12	463.95	
41	2:35:21	1	0	2	0	0	421.06	
42	2:38:52	2	0	5	0	235.94	423.22	

43	2:42:24	3	0	10	0	0	438.91
44	2:45:55	8	0	22	0	12.43	433.63
45	2:49:26	3	0	8	0	4.61	444.9
46	2:52:57	0	0	1	0	0	427.77
47	2:56:29	4	0	10	0	7.07	417.95
48	3:00:05	2	0	8	0	0	407.63
49	3:03:37	0	0	0	0	0	442.37
50	3:07:08	2	0	6	0	38.29	448.06
51	3:10:39	4	0	11	0	65.11	413.88
52	3:14:10	2	1	4	1	79.45	443.95
53	3:17:41	2	0	6	0	0	437.98
54	3:21:12	0	0	2	0	0	445.68
55	3:24:43	0	2	0	3	44.8	423.53
56	3:28:14	2	2	4	2	117.53	426.77
57	3:31:46	4	0	12	0	0	436.26
58	3:35:17	0	0	1	0	0	423.26
59	3:38:49	2	2	6	2	65.83	418.67
60	3:42:25	0	0	0	0	0	425.97
61	3:45:56	2	0	7	0	25.95	424.94
62	3:49:28	3	0	10	0	0	417.57
63	3:52:59	3	0	7	0	58.9	427.25
64	3:56:30	0	0	2	0	0	436.03
65	4:00:02	7	2	17	2	29.23	425.41
66	4:03:33	0	0	0	0	0	415.28
67	4:07:04	3	0	10	0	0	430.27
68	4:10:35	1	0	3	0	228.27	444.44
69	4:14:06	0	0	1	0	0	439.12
70	4:17:38	6	0	16	0	64.66	440.26
71	4:21:10	0	0	2	0	0	426.27
72	4:24:47	6	0	16	0	1.49	434.24
73	4:28:18	1	0	3	0	96.96	422.97
74	4:31:50	3	1	8	0	58.68	420.63
75	4:35:21	6	2	14	2	39.11	428.46
76	4:38:51	4	3	10	3	67.95	427.87
77	4:42:23	0	0	2	0	0	425.58
78	4:45:55	3	0	10	0	0	396.64
79	4:49:27	3	0	8	0	0	410.9
80	4:52:58	3	1	6	1	97.54	453.58
81	4:56:29	1	0	4	0	0	405.95
82	5:00:01	2	0	8	0	1788.77	416.52
83	5:03:32	0	3	0	4	203.61	414.01
84	5:07:08	5	2	14	2	47.42	420.08
85	5:10:40	0	0	1	0	0	428.99
86	5:14:12	3	0	9	0	6.3	420.57
87	5:17:44	3	3	7	3	56.46	410.61
88	5:21:15	0	0	1	0	0	419.43

[Position Skipped to Set Off Spikes Runs with sample batch]

GB H-3 Spike	5:24:48	16582	1933	41152	282	11.48	469.16
GB C-14 Spike	5:28:19	1148	8736	0	10604	79.19	453.32
GB Dual Label Spike (H-3/C-14)	5:31:51	16745	7864	39801	7539	29.97	464.08

Data Validation:

	CPMA	CPMB	Comments
Blank	8	12	Acceptable ranges; 10 minute stabilized count.

	H-3 dpm Actual	LSC Result	% Difference	C-14 dpm Actual	LSC Result	% Difference	Comments
GB H-3 Spike	44298	41152	-7.1%	NA	NA	NA	Excellent agreement
GB C-14 Spike	NA	NA	NA	10252	10604	3%	Excellent agreement
GB Dual Label Spike (H-3/C-14)	40158	39801	-1%	6757	7539	12%	Excellent Agreement

Minimum Detection Count Rate Limit:

H-3 +6.13 cpm above blank/background

C-14 +7.50 cpm above blank/background

Calculated as follows: $(k_\alpha+k_\beta)*SQRT[(Sigma_{background})^2+(Sigma_{sample})^2]$

$= (k_\alpha+k_\beta)*SQRT[(BCR/BT)+(SCR/ST)]$

Where:

k_α = Type I error (False positive) = 0.05 or 5%; therefore Normal table distribution value = 1.645

k_β = Type II error (False negative) = 0.05 or 5%; therefore Normal table distribution value = 1.645

SQRT = Square root function

$Sigma_{background}$ = Standard deviation of the blank/background count

$Sigma_{sample}$ = 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	40.3%	15.21	0.25	6.85E-06	Calculated using H-3 Spike applied quench curve efficiency
C-14	82.4%	9.10	0.15	4.10E-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: 396.64 Maximum: 469.16**
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 excellent agreement with their respective expected or 'true' DPM rates. Therefore, the quench curves and the efficiency corrections applied were valid.
6. The cocktail liquid was clear but each sample had a few bubbles floating in the cocktail (clear in coloration).

At the bottom of each vial, a light blue (like fluorescence of some sort) coloration could be seen.
7. Several samples at or slightly above the the calculated minimum detectable count rate for H-3 were recounted with results noted below.
8. Possible reason for negative percent differences noted in both the single and dual spiked H-3 standards could be the fact that in order to obtain an adequate count rate for H-3 I had to pipette equal volumes four separate times in each standard prepared thereby adding to some potential volume losses.

2/7/2008 7:13:04 PM Recounts of 44, 65, 70, 72 and 75 with Spike Set

Sample ID	ELTIME	CPMA	CPMB	DPM1	DPM2	SIS	tSIE	MESSAGES
Blank	0:10:45	10	11	0	0	48.27	408.53	Background Vial
44	0:14:16	0	0	2	0	0	429.6	
65	0:17:48	1	3	3	3	48.93	424.44	
70	0:21:19	0	3	0	3	70.94	437.07	
72	0:24:51	0	1	0	1	0	434.23	
75	0:28:23	0	0	0	0	0	430.03	
[Position Skipped to Set Off Spikes Runs with sample batch]								
GB H-3 Spike	0:31:56	16808	1956	41715	281	11.48	469.19	
GB C-14 Spike	0:35:28	1155	8650	0	10496	79.02	456.18	
GB Dual Label Spike (H-3/C-14)	0:38:59	16685	7899	39706	7586	30.19	463.14	

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

Analysis Performed by: Ritchie D. Buschow

Ritchie D. Buschow 2/21/08
Signature and Date:

Verified by: Todd W. Baker

Todd W. Baker 2/21/08
Signature and Date:

This is to acknowledge the receipt of your letter/application dated 9/3/08, and to inform you that the initial processing which includes an administrative review has been performed.

Amendment (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** 142803.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader