



## **U.S. Geological Survey**

345 Middlefield Road  
Menlo Park, CA 94025

**NRC License # 04-06674-07**  
**Permit #9**

**Final Status Survey Report**  
**Building 15, Lab 2061.**

**Report Date: December 12, 2012**

**Project Number: G4007**

**Prepared by:**

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*Restoring the environment for future generations*

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December 11, 2012

Craig Hendrickson  
Radiation Safety Officer  
U. S. Geological Survey  
345 Middlefield Road  
Menlo Park, CA 94025

Dear Craig,

The U. S. Geological Survey's Lab 2061's Final Status Survey Report is enclosed. Your facility was surveyed on September 5, 2012.

The survey indicated zero contamination. New World Environmental Inc. was able to initiate the final status survey for Lab 2061 without having to perform extensive decontamination procedures due to proper and diligent control of all radioactive materials used in the above mentioned area. This is a reflection of the high standards maintained by U. S. Geological Survey's laboratory staff and associated personnel.

The U. S. Nuclear Regulatory Commission has the option to conduct a final inspection before granting approval of the request for unrestricted release of the licensed facilities. Upon their approval the facility may be released as an uncontrolled area.

Please note that this survey is not a release of these facilities. Only the U. S. Nuclear Regulatory Commission can officially release lab 2061 as a unrestricted use area. You must submit two copies of this report with your duplicate request for this request. If you need assistance with this part of your license amendment, please do not hesitate to call us.

Thank you very much for your assistance during the close out survey. If we may be of further service, please contact us at ph. 925 443-7967 or by e-mail: [don@nwenvironmentalinc.com](mailto:don@nwenvironmentalinc.com) .

Sincerely,

Don Wadsworth  
Health Physicist  
New World Environmental, Inc.

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## 1. Executive Summary

The U.S. Geological Survey (USGS) is currently licensed to possess and use radioactive materials at its facility in Menlo Park, California under NRC license # 05-01399-08. The USGS has decided to terminate the use of radioactive materials in lab M2061 located in Building 15 at 345 Middlefield Rd. Menlo Park, CA 94025 and request that lab M2061 be released for unrestricted use under U.S. Nuclear Regulatory Commission (NRC) requirements.

### **10 CFR § 20.1402 Radiological criteria for unrestricted use.**

A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Determination of the levels which are ALARA must take into account consideration of any detriments, such as deaths from transportation accidents, expected to potentially result from decontamination and waste disposal.

New World Environmental Inc. (NWE) was the contractor hired by the USGS to assist in the decommissioning of lab M2061 and conduct a radiological final status survey (RFSS) in compliance with NRC requirements.

After all radioactive materials had been located and removed from lab M2061 personnel from NWE performed a RFSS of the lab.

The RFSS was performed to determine if residual contamination of the IOC met NRC requirements to release facilities for unrestricted use.

## 2. Introduction

The USGS is authorized to use specifically licensed radioisotopes at Building 15, 345 Middlefield Road, Menlo Park, CA 94025. During permitted activities NWE has for many years conducted regular monthly laboratory surveys of Building 15, including lab M2061, in order to determine if any of the radioactive use areas had residual radioactivity levels distinguishable from background. A review of those surveys revealed no evidence of contamination in the lab.

In order to comply with NRC requirements for vacating installations where licensed activities have taken place, an extensive RFSS of lab M2061 was performed by New World Environmental Inc. of Livermore, California on September 5, 2012.

### 3. Historical Site Analysis

The USGS possesses licensed radioactive materials used on the site under NRC Form 374 Radioactive Material License # 05-01399-08, amendment No. 79. The license has an expiration date of February 28, 2015. A copy of the Radioactive Material License is included in this report as Appendix A.

Craig E. Henderson is the Radiation Safety Officer for this license and Dr. James Paces is the Chair of the Radiation Safety Committee.

The location to be removed from the USGS License # 05-01399-08 and decommissioned for unrestricted release is Building 15, Laboratory M2061, 345 Middlefield Road, Menlo Park, CA 94025.

Since the USGS only used Hydrogen-3 and Uranium-233 in Laboratory M2061, those are the only radioisotopes of concern (ROC) and are given in Table 1.

#	Radionuclide	Radiation	Energy (MeV)	Half-life
B	Hydrogen-3	Beta, ( $\beta$ )	0.0186	12.3 y
L	Uranium-233	Alpha, ( $\alpha$ )	4.78, 4.824	1.592E5 y

**Table 1 Radionuclides of concern, radiation emissions, energies, and half-lives (Radiological Health Handbook, 1970).**

### 4. Disposition of Radioactive Materials

All radioactive materials were removed from lab M2061 and transferred to other projects or transferred for disposal by the USGS prior to NWE beginning the RFSS. See attached documents included in Appendices F & G.

### 5. Release Criterion

The release criterion for Laboratory M2061 for unrestricted use was derived from current NRC guidelines (10 CFR 20.1402). This requirement is met “if the residual radioactivity that is distinguishable from background radiation results in a Total Effective Dose Equivalent (TEDE) to an average member of the critical group that does not exceed 25 mrem/yr, including that from groundwater sources of drinking water, and that the residual

radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA)".

## **6. Final Status Survey**

The survey was conducted using the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). NUREG-1575, NUREG-1505, and NUREG-1507 were used as technical guidance in designing and conducting this RFSS. Other considerations were the site history, technical theory and specifications for radiation measurements.

### **6.1 Objective of the Final Status Survey**

The objective of the RFSS is to demonstrate that any residual radioactivity levels from the ROC are indistinguishable from natural background.

### **6.2 Survey Areas**

USGS, Building 15, Laboratory M2061, 345 Middlefield Road, Menlo Park, CA 94025. See attachments included in Appendix B.

### **6.3 Reference (Background) Area**

An area located in the hallway outside of lab M2061 where radioisotopes had not been used was selected as the background reference area for the lab survey data for lab M2061. The background area was chosen because of the similar qualities of the floor being surveyed and similar building composition. Thirty samples and/or counts from the reference areas were used to acquire the average instruments background in the MDA calculation and to establish background numbers for the tests for removable and static contamination.

### **6.4 Methodology**

A previously scheduled USGS regular monthly lab survey was conducted by NWE of lab M2061. Spot checking for removable contamination was done with wipes of areas where radioisotopes were stored and/or used.

Several maps of lab M2061, where radioactive material may have possibly caused contamination, are included in Appendix B. Spot checking indicated that no detectable contamination exists in the designated radioactive materials use area. The RFSS data results are in Appendices D & E.

## 7. Selection of Survey Instruments and Survey Techniques

### Selection of Survey Instrument

Instruments were selected that were suitable for the physical and environmental conditions at the site. The instruments and measurement methods selected were able to detect the radionuclides of concern or radiation types of interest.

Make	Model	Survey Type	Type	Serial No.	Calibration Due
Beckman	3801	Wipe	Liquid Scintillation Counter	7013849	28-Aug-12
Ludlum	43-68	Direct	Gas Proportional	PR148457	4-Sep-12
Ludlum	43-37	Direct	Gas Proportional	PR149713	4-Sep-12

**Table 2 Instruments selected for the survey.**

### Instrument Calibration and Quality Assurance (QA) Procedures

Proper calibration procedures are an essential requisite toward providing confidence in measurements made to demonstrate compliance with cleanup criteria. All survey and laboratory instruments were calibrated with National Institute of Standards and Technology (NIST) traceable standards prior to the start of the project. Instrument calibration forms and certificates of calibration for the radioactive check sources used are located in Appendix C.

### Survey Techniques

#### Direct Monitoring Samples for Fixed Contamination

The Ludlum 43-37 and 43-68 detectors used in this project are thin window gas-flow proportional detectors typically used for performing alpha and beta surveys.

Direct measurements for beta emitting radionuclides were performed by placing the detector close to the surface to be measured and collecting a measurement without moving the detector. These measurements are more reliable on relatively smooth, impermeable surfaces where the activity is present as surface contamination. Measurements were taken with the detector 0.5 cm from the surface for a period of thirty seconds. These detectors also reliably detect and measure the presence of alpha emitting radionuclides. Direct measurement demonstrated no radiation levels above background. Direct measurement location maps and data analysis are attached in Appendices B & E respectively.

### **Wipe Samples for Removable Contamination**

Wipe samples were taken in the background reference area and the survey areas to evaluate for the presence of removable surface contamination. A Whatman filter paper (2.5 cm) was used to wipe all surfaces. Each wipe covers an average of 100 cm<sup>2</sup> and each location was recorded on the facility map. Each wipe was placed in a scintillation vial which was loaded with 3 cc of scintillation cocktail, and then counted by the Beckman 3801 liquid scintillation counter. The cap of each vial is numbered to correspond with the map location. Samples were analyzed in accordance with the radio emissions from the isotopes of interest. The Beckman 3801 is capable of performing an analysis for a number of different energy beta radiations simultaneously. This test is accomplished by setting the detector windows to “view” the energy range of interest. The efficiency for the different interest energies were determined by using H-3 and C-14 standards traceable to NIST for calibration purposes. Uranium-233 emits alpha radiation which is its radiation of interest. The Beckman 3801 liquid scintillation counter detection efficiency for this alpha radiation is essentially 100 %. Higher quality individual sample data was obtained by using the internal standard method to compensate for quenching in order to determine individual sample efficiencies to calculate individual sample Disintegration per Minute (DPM) values. Wipe location maps and data analysis are attached in Appendices B & D respectively.

## **8. Instrument Detection Limits**

### **Detection Limit ( $L_D$ )**

Detection limit ( $L_D$ ) can be expressed in terms of the net counts that are detectable above background levels. The calculation expression for instrument sensitivity is typically stated as the minimum detectable concentration (MDC) having a 95% probability of being detected when a sample contains activity at  $L_D$ . The square root of the 30



background counts averaged, determined by repetitive background measurements to provide a better estimate of the background value.

	<b>Wipe Samples</b>	<b>Direct Monitor Samples</b>
<b>Equation 1;</b>	$L_d (cpm) = 3 + 4.65\sqrt{BKG_{cpm}}$	$L_d (cpm) = 3 + 4.65\sqrt{BKG_{cpm}}$
<b>Equation 2;</b>	$L_d (dpm) = \frac{3 + 4.65\sqrt{BKG_{cpm}}}{eff_i}$	$L_d (dpm) = \frac{3 + 4.65\sqrt{BKG_{cpm}}}{eff_i \cdot eff_s}$

Where,

$L_d$  = Detection Limit

$\sqrt{BKG_{cpm}}$  = Square root of background counts.

$eff_i$  = Instrument efficiency

$eff_s$  = Source surface efficiency

### Detection Sensitivity - Minimum Detectable Activity (MDA)

The MDA equation accounts for the difference in background count time and sample count time. This equation also accounts for the probe active area. Since the wipe covers 100cm<sup>2</sup>, the area of the detector is considered the same.

**Equation 3;**

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29\sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\varepsilon_i * T_{s+b} * \varepsilon_s * \left(\frac{\text{Probe Active Area}(cm^2)}{100cm^2}\right)}$$

Where,

$R_b$  = Background count rate (cpm)

$T_b$  = Background counting time (min)

$T_{s+b}$  = Gross Sample counting time (min)

$\varepsilon_i$  = Instrument efficiency (count per particle)

$\varepsilon_s$  = Source surface efficiency (particle per disintegration)

Wipe data is reported in units of dpm per 100cm<sup>2</sup> and is included in Appendix D.  
 Direct Monitor data is reported in units of dpm per 100cm<sup>2</sup> and is included in Appendix E.

### Surface Activity Measurements

Measurements to quantify surface activity levels represent the fundamental compliance measurements for buildings and structures. Applicable portions of ISO-7503, NUREG-1507, and ASTM were used as technical guidance to ensure the accurate measurement of surface activity.

**Equation 4;** 
$$A_s = \frac{R_{S+B} - R_B}{\epsilon_i \epsilon_s}$$

Where,

$A_s$  = Total surface activity (dpm)

$R_{S+B}$  = Gross count rate of the measurement in cpm

$R_B$  = Background count rate in cpm

$\epsilon_i$  = Instrument efficiency (count per particle)

$\epsilon_s$  = Contaminated surface efficiency (particle per disintegration)

**Note:**  $A_s$  is represented in the data report forms as the DPM column

## 9. Survey Analytical Results and Conclusions

### Analytical Results

All survey data indicated that there was no activity distinguishable from background in any of the impacted areas. Equation 5 (same as Sec. 8 equation 1, pg.5) and Equation 6 were used for this conclusion.

	Wipe Samples	Direct Monitor Samples
<b>Equation 5;</b>	$L_d (dpm) = \frac{3 + 4.65 \sqrt{BKG_{cpm}}}{eff_i}$	$L_d (dpm) = \frac{3 + 4.65 \sqrt{BKG_{cpm}}}{eff_i \cdot eff_s}$
	<i>and,</i>	

**Equation 6; Wipe Samples** (BKG dpm + L<sub>d</sub> dpm) = Fail Level (DPM/100cm<sup>2</sup>)  
**Direct hand monitor samples** (BKG dpm + L<sub>d</sub> dpm) = Fail Level (DPM/128cm<sup>2</sup>)  
**Direct floor monitor samples** (BKG dpm + L<sub>d</sub> dpm) = Fail Level (DPM/582cm<sup>2</sup>)

At all locations the DPM column must not exceed the “Fail Level” stated in each worksheet and is illustrated by the “PASS” or “FAIL” notation in the adjacent column.

### **Wipe Sample Tests Results**

The RFSS of the wipe test results are included in Appendix D and the maps of the wipe locations are in Appendix B. All wipe tests for removable contamination demonstrate that any residual radioactivity levels have no significant difference from the background levels taken from the background reference area.

### **Direct Monitor Tests Results**

The RFSS of the direct monitor test results are included in Appendix E and the maps of the scan locations are in Appendix B. All scan tests for static contamination demonstrate that any residual radioactivity levels have no significant difference from the background levels taken from the background reference areas.

### **Conclusion**

After completion of decommissioning activities all areas surveyed were found to comply with the NRC requirements for the release of facilities and equipment for unconditional use. The RFSS data indicates that the residual Total Effective Dose Equivalent (TEDE) from licensed activities is no different than natural background in the Bay Area.

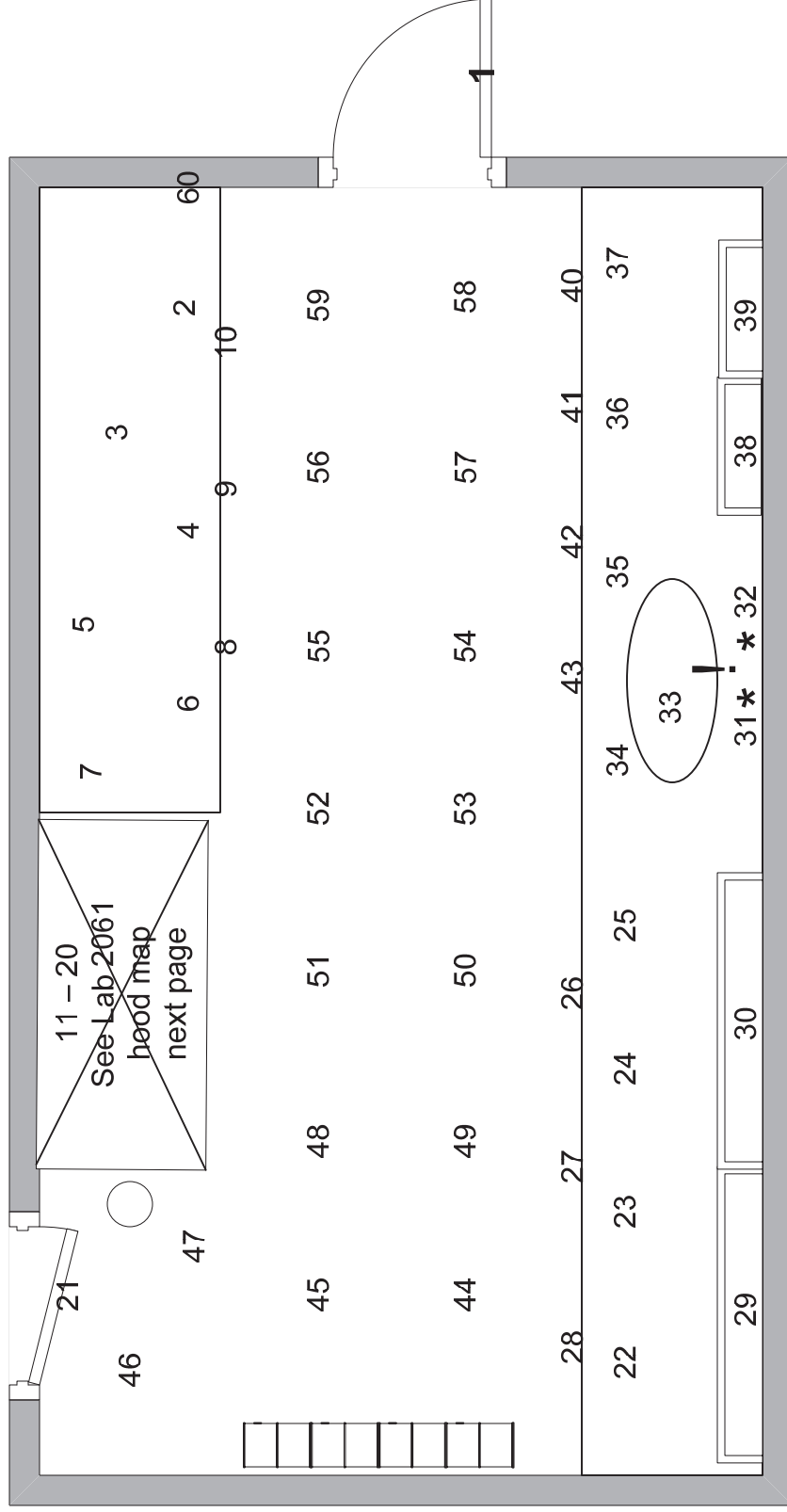
The site release criteria applied to the structural surface areas of lab M2061 correspond to the radiological dose criteria for unrestricted use per 10 CFR 20.1402. The dose criteria is met “if the residual radioactivity that is distinguishable from background radiation results in a Total Effective Dose Equivalent (TEDE) to an average member of the critical group that does not exceed 25 mrem/yr, including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to levels that are as low as reasonable achievable (ALARA)”.

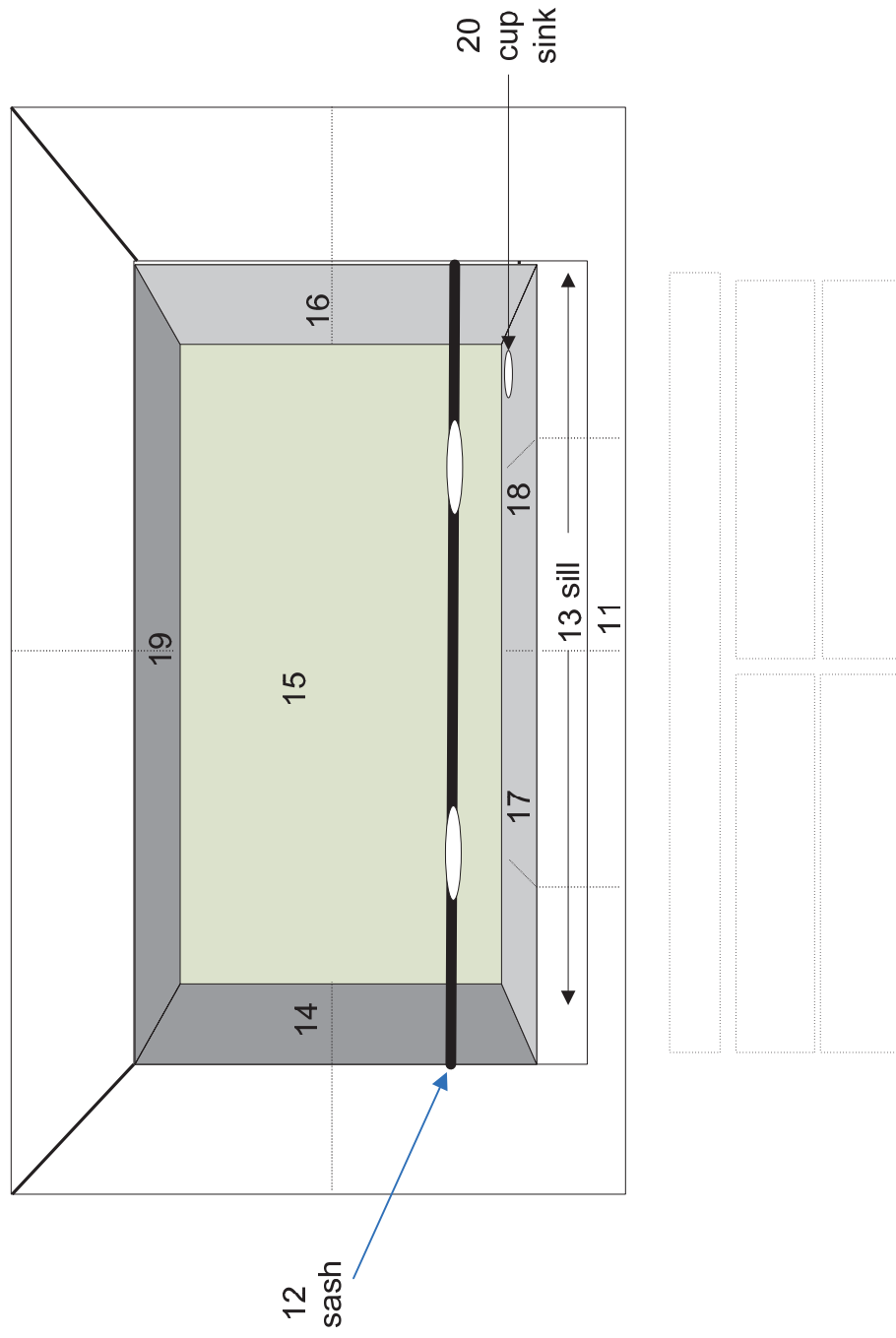
The RFSS of lab M2061, where radioactive material, may have possibly caused contamination is included in Appendix B. Spot checking indicated that no detectable contamination exists in the designated radioactive materials use area. The main isotopes of interest are H-3 and U-233, where H-3 is a very low energy beta emitter and the RFSS indicates no residual detectable activity. Therefore any individual receiving a dose from

tritium is very unlikely. As for U-233 a calculated TEDE dose to an individual occupying the space using the MDA as an input for surface contamination, the analytical results indicates a TEDE of less than  $2 \times 10^{-6}$   $\mu\text{rem}$  or two Pico rem,  $2 \times 10^{-12}$  and again our survey indicated no residual detectable activity. The RFSS data results are included in Appendices D & E.

## Appendix A – License & Permit

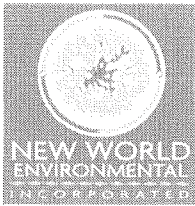
## Appendix B – Facility Drawings







## Appendix C – Instrument Calibrations



## Certificate of Calibration

Customer: NWE Project: USGS – Menlo Park  
 Mfg: Ludlum Model: 2360 Serial No: 184435  
 Mfg: Ludlum Det. Model: 43-68 Serial No: PR148457  
 Cal. Date: 9/4/12 Due Date: 9/4/13 Cal. Interval: 1 year

Det. Bkg: <u>155 cpm</u>	Alarm Check: <u>off</u>	Input V1 <u>          </u>
Temp.: <u>79 °F</u>	Reset: <u>          </u>	Input V2 <u>          </u>
Humidity: <u>37 %</u>	Audio: <u>Ok</u>	Threshold 1 <u>100</u>
Bat. Check: <u>Ok</u>	Bat. Voltage: <u>6.2</u>	Threshold 2 <u>          </u>
HV set: <u>1650</u>	Mechanical: <u>Ok</u>	Window 1 <u>500</u>
HV reading: <u>1650</u>	Bkg Subtract: <u>Na</u>	Window 2 <u>          </u>

Check mark applies to applicable instrument and or detector.

Instrument Received:      Within Tolerance (+/- 10%)       10 to 20%       Out of Tolerance       Requires Repair

Comments:

Range Multiplier	Reference Point CPM	Instrument Reading CPM	Chi Square	CPM	Efficiency
NA	100	100	1	8237	
	400	400	2	8136	C-14
	1,000	1,000	3	8326	8,301 cpm
	4,000	4,000	4	8274	100,281 dpm
	10,000	10,000	5	8425	= <b>8.2% eff. 4π</b>
	40,000	40,000	6	8297	
	100,000	100,000	7	8247	8,301 cpm
	400,000	400,000	8	8363	26289 dpm
			9	8486	= <b>31.6% eff. 2π</b>
			10	8340	
			<b>PASS!</b>	<b>10.7</b>	

Sources & Instruments:

Gamma sn: \_\_\_\_\_  (C-14) Beta sn: A8-074  Other: \_\_\_\_\_  
 Alpha sn: \_\_\_\_\_  Beta sn: \_\_\_\_\_  
 Pulser sn: 81071  Oscilloscope sn: \_\_\_\_\_  Multimeter: \_\_\_\_\_

Calibrated by: *John Bane* Date: 9/4/12

NWT certifies that the above instrument has been calibrated by instruments and standards traceable to NIST or to the calibration facilities of other International Standards Organization members or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of MIL-STD-45662A and ANSI N323-1978



## Certificate of Calibration

Customer: NWE Project: USGS – Menlo Park  
 Mfg: Ludlum Model: 2360 Serial No: 168023  
 Mfg: Ludlum Det. Model: 43-37 Serial No: PR149713  
 Cal. Date: 9/4/12 Due Date: 9/4/13 Cal. Interval: 1 year

Det. Bkg: <u>276 cpm</u>	Alarm Check: <u>off</u>	Input V1 <u>        </u>
Temp.: <u>79 °F</u>	Reset: <u>        </u>	Input V2 <u>        </u>
Humidity: <u>37 %</u>	Audio: <u>Ok</u>	Threshold 1 <u>100</u>
Bat. Check: <u>Ok</u>	Bat. Voltage: <u>6.1</u>	Threshold 2 <u>        </u>
HV set: <u>1600</u>	Mechanical: <u>Ok</u>	Window 1 <u>500</u>
HV reading: <u>1600</u>	Bkg Subtract: <u>Na</u>	Window 2 <u>        </u>

Check mark applies to applicable instrument and or detector.

Instrument Received:      Within Tolerance (+/- 10%)       10 to 20%       Out of Tolerance       Requires Repair

Comments:

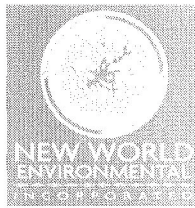
Range Multiplier	Reference Point CPM	Instrument Reading CPM	Chi Square	CPM	Efficiency
NA	100	100	1	8894	
	400	400	2	8896	C-14
	1,000	1,000	3	8820	8,896 cpm
	4,000	4,000	4	8945	100,281 dpm
	10,000	10,000	5	8869	= <b>8.9% eff. 4π</b>
	40,000	40,000	6	9093	
	100,000	100,000	7	8908	8,896 cpm
	400,000	400,000	8	8866	26289 dpm
			9	8938	= <b>33.8% eff. 2π</b>
			10	8733	
			<b>PASS!</b>	<b>8.67</b>	

Sources & Instruments:

Gamma sn: \_\_\_\_\_  (C-14) Beta sn: A8-074  Other: \_\_\_\_\_  
 Alpha sn: \_\_\_\_\_  Beta sn: \_\_\_\_\_  
 Pulser sn: 81071  Oscilloscope sn: \_\_\_\_\_  Multimeter: \_\_\_\_\_

Calibrated by: *Janice* Date: 9/4/12

NWT certifies that the above instrument has been calibrated by instruments and standards traceable to NIST or to the calibration facilities of other International Standards Organization members or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of MIL-STD-45662A and ANSI N323-1978



# Certificate of Calibration

Customer: NWE Order No: \_\_\_\_\_

Mfg: Beckman Model: 3801 Serial No: 7013849

Mfg: \_\_\_\_\_ Det. Model: Internal PM Tubes Serial No: NA

Cal. Date: 8/28/12 Due Date: 8/28/13 Cal. Interval: 1 year

H-3 Det. Bkg:	<u>13.0</u>	<u>cpm</u>	Operating	Input V1	_____
C-14 Det. Bkg:	<u>11.33</u>	<u>cpm</u>	Voltage:	Input V2	_____
Temp.:	_____	_____	Reset:	Threshold1	<u>1</u>
Bat. Check:	<u>na</u>	_____	Audio:	Threshold2	_____
Threshold:	_____	_____	Bat. Voltage:	Window 1	<u>H-3</u>
HV set:	_____	_____	Mechanical:	Window 2	<u>C-14</u>
HV reading:	_____	_____	Bkg Subtract:	Window 3	_____
Alarm Check:	_____	_____			

Check mark applies to applicable instrument and or detector.

Instrument Received:  Within Tolerance (+/- 10%)  10 to 20%  Out of Tolerance  Requires Repair

Comments:

Empty box for comments.

Range Multiplier	Reference Point DPM	Instrument Reading CPM	Calculated Efficiency
NA			
H-3	24,224	12,168	50.2 %
C-14	45,159	42,669	94.5 %

### NWE Procedure:

#### Sources & Instruments:

<input type="checkbox"/>	Gamma sn: _____	<input checked="" type="checkbox"/>	(H-3) Beta sn: <u>HBX0402</u>	<input type="checkbox"/>	Other: _____
<input type="checkbox"/>	Alpha sn: _____	<input checked="" type="checkbox"/>	(C-14) Beta sn: <u>CBX02703</u>	<input type="checkbox"/>	Multimeter: _____
<input type="checkbox"/>	Pulser sn: _____	<input type="checkbox"/>	Oscilloscope sn: _____		

Calibrated by: Jenny Pains

Date: 8/28/12

NWE certifies that the above instrument has been calibrated by instruments and standards traceable to NIST or to the calibration facilities of other International Standards Organization members or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of MIL-STD-45662A and ANSI N323-1978

## Appendix D – Wipe Test Results



Name: U. S. Geological Survey  
 Location: 345 Middlefield Rd. Menlo Park, CA 94025  
 Title: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: LSC- Beckman 3801 Inst. SN: 7013849

Sample collection date: 5-Sep-12  
 Sample process date: 7-Sep-12

Ref: MARSSIM/NUREG-1575, NUREG 1507

Average Bkg = 32 cpm  
 Bkg Count time = 90 min  
 Sample & Bkg Count time = 3 min  
 Instrument Efficiency = 94.46 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{Probe Active Area (cm}^2\text{)}}{100 \text{ cm}^2}\right)} = \underline{51} \text{ dpm/100cm}^2$$

Isotope: U-233 (Alpha)

Fail = 65 dpm

Location	CPM	Net CPM (CPMs - CPMb)	DPM	Pass/ Fail	Comment
1	29.00	-3.17	30.70	PASS	Lab 2061 Door
2	35.00	2.83	37.05	PASS	Lab 2061
3	38.00	5.83	40.23	PASS	Lab 2061
4	26.00	-6.17	27.53	PASS	Lab 2061
5	31.00	-1.17	32.82	PASS	Lab 2061
6	36.00	3.83	38.11	PASS	Lab 2061
7	28.00	-4.17	29.64	PASS	Lab 2061
8	32.00	-0.17	33.88	PASS	Lab 2061 Area below Counter
9	30.00	-2.17	31.76	PASS	Lab 2061 Area below Counter
10	31.00	-1.17	32.82	PASS	Lab 2061 Area below Counter
11	34.00	1.83	36.00	PASS	Lab 2061 Hood
12	31.00	-1.17	32.82	PASS	Lab 2061 Hood
13	37.00	4.83	39.17	PASS	Lab 2061 Hood
14	31.00	-1.17	32.82	PASS	Lab 2061 Hood
15	33.00	0.83	34.94	PASS	Lab 2061 Hood
16	28.00	-4.17	29.64	PASS	Lab 2061 Hood
17	34.00	1.83	36.00	PASS	Lab 2061 Hood
18	29.00	-3.17	30.70	PASS	Lab 2061 Hood
19	37.00	4.83	39.17	PASS	Lab 2061 Hood
20	27.00	-5.17	28.58	PASS	Lab 2061 Hood
21	39.00	6.83	41.29	PASS	Lab 2061 Door
22	38.00	5.83	40.23	PASS	Lab 2061
23	33.00	0.83	34.94	PASS	Lab 2061
24	34.00	1.83	36.00	PASS	Lab 2061
25	38.00	5.83	40.23	PASS	Lab 2061
26	26.00	-6.17	27.53	PASS	Lab 2061 Area below Counter
27	33.00	0.83	34.94	PASS	Lab 2061 Area below Counter
28	35.00	2.83	37.05	PASS	Lab 2061 Area below Counter
29	31.00	-1.17	32.82	PASS	Lab 2061 Shelving
30	28.00	-4.17	29.64	PASS	Lab 2061 Shelving
31	29.00	-3.17	30.70	PASS	Lab 2061 Faucet
32	36.00	3.83	38.11	PASS	Lab 2061 Faucet
33	38.00	5.83	40.23	PASS	Lab 2061 Basin
34	30.00	-2.17	31.76	PASS	Lab 2061
35	35.00	2.83	37.05	PASS	Lab 2061



Name: U. S. Geological Survey  
 Location: 345 Middlefield Rd. Menlo Park, CA 94025  
 Title: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: LSC- Beckman 3801 Inst. SN: 7013849

Sample collection date: 5-Sep-12  
 Sample process date: 7-Sep-12

Ref: MARSSIM/NUREG-1575, NUREG 1507

Average Bkg = 32 cpm  
 Bkg Count time = 90 min  
 Sample & Bkg Count time = 3 min  
 Instrument Efficiency = 94.46 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{Probe Active Area (cm}^2\text{)}}{100 \text{ cm}^2}\right)} = \underline{51} \text{ dpm/100cm}^2$$

Isotope: U-233 (Alpha)

Fail = 65 dpm

Location	CPM	Net CPM (CPMs - CPMB)	DPM	Pass/ Fail	Comment
36	31.00	-1.17	32.82	PASS	Lab 2061
37	36.00	3.83	38.11	PASS	Lab 2061
38	31.00	-1.17	32.82	PASS	Lab 2061 Shelving
39	36.00	3.83	38.11	PASS	Lab 2061 Shelving
40	32.00	-0.17	33.88	PASS	Lab 2061 Area below Counter
41	30.00	-2.17	31.76	PASS	Lab 2061 Area below Counter
42	30.00	-2.17	31.76	PASS	Lab 2061 Area below Counter
43	36.00	3.83	38.11	PASS	Lab 2061 Area below Counter
44	33.00	0.83	34.94	PASS	Lab 2061 Floor
45	34.00	1.83	36.00	PASS	Lab 2061 Floor
46	30.00	-2.17	31.76	PASS	Lab 2061 Floor
47	33.00	0.83	34.94	PASS	Lab 2061 Floor
48	37.00	4.83	39.17	PASS	Lab 2061 Floor
49	34.00	1.83	36.00	PASS	Lab 2061 Floor
50	35.00	2.83	37.05	PASS	Lab 2061 Floor
51	36.00	3.83	38.11	PASS	Lab 2061 Floor
52	31.00	-1.17	32.82	PASS	Lab 2061 Floor
53	38.00	5.83	40.23	PASS	Lab 2061 Floor
54	34.00	1.83	36.00	PASS	Lab 2061 Floor
55	30.00	-2.17	31.76	PASS	Lab 2061 Floor
56	32.00	-0.17	33.88	PASS	Lab 2061 Floor
57	37.00	4.83	39.17	PASS	Lab 2061 Floor
58	32.00	-0.17	33.88	PASS	Lab 2061 Floor
59	35.00	2.83	37.05	PASS	Lab 2061 Floor
60	32.00	-0.17	33.88	PASS	Lab 2061 Light Switch

Prepared By: \_\_\_\_\_  
 Print Name: Jenny Parra  
 Title: Health Physicist

Date: \_\_\_\_\_  
 Date: 11/7/2012





Name: U. S. Geological Survey  
 Location: 345 Middlefield Rd. Menlo Park, CA 94025  
 Title: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: LSC- Beckman 3801 Inst. SN: 7013849

Sample collection date: 5-Sep-12  
 Sample process date: 7-Sep-12

Ref: MARSSIM/NUREG-1575, NUREG 1507

Average Bkg = 10 cpm  
 Bkg Count time = 90 min  
 Sample & Bkg Count time = 3 min  
 Instrument Efficiency = 50.3 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{Probe Active Area}(cm^2)}{100 cm^2}\right)} = \underline{57} \text{ dpm}/100cm^2$$

Isotope H-3

Fail = 55 dpm

Location	CPM	Net CPM (CPMs - CPMB)	DPM	Pass/ Fail	Comment
1	10.00	-0.10	19.90	PASS	Lab 2061 Door
2	11.00	0.90	21.89	PASS	Lab 2061
3	10.00	-0.10	19.90	PASS	Lab 2061
4	6.00	-4.10	11.94	PASS	Lab 2061
5	10.00	-0.10	19.90	PASS	Lab 2061
6	7.00	-3.10	13.93	PASS	Lab 2061
7	8.00	-2.10	15.92	PASS	Lab 2061
8	9.00	-1.10	17.91	PASS	Lab 2061 Area below Counter
9	8.00	-2.10	15.92	PASS	Lab 2061 Area below Counter
10	9.00	-1.10	17.91	PASS	Lab 2061 Area below Counter
11	11.00	0.90	21.89	PASS	Lab 2061 Hood
12	8.00	-2.10	15.92	PASS	Lab 2061 Hood
13	13.00	2.90	25.87	PASS	Lab 2061 Hood
14	8.00	-2.10	15.92	PASS	Lab 2061 Hood
15	12.00	1.90	23.88	PASS	Lab 2061 Hood
16	6.00	-4.10	11.94	PASS	Lab 2061 Hood
17	10.00	-0.10	19.90	PASS	Lab 2061 Hood
18	9.00	-1.10	17.91	PASS	Lab 2061 Hood
19	12.00	1.90	23.88	PASS	Lab 2061 Hood
20	9.00	-1.10	17.91	PASS	Lab 2061 Hood
21	12.00	1.90	23.88	PASS	Lab 2061 Door
22	13.00	2.90	25.87	PASS	Lab 2061
23	9.00	-1.10	17.91	PASS	Lab 2061
24	11.00	0.90	21.89	PASS	Lab 2061
25	15.00	4.90	29.85	PASS	Lab 2061
26	6.00	-4.10	11.94	PASS	Lab 2061 Area below Counter
27	7.00	-3.10	13.93	PASS	Lab 2061 Area below Counter
28	10.00	-0.10	19.90	PASS	Lab 2061 Area below Counter
29	10.00	-0.10	19.90	PASS	Lab 2061 Shelving
30	11.00	0.90	21.89	PASS	Lab 2061 Shelving
31	8.00	-2.10	15.92	PASS	Lab 2061 Faucet
32	9.00	-1.10	17.91	PASS	Lab 2061 Faucet
33	13.00	2.90	25.87	PASS	Lab 2061 Basin
34	11.00	0.90	21.89	PASS	Lab 2061
35	11.00	0.90	21.89	PASS	Lab 2061





Name: U. S. Geological Survey  
 Location: 345 Middlefield Rd. Menlo Park, CA 94025  
 Title: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: LSC- Beckman 3801 Inst. SN: 7013849

Sample collection date: 5-Sep-12  
 Sample process date: 7-Sep-12

Ref: MARSSIM/NUREG-1575, NUREG 1507

Average Bkg = 10 cpm  
 Bkg Count time = 90 min  
 Sample&Bkg Count time = 3 min  
 Instrument Efficiency = 50.3 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{Probe Active Area}(cm^2)}{100 cm^2}\right)} = \underline{57} \text{ dpm}/100cm^2$$

Isotope H-3

Fail = 55 dpm

Location	CPM	Net CPM (CPMs - CPMB)	DPM	Pass/ Fail	Comment
36	8.00	-2.10	15.92	PASS	Lab 2061
37	8.00	-2.10	15.92	PASS	Lab 2061
38	11.00	0.90	21.89	PASS	Lab 2061 Shelving
39	14.00	3.90	27.86	PASS	Lab 2061 Shelving
40	10.00	-0.10	19.90	PASS	Lab 2061 Area below Counter
41	9.00	-1.10	17.91	PASS	Lab 2061 Area below Counter
42	10.00	-0.10	19.90	PASS	Lab 2061 Area below Counter
43	7.00	-3.10	13.93	PASS	Lab 2061 Area below Counter
44	12.00	1.90	23.88	PASS	Lab 2061 Floor
45	9.00	-1.10	17.91	PASS	Lab 2061 Floor
46	9.00	-1.10	17.91	PASS	Lab 2061 Floor
47	12.00	1.90	23.88	PASS	Lab 2061 Floor
48	8.00	-2.10	15.92	PASS	Lab 2061 Floor
49	8.00	-2.10	15.92	PASS	Lab 2061 Floor
50	12.00	1.90	23.88	PASS	Lab 2061 Floor
51	10.00	-0.10	19.90	PASS	Lab 2061 Floor
52	12.00	1.90	23.88	PASS	Lab 2061 Floor
53	14.00	3.90	27.86	PASS	Lab 2061 Floor
54	9.00	-1.10	17.91	PASS	Lab 2061 Floor
55	10.00	-0.10	19.90	PASS	Lab 2061 Floor
56	10.00	-0.10	19.90	PASS	Lab 2061 Floor
57	13.00	2.90	25.87	PASS	Lab 2061 Floor
58	11.00	0.90	21.89	PASS	Lab 2061 Floor
59	10.00	-0.10	19.90	PASS	Lab 2061 Floor
60	9.00	-1.10	17.91	PASS	Lab 2061 Light Switch

Prepared By: \_\_\_\_\_  
 Print Name: Jenny Parra  
 Title: Health Physicist

Date: \_\_\_\_\_  
 Date: 11/7/2012

## Appendix E – Direct Monitoring Results

# New World Environmental Inc.

Restoring the environment for future generations



Phone: 925.443.7967 Fax: 925.443.0119

Name: U. S. Geological Survey  
 Location: 345 Middlefield Rd. Menlo Park, CA 94025  
 Survey Type: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: Ludlum 2360 Inst. SN: 184435

Date: 5-Sep-12

Ref: **MARSSIM/NUREG-1575, NUREG 1507**

Probe: 43-68 Probe SN: PR148457

Average Bkg = 173.33 cpm  
 Bkg Count time = 30 min  
 Sample Count time = 1 min  
 Instrument Efficiency = 31.58 %  
 $\epsilon_i \epsilon_s =$  7.89 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{ProbeActiveArea}(cm^2)}{100cm^2}\right)} = \underline{465} \text{ dpm}/100cm^2$$

Isotope: U-233 alpha

Fail = 1,362 dpm

Location	CPM	Net CPM (CPMs - CPMb)	DPM	Pass/ Fail	Comment
1	122	-51.33	386.36	PASS	Lab 2061 Hood
2	120	-53.33	380.03	PASS	Lab 2061 Hood
3	122	-51.33	386.36	PASS	Lab 2061 Hood
4	142	-31.33	449.70	PASS	Lab 2061 Hood
5	134	-39.33	424.37	PASS	Lab 2061 Hood
6	102	-71.33	323.02	PASS	Lab 2061 Hood
7	140	-33.33	443.37	PASS	Lab 2061 Hood
8	152	-21.33	481.37	PASS	Lab 2061 Hood
9	144	-29.33	456.03	PASS	Lab 2061 Hood
10	192	18.67	608.05	PASS	Lab 2061 Hood
11	152	-21.33	481.37	PASS	Lab 2061 Hood
12	130	-43.33	411.70	PASS	Lab 2061 Hood
13	156	-17.33	494.04	PASS	Lab 2061 Hood
14	150	-23.33	475.04	PASS	Lab 2061 Hood
15	130	-43.33	411.70	PASS	Lab 2061 Hood
16	164	-9.33	519.37	PASS	Lab 2061 Hood
17	146	-27.33	462.37	PASS	Lab 2061 Hood
18	110	-63.33	348.36	PASS	Lab 2061 Hood
19	134	-39.33	424.37	PASS	Lab 2061 Hood
20	138	-35.33	437.03	PASS	Lab 2061 Hood
21	132	-41.33	418.03	PASS	Lab 2061 Shelf
22	152	-21.33	481.37	PASS	Lab 2061 Counter
23	120	-53.33	380.03	PASS	Lab 2061 Counter
24	154	-19.33	487.70	PASS	Lab 2061 Counter
25	124	-49.33	392.70	PASS	Lab 2061 Counter
26	148	-25.33	468.70	PASS	Lab 2061 Counter
27	142	-31.33	449.70	PASS	Lab 2061 Counter
28	134	-39.33	424.37	PASS	Lab 2061 Counter
29	102	-71.33	323.02	PASS	Lab 2061 Area below Counter
30	160	-13.33	506.71	PASS	Lab 2061 Area below Counter
31	122	-51.33	386.36	PASS	Lab 2061 Slide out board
32	120	-53.33	380.03	PASS	Lab 2061 Slide out board
33	140	-33.33	443.37	PASS	Lab 2061 Area below Counter

# New World Environmental Inc.

Restoring the environment for future generations



Phone: 925.443.7967 Fax: 925.443.0119

**Name:** U. S. Geological Survey  
**Location:** 345 Middlefield Rd. Menlo Park, CA 94025  
**Survey Type:** Lab Closure Survey  
**NRC Lic. No.** 04-06674-07 **Job No:** G4007  
**Survey Inst:** Ludlum 2360 **Inst. SN:** 184435

**Date:** 5-Sep-12

**Ref:** MARSSIM/NUREG-1575, NUREG 1507

**Probe:** 43-68 **Probe SN:** PR148457

Average Bkg = 173.33 cpm  
 Bkg Count time = 30 min  
 Sample Count time = 1 min  
 Instrument Efficiency = 31.58 %  
 $\epsilon_i \epsilon_s$  = 7.89 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{ProbeActiveArea}(cm^2)}{100cm^2}\right)} = \underline{465} \text{ dpm}/100cm^2$$

**Isotope:** U-233 alpha

**Fail =** 1,362 dpm

Location	CPM	Net CPM (CPMs - CPMb)	DPM	Pass/ Fail	Comment
34	152	-21.33	481.37	PASS	Lab 2061 Area below Counter
35	116	-57.33	367.36	PASS	Lab 2061 Area below Counter
36	136	-37.33	430.70	PASS	Lab 2061 Area below Counter
37	116	-57.33	367.36	PASS	Lab 2061 Area below Counter
38	134	-39.33	424.37	PASS	Lab 2061 Area below Counter
39	124	-49.33	392.70	PASS	Lab 2061 Area below Counter
40	92	-81.33	291.36	PASS	Lab 2061 Area below Counter
41	146	-27.33	462.37	PASS	Lab 2061 Area below Counter
42	106	-67.33	335.69	PASS	Lab 2061 Area below Counter
43	104	-69.33	329.36	PASS	Lab 2061 Area below Counter
44	138	-35.33	437.03	PASS	Lab 2061 Area below Counter
45	120	-53.33	380.03	PASS	Lab 2061 Area below Counter
46	90	-83.33	285.02	PASS	Lab 2061 Area below Counter
47	128	-45.33	405.36	PASS	Lab 2061 Area below Counter
48	100	-73.33	316.69	PASS	Lab 2061 Area below Counter
49	134	-39.33	424.37	PASS	Lab 2061 Area below Counter
50	110	-63.33	348.36	PASS	Lab 2061 Area below Counter
51	96	-77.33	304.02	PASS	Lab 2061 Area below Counter
52	92	-81.33	291.36	PASS	Lab 2061 Area below Counter
53	110	-63.33	348.36	PASS	Lab 2061 Area below Counter
54	146	-27.33	462.37	PASS	Lab 2061 Area below Counter
55	102	-71.33	323.02	PASS	Lab 2061 Area below Counter
56	96	-77.33	304.02	PASS	Lab 2061 Area below Counter
57	134	-39.33	424.37	PASS	Lab 2061 Counter
58	140	-33.33	443.37	PASS	Lab 2061 Counter
59	88	-85.33	278.69	PASS	Lab 2061 Counter
60	116	-57.33	367.36	PASS	Lab 2061 Counter
61	122	-51.33	386.36	PASS	Lab 2061 Counter
62	146	-27.33	462.37	PASS	Lab 2061 Counter
63	128	-45.33	405.36	PASS	Lab 2061 Counter
64	130	-43.33	411.70	PASS	Lab 2061 Counter
65	106	-67.33	335.69	PASS	Lab 2061 Counter
66	112	-61.33	354.69	PASS	Lab 2061 Counter

# New World Environmental Inc.

Restoring the environment for future generations



Phone: 925.443.7967 Fax: 925.443.0119

Name: U. S. Geological Survey  
 Location: 345 Middlefield Rd. Menlo Park, CA 94025  
 Survey Type: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: Ludlum 2360 Inst. SN: 184435

Date: 5-Sep-12  
 Ref: MARSSIM/NUREG-1575, NUREG 1507  
 Probe: 43-68 Probe SN: PR148457

Average Bkg = 173.33 cpm  
 Bkg Count time = 30 min  
 Sample Count time = 1 min  
 Instrument Efficiency = 31.58 %  
 $\epsilon_i \epsilon_s =$  7.89 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{ProbeActiveArea}(cm^2)}{100cm^2}\right)} = \underline{465} \text{ dpm}/100cm^2$$

Isotope: U-233 alpha

Fail = 1,362 dpm

Location	CPM	Net CPM (CPMs - CPMb)	DPM	Pass/ Fail	Comment
67	124	-49.33	392.70	PASS	Lab 2061 Counter
68	118	-55.33	373.70	PASS	Lab 2061 Sink
69	154	-19.33	487.70	PASS	Lab 2061 Sink
70	128	-45.33	405.36	PASS	Lab 2061 Sink
71	132	-41.33	418.03	PASS	Lab 2061 Shelf

Prepared By: \_\_\_\_\_

Date: 11/8/12

Title: Health Physicist

# New World Environmental Inc.

Restoring the environment for future generations



Phone: 925.443.7967 Fax: 925.443.0119

Name: U.S. Geological Survey  
 Location: 345 Middlefield Road, Menlo Park, CA 94025  
 Survey Type: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: Ludlum 2360 Inst. SN: 168023

Date: 5-Sep-12  
 Ref: **MARSSIM/NUREG-1575, NUREG 1507**  
 Probe: 43-37 Probe SN: PR148504

Average Bkg = 236.47 cpm  
 Bkg Count time = 30 min  
 Sample Count time = 1 min  
 Instrument Efficiency = 30.34 %  
 $\epsilon_i \epsilon_s$  = 7.59 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{Probe Active Area (cm}^2\text{)}}{100 \text{ cm}^2}\right)} = \underline{123} \text{ dpm/100cm}^2$$

Isotope: U-233 Alpha

Fail = 1,762 dpm

Location	CPM	Net CPM (CPMs - CPMb)	DPM	Pass / Fail	Comment
1	386	149.53	1272.24	PASS	Lab 2061 Floor
2	390	153.53	1285.42	PASS	Lab 2061 Floor
3	412	175.53	1357.93	PASS	Lab 2061 Floor
4	430	193.53	1417.26	PASS	Lab 2061 Floor
5	448	211.53	1476.59	PASS	Lab 2061 Floor
6	436	199.53	1437.04	PASS	Lab 2061 Floor
7	476	239.53	1568.87	PASS	Lab 2061 Floor
8	442	205.53	1456.81	PASS	Lab 2061 Floor
9	448	211.53	1476.59	PASS	Lab 2061 Floor
10	432	195.53	1423.85	PASS	Lab 2061 Floor
11	412	175.53	1357.93	PASS	Lab 2061 Floor
12	412	175.53	1357.93	PASS	Lab 2061 Floor
13	398	161.53	1311.79	PASS	Lab 2061 Floor
14	462	225.53	1522.73	PASS	Lab 2061 Floor
15	476	239.53	1568.87	PASS	Lab 2061 Floor
16	412	175.53	1357.93	PASS	Lab 2061 Floor
17	428	191.53	1410.67	PASS	Lab 2061 Floor
18	406	169.53	1338.16	PASS	Lab 2061 Floor
19	434	197.53	1430.44	PASS	Lab 2061 Floor
20	490	253.53	1615.02	PASS	Lab 2061 Floor
21	414	177.53	1364.52	PASS	Lab 2061 Floor
22	436	199.53	1437.04	PASS	Lab 2061 Floor
23	436	199.53	1437.04	PASS	Lab 2061 Floor
24	442	205.53	1456.81	PASS	Lab 2061 Floor
25	464	227.53	1529.32	PASS	Lab 2061 Floor
26	476	239.53	1568.87	PASS	Lab 2061 Floor
27	374	137.53	1232.69	PASS	Lab 2061 Floor
28	416	179.53	1371.12	PASS	Lab 2061 Floor
29	378	141.53	1245.87	PASS	Lab 2061 Floor
30	418	181.53	1377.71	PASS	Lab 2061 Floor
31	398	161.53	1311.79	PASS	Lab 2061 Floor
32	438	201.53	1443.63	PASS	Lab 2061 Floor
33	444	207.53	1463.40	PASS	Lab 2061 Floor

# New World Environmental Inc.

Restoring the environment for future generations

Phone: 925.443.7967 Fax: 925.443.0119



Name: U.S. Geological Survey  
 Location: 345 Middlefield Road, Menlo Park, CA 94025  
 Survey Type: Lab Closure Survey  
 NRC Lic. No. 04-06674-07 Job No: G4007  
 Survey Inst: Ludlum 2360 Inst. SN: 168023

Date: 5-Sep-12  
 Ref: MARSSIM/NUREG-1575, NUREG 1507  
 Probe: 43-37 Probe SN: PR148504

Average Bkg = 236.47 cpm  
 Bkg Count time = 30 min  
 Sample Count time = 1 min  
 Instrument Efficiency = 30.34 %  
 $\epsilon_i \epsilon_s =$  7.59 %

$$MDA_{(dpm/100cm^2)} = \frac{3 + 3.29 \sqrt{R_b * T_{s+b} * \left(1 + \frac{T_{s+b}}{T_b}\right)}}{\epsilon_i * T_{s+b} * \epsilon_s * \left(\frac{\text{Probe Active Area (cm}^2\text{)}}{100 \text{ cm}^2}\right)} = \underline{123} \text{ dpm/100cm}^2$$

Isotope: U-233 Alpha

Fail = 1,762 dpm

Location	CPM	Net CPM (CPMs - CPMb)	DPM	Pass / Fail	Comment
34	370	133.53	1219.50	PASS	Lab 2061 Floor
35	444	207.53	1463.40	PASS	Lab 2061 Floor
36	366	129.53	1206.32	PASS	Lab 2061 Floor
37	366	129.53	1206.32	PASS	Lab 2061 Floor
38	436	199.53	1437.04	PASS	Lab 2061 Floor

Prepared By: \_\_\_\_\_

Date: 11/8/12

Title: Health Physicist

## Appendix F – Isotope Inventory & Leak Test Certificates



## Appendix G – Waste Disposal