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August 27, 2003

Pamela J. Henderson  
Division of Nuclear Materials Safety  
U.S. Nuclear Regulatory Commission  
Region 1  
475 Allendale Road  
King of Prussia, PA 19406-14015

RE: License No. 29-30516-01

Dear Ms. Henderson,

03034998

Please amend license number to decommission the Gibraltar Laboratories facility located at 122 Fairfield Road, Fairfield, NJ 07004 from our radioactive materials license. I have enclosed a final release surveys from October through March, 2003 which documents the radiological condition of the site, and demonstrates that the facility meets the requirements to be released for unrestricted use, as per 10 CFR 20.1402.

I trust that this information is sufficient for the approval of this amendment. Should you have any questions, please contact Mr. Artur Lewandowski or myself at 973-227-6882.

Sincerely,

D. Prince, CEO  
Gibraltar Laboratories

122 Fairfield Rd.  
Fairfield, NJ  
07004-2405  
(973) 227-6882  
Fax: (973) 227-0812

www.gibraltarlabsinc.com  
e-mail: info@gibraltarlabsinc.com

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RECEIVED  
REGION 1

133587

NMSS/RGNI MATERIALS-002

REPORT ON THE RADIOLOGICAL DECOMMISSIONING OF LICENSE NO.  
GIBRALTAR LABORATORIES

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## 1.0 BACKGROUND

### 1.1 Reason for Decontamination

The facility of Gibraltar Laboratories at 122 Fairfield Rd, Fairfield, NJ has been used for research activities and development activities since March 1999. Gibraltar Laboratories was granted a NRC license on March 18, 1999. Gibraltar is not planning to use radioactive materials and would like to decommission this facility. The facility will be for non-radiological operations. Thus, the facility has to be decommissioned to a non-radiologically controlled status.

### 1.2 Technical/Management Approach

During the early weeks of March 2003, Gibraltar personnel performed initial survey operations in all radiation controlled areas of the facility. A Ludlum Model 3 survey instrument with a 44-9 G-M pancake probe was used to conduct a survey, while a liquid scintillation counter (LSC) was used to analyze wipe tests by the contractor Emerson RSI. No contamination above background was identified.

On May 13, 2003 an outside consultant performed a final status survey in the controlled areas using survey measurements with the Ludlum Model 3. The survey was performed following general survey methodology in MARRSIM ("Multi-Agency Radiation Survey and Site Investigation Manual", 1997). Because of the nature of the radioactive material used at the Gibraltar facility (C-14) techniques for evaluating data (statistical analyses) were not performed.

This report summarizes the results of final status survey measurements with respect to applicable guidelines.

### 1.3 Site Description

#### 1.3.1 Type and Location of Facility

The facility is a research laboratory located in a stand alone steel/wood/concrete building zoned for light industrial use on approximately 1/3 acres of land. Gibraltar Laboratories is a privately held laboratory owned by Dr. D. Prince and founding partners. Gibraltar occupies the entire building, approximately 4,000.00 sq. ft. of laboratory space. Approximately 16.5 sq. ft. is approved for work with radioisotopes.

#### 1.3.2 Areas

The main areas of interest were the area of the radioisotope usage. The main lab is an approximately 4,000.00 sq. ft. standard research laboratory with a vinyl tile floor. Also in the lab were approximately 230 feet of lab benches, 3 sink, 3 refrigerator, 1 freezer and 2 chemical fume hoods.

### 1.3.3 Licensing and Operations

Since it was granted the NRC license in May 1999 Gibraltar has only possessed and used  $C-14$  at its Fairfield facility. A total inventory of 1.425 mCi of C-14 has been received since March 1999. A total of 1.425 mCi of C-14 solid waste was held for picked up by the waste contractor RSI.

### 1.4 Site Conditions At Time of Final Survey

At the time of final status survey on March 13, 2003 all licensed operations had been suspended. 7/21/00 was the last day C-14 was used at the facility and 10/11/02 was the date the radioactive waste was picked up.

### 1.5 Identity of Contaminants and Release Guidelines

The only contaminant of interest was C-14 as surface contamination or incorporated into objects. Decontamination guidelines for floors, walls and other fixtures for non-controlled use were those given by USNRC Reg. Guide 1.86, as well as Gibraltar internal guidance:

Removable beta-gamma contamination:

1,000 dpm/100 sq.cm

## 2.0 REMEDIATION ACTIVITIES

No remediation was performed, as it was unnecessary.

## 3.0 SURVEY METHODOLOGY

### 3.1 Objectives

The purpose of the final status survey is to demonstrate that the radiation-controlled areas contain no residual radioactivity levels in excess of applicable guidelines so that the space can be released from radiation safety restrictions for future use. Specifically:

1. All removable surface contamination levels must be less than applicable limits;
2. Residual contamination, if any, is as low as is reasonably achievable; and
3. The dose from residual radioactivity above background does not exceed 25 mrem to the average member of a critical group to occupy the area.

### 3.2 Results of Previous Surveys

Results of initial surveys performed by the contractor's personnel indicated the results were consistent with background.

Contamination surveys were also performed monthly as part of the Gibraltar radiation safety program and its license conditions. Records from 1999 to the present indicate no areas of contamination above background

### 3.3 Survey Organization and Responsibilities

The final status survey was performed under direction of consultants hired to assist Gibraltar with their radiation safety program. Their responsibilities included:

- that the survey was conducted according to the survey plan.
- that an adequate number of survey samples were taken as per MARSSIM.

Analyses of wipes samples were performed by consultants using the procedures outlined in NUREG/CR- 5849 as guidance only.

### 3.4 Instrumentation

#### 3.4.1 Liquid Scintillation Counter

Off-site analyses of wipe tests were performed in a Beckman Model LS 6500 Liquid Scintillation Counter (LSC). This instrument was used with a 1-minute counting time which provided a minimum detectable activity (MDA) of approximately 10-15% of the guideline of 1000 dpm/100 cm<sup>2</sup> for C-14 wipes covering 100 cm<sup>2</sup>.

The operation of the LSC was checked during the project by counting standards (H-3 and C-14) and backgrounds vials and calculating the efficiency and MDA. Conversion from cpm to dpm was performed by dividing the cpm of each sample by the lowest counting efficiency (most conservative approach).

#### 3.4.2 Ludlum Model 3 Survey Meter with 44-9 G-M Probe

A Ludlum Model 3 Survey instrument (sn 159352) with a 44-9 pancake probe, last calibrated 06/12/02, was used to assess beta emissions from surfaces.

Instrumentation calibration certificates are shown in Appendix D.

#### 3.4.3 Minimum Detectable Activity

The MDA of the LSC was calculated and can be found in Appendix A.

#### 3.4.4 Instrument QA/QC

The LSC efficiency and calibration can be found in Appendix A.

#### 3.5 Area Classification

The radioisotope lab and the radioactive waste storage area were MARSSIM Class 3 Areas.

#### 3.6 Reference Grid and Measurement Frequency

Grids were established for the purpose of referencing locations of samples and measurements, relative to the floor plan of the area. All affected floor areas were gridded at approximately 1 m x 1 m intervals (actually 3 ft x 3 ft based on floor tile sections). All remaining equipment, furnishings and fixtures were also identified with a unique numbering sequence.

Floor plans of the areas surveyed are shown in Appendix B.

#### 3.7 Background Level Determinations

Because natural tritium and C-14 background levels on surfaces are much less than the MDA of the LSC, any test result over the instrument's MDA is considered to be "above background". Thus, determining local background levels over which regulatory guidelines apply per MARSSIM was not necessary for this project.

Background for the G-M counter is dependent on the amount of natural radioactivity in the surfaces measured. For painted concrete block, plasterboard, and vinyl tile over concrete, the G-M background ranged from 10 to 20 cpm. Background measurements were performed in a non-radiological area that had a similar construction as the radioisotope laboratory. The background count rate for the Ludlum G-M was approximately 20 cpm.

#### 3.8 Sample Collection Procedure

The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area was determined by wiping that area with Whatman #1 filter or cotton swabs, applying moderate pressure, and assessing the amount of radioactive material on the wipe with the LSC. If removable contamination on objects of less surface area was determined, the pertinent levels were reduced proportionately and the entire surface wiped.

The wipes were either cotton swabs for use in probing cracks and interfaces between surfaces, or filter papers such as Whatman filters. Wipes were placed in numbered scintillation vials. The sample numbers corresponded to a grid location, recognizable piece of equipment or other facility item.

#### 3.9 Sample Analysis

Wipe samples (1 ml aliquots) were placed into 7 ml plastic scintillation vials, cocktail was added, and the samples analyzed in the liquid scintillation counter as discussed previously in this section.

### 3.10 Data Recording Procedures

All wipe test results on the LSC printout sheets were labeled with the sample number so that they corresponded to a sample location or grid. The sample numbers were recorded on data sheets along with descriptions of the items surveyed.

Ludlum G-M measurement readings were also recorded on the data sheets along with sample numbers and descriptions of the items surveyed. The readings then were entered into the spreadsheet program and were converted from cpm/100 cm<sup>2</sup> to dpm/100 cm<sup>2</sup> for comparison to the surface activity guidelines. This was done by subtracting background and then dividing by the efficiency obtained during calibration. We did not record these on data sheets. There were no measurements above background. Everything was wipe tested as well and these are recorded as indicated above.

### 3.11 Techniques For Reducing/evaluation Data

Data conversion and evaluations were performed, following the guidance in NUREG/CR-5849 and MARSSIM.

## 4.0 SURVEY FINDINGS

### 4.1 Findings

The results of field measurements and laboratory analysis for final release measurements of the areas are shown in the Appendix A.

### 4.2 Comparison of Findings with Guideline Values and Conditions

The results of measurements performed are compared to the survey objectives below:

- a. All measurement results were found to be in compliance with the contamination limit criteria. All wipe samples were consistent with background.
- b. ALARA considerations: No further ALARA consideration is warranted since the samples were indistinguishable from background.
- c. Confidence level objectives (number of samples, background values) as described in MARSSIM were met, although the calculations were not included in this report.
- d. Prospective doses will not measurably exceed background levels and thus will comply with the 25 mrem dose limitation since no residual radioactivity was detected.

## 5.0 SUMMARY

As part of radiological decommissioning, the radioisotope laboratory and radioactive waste storage facility at the Gibraltar Laboratories were surveyed in accordance with generally-accepted procedures. In the opinion of the Licensee, as supported by work described herein by qualified consultants, the following are concluded:

- no residual radioactivity exists in excess of guidelines and,
- prospective doses to future occupants and workers will be well within guideline values and will be indistinguishable from natural background levels.



## Appendix C - Summary of MARSSIM Area Classification and Sample Frequency Calculations

Area Classification: For purposes of establishing the sampling and measurement frequency and pattern, MARSSIM discusses non-impacted and impacted areas in which there are 3 sub-classifications:

Impacted Areas - have potential radioactive contamination (based on facility operating history) or known radioactive contamination (based on past or preliminary radiological surveillance). These include areas where radioactive materials were used or stored, or potential for unusual occurrences that could have resulted in contamination. Areas adjacent to locations where radioactive materials were used or stored are normally included in this classification because of the potential for inadvertent spread of contamination. These areas are further classified as:

- Class 1 Areas: (areas experiencing prior remedial action, spills, waste storage or disposal, relatively large quantities of loose radioactivity)
- Class 2 Areas: (areas handling low concentrations or small quantities of radioactivity in unsealed forms, upper walls and ceilings in airborne radioactivity areas, perimeters of contamination control areas, etc. where no individual measurement result would be expected to exceed guideline values before remediation)

Class 3 Areas: (areas in which residual radioactivity is expected but at a small fraction of guideline values such as buffer areas to contaminated areas, lab offices, hallways, loading docks used for radioactive shipments, etc.)

Non-impacted areas - All areas not classified as affected. These areas are not expected to contain residual radioactivity, based on a knowledge of site history and/or previous survey information.

NRC FORM 314

(7-2001)

10 CFR 30.360(i); 40.420(i);  
70.360(i), and 72.540(i)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3160-0028

EXPIRES: 07/31/2004

## CERTIFICATE OF DISPOSITION OF MATERIALS

Estimated burden per response to comply with this mandatory collection request: 30 minutes. This submission is used by NRC as part of the basis for its determination that the facility is released for unrestricted use. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bja1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0028), Office of Management and Budget, Washington, DC 20503. If a measure used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE NAME AND ADDRESS

LICENSE NUMBER

DOCKET NUMBER

LICENSE EXPIRATION DATE

- A. LICENSE STATUS (Check the appropriate box)**
- ☐ This license has expired. ☐ This license has not yet expired; please terminate it.

**B. DISPOSAL OF RADIOACTIVE MATERIAL**

(Check the appropriate boxes and complete as necessary. If additional space is needed, provide attachments)

The licensee, or any individual executing this certificate on behalf of the licensee, certifies that:

- ☐ 1. No radioactive materials have ever been procured or possessed by the licensee under this license.
- ☐ 2. All activities authorized by this license have ceased, and all radioactive materials procured and/or possessed by the licensee under this license number cited above have been disposed of in the following manner:
- ☐ a. Transfer of radioactive materials to the licensee listed below:
- ☐ b. Disposal of radioactive materials:
- ☐ 1. Directly by the licensee:
- ☐ 2. By licensed disposal site:
- ☐ 3. By waste contractor:
- ☐ c. All radioactive materials have been removed such that any remaining residual radioactivity is within the limits of 10 CFR Part 20, Subpart E, and is ALARA.

**C. SURVEYS PERFORMED AND REPORTED**

- ☐ 1. A radiation survey was conducted by the licensee. The survey confirms:
- ☐ a. the absence of licensed radioactive materials
- ☐ b. that any remaining residual radioactivity is within the limits of 10 CFR 20, Subpart E, and is ALARA.
- ☐ 2. A copy of the radiation survey results:
- ☐ a. is attached; or ☐ b. is not attached (Provide explanation); or ☐ c. was forwarded to NRC on: \_\_\_\_\_ Date \_\_\_\_\_
- ☐ 3. A radiation survey is not required as only sealed sources were ever possessed under this license, and
- ☐ a. The results of the latest leak test are attached; and/or ☐ b. No leaking sources have ever been identified

The person to be contacted regarding the information provided on this form:

NAME

TITLE

TELEPHONE (Include Area Code)

E-MAIL ADDRESS

Mail all future correspondence regarding this license to:

**C. CERTIFYING OFFICIAL**

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT

PRINTED NAME AND TITLE

SIGNATURE

DATE

WARNING: FALSE STATEMENTS IN THIS CERTIFICATE MAY BE SUBJECT TO CIVIL AND/OR CRIMINAL PENALTIES. NRC REGULATIONS REQUIRE THAT SUBMISSIONS TO THE NRC BE COMPLETE AND ACCURATE IN ALL MATERIAL RESPECT. 18 U.S.C. SECTION 1001 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

**CERTIFICATE OF DISPOSITION OF MATERIALS**

PLEASE READ THESE INSTRUCTIONS BEFORE COMPLETING NRC FORM 314.

Subpart E of 10 CFR Part 20 establishes the radiological criteria for license terminations/decommissioning of facilities licensed under 10 CFR Parts 30, 40, 50, 60, 61, 70, and 72, as well as other facilities subject to the Commission's jurisdiction under the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended.

**INSTRUCTIONS****Section B, Item 2.**

Licensees should describe the specific radioactive material transfer actions. If radioactive wastes were generated in terminating this license, the licensee should describe the disposal actions taken, including the disposition of low-level radioactive waste, mixed waste, greater-than-Class-C waste, and sealed sources.

**Section B, Item 2.a.**

The information provided concerning the transfer of radioactive material to another licensee should specify the date of the transfer, the name of the licensee recipient, an individual contact name and telephone number for the licensee recipient, and the recipient's NRC or Agreement State license number.

**Section B, Item 2.b.**

For disposal of radioactive materials, licensees should describe the specific disposal method or procedure (e.g., decay-in-storage). For those cases when radioactive materials are disposed of by a licensed disposal site or by a waste contractor, the licensee should specify the name, address, and telephone number of the licensed disposal site operator or waste contractor.

**Section B, Item 2.c.**

"Residual radioactivity," as defined in 10 CFR 20.1003, means radioactivity in 'areas' (structures, materials, soils, etc.) remaining as a result of activities (licensed and unlicensed) under the licensee's control from sources used by the licensee, excluding background radiation. ALARA is defined in 10 CFR 20.1003.

**FILE CERTIFICATES AS FOLLOWS:****IF YOU ARE LOCATED IN:**

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA,  
MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE,  
NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE  
ISLAND, OR VERMONT, SEND CERTIFICATES TO:

LICENSING ASSISTANT SECTION  
NUCLEAR MATERIALS SAFETY BRANCH  
U.S. NUCLEAR REGULATORY COMMISSION, REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI,  
NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA,  
TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST  
VIRGINIA, SEND CERTIFICATES TO:

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U. S. NUCLEAR REGULATORY COMMISSION, REGION II  
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ATLANTA, GEORGIA 30303-8931

**IF YOU ARE LOCATED IN:**

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MISSOURI, OHIO, OR WISCONSIN, SEND CERTIFICATES  
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MATERIALS LICENSING SECTION  
U.S. NUCLEAR REGULATORY COMMISSION, REGION III  
801 WARRENVILLE RD.  
LISLE, IL 60532-4351

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DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST  
TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH,  
WASHINGTON, OR WYOMING, SEND CERTIFICATES TO:

MATERIAL RADIATION PROTECTION SECTION  
U. S. NUCLEAR REGULATORY COMMISSION, REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TX 76011-8064

**Emerson RSI**

## Certificate of Calibration

Certificate Number: 1170

Type of Calibration:

Linearity & Efficiency Test ☒Dose Rate Calibration ☐

Meter: Ludlum 3

Serial #: 155944 Detector: 44-9

Serial #: 159352

Calibrated for: Gibraltar Laboratories

Battery check: pass ☒ fail ☐High voltage: meter ☐pulsar ☒

900 v

int. ☐

Meter tested as:

scaler ☐or ratemeter ☒

Meter Multiplier or Scale	Reference Calibration Point mR/hr <input type="checkbox"/> cpm <input checked="" type="checkbox"/>	Meter Reading	Reference Calibration Point mR/hr <input type="checkbox"/> cpm <input checked="" type="checkbox"/>	Meter Reading
x100	200,000	200,000	400,000	400,000
x10	20,000	20,000	40,000	39,000
x1	2,000	2,000	4,000	3,900
x0.1	200	200	400	400

Meter is:

within 10% ☒within 20% ☐ (graph attached)**NIST referenced instruments and sources used with this calibration:**

Isotope / $\beta_{avg}$	Net Cts.	Eff.	Isotope / $\gamma_{avg}$	Net Cts.	Eff.
C-14, s.n. K786, 3.752 kBq, 49.5 keV	8,000	0.036			
Tc-99, s.n. D713, 385.9 Bq, 85 keV	3,000	0.130			

Ludlum Model 500 Pulse Generator, s.n. 114518

NIST Traceable Calibration date: March 25, 2002

Calibrated by: D. McFarlane

Date: 6/12/02

Approved by:

Date: 6/14/02

Comments: Replaced 2-D batteries.

**Emerson RSI**

## Certificate of Calibration

Certificate Number: 1198

Type of Calibration:

Linearity & Efficiency Test ☒Dose Rate Calibration ☐

Meter: Ludlum 3

Serial #: 157157

Detector: 44-9

Serial #: 158037

Calibrated for: Gibraltar Laboratories

Battery check: pass ☒fail ☐High voltage: meter ☐pulser ☒

900 v

int. ☐

Meter tested as:

scaler ☐or ratemeter ☒

Meter Multiplier or Scale	Reference Calibration Point mR/hr <input type="checkbox"/> cpm <input checked="" type="checkbox"/>	Meter Reading	Reference Calibration Point mR/hr <input type="checkbox"/> cpm <input checked="" type="checkbox"/>	Meter Reading
x100	170,000	170,000	340,000	350,000 -
x10	17,000	17,000	34,000	34,000
x1	1,700	1,700	3,400	3,400
x0.1	170	170	340	340

Meter is:

within 10% ☒within 20% ☐ (graph attached)**NIST referenced instruments and sources used with this calibration:**

Isotope / $\beta_{avg}$	Net Cts.	Eff.	Isotope / $\gamma_{avg}$	Net Cts.	Eff.
C-14, s.n. K786, 3.752 kBq, 49.5 keV	8,000	0.036			
Tc-99, s.n. D713, 385.9 Bq, 85 keV	2,750	0.119			

Ludlum Model 500 Pulse Generator, s.n. 114518

NIST Traceable Calibration date:

March 25, 2002

Calibrated by: D. McFarlane

Date: 6/26/02

Approved by:

Date: 6/28/02

Comments:



**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**March 2003**

Prepared by



NRC License # 29-30310-01



**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**March 2003**

*Survey Date:* March 25, 2003

*Survey performed by:*

Robert Mahoney

*Report prepared by:*

Joel Antkowiak

Reviewed and Approved by: Robert Mahoney Date: 4/8/03

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Approval	
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## I. Introduction

This report has been prepared by Radiation Science, Inc. for Gibraltar Laboratories, Inc. to summarize the results of the monthly radiation safety surveys performed in the radioactive materials use areas at your facility in Fairfield, New Jersey. The purpose of the survey was to identify and define the extent of fixed and removable radioactive contamination in the rooms where radioactive materials are used so that the researchers will be able to decontaminate the areas as soon as possible.

The survey was performed on March 25, 2003 by Robert Mahoney.

## II. Survey Instrumentation

Table 2-1 provides a description of the instrumentation used to perform the routine monthly surveys.

Instrument	Use	Serial Number	Calibration Date
Ludlum Model 12  W/Model 43-68 probe	Direct measurements for beta and gamma radiation.	105685  PR110377	02/14/03
Packard 1900CA Liquid Scintillation Analyzer	Liquid scintillation counting of samples for removable radioactive contamination	102312	At time of use.

All meters and instrumentation used for this survey have been calibrated within the past twelve months to standards traceable to the National Institute of Standards and Testing (NIST). The hand held meters response to a dedicated check source was verified prior to use. The liquid scintillation counter was calibrated prior to use by running the manufacturer's calibration protocol, allowing the machine to adjust the gain.

### Minimum Detectable Activity Calculations\*

---

#### Equation

$$MDA = \frac{2.71 + 4.65 \sqrt{Br \times t}}{t \times E \times A / 100}$$

where:

- MDA = activity in dpm/100 cm<sup>2</sup>
- Br = background rate in counts per minute
- t = counting time in minutes
- E = detector efficiency in counts per disintegration (4π)
- A = probe area or area wiped in cm<sup>2</sup>



## II. Survey Instrumentation (cont)

Table 2-2 provides the lower limits of detection for the instrumentation used to perform the surveys. The MDA for the Ludlum survey meter uses a background count rate of 280 cpm and an efficiency of 8 % for carbon-14.

Instrument	Serial Number	Minimum Detectable Activity
Ludlum Model 12 W/Model 43-68 probe	105685  PR110377	1,006 dpm/100 cm <sup>2</sup>
Packard Model 1900CA Liquid Scintillation Analyzer	102312	Channel 1: 33 dpm/sample  Channel 2: 28 dpm/sample  Channel 3: 29 dpm/sample

## III. Survey Methodology

Wipe samples were obtained by wiping at least 100 cm<sup>2</sup> with a 4.25 cm diameter, dry filter paper. The samples were placed directly into plastic 7 milliliter vials in an LSC rack labeled with a unique identification number. Upon returning to the Emerson laboratory, 5 milliliters of an ecologically safe liquid scintillation cocktail were added to each vial. The vial was then capped, shaken, and returned to the rack. All vials were allowed to sit for at least 15 minutes before counting was initiated so that any chemical reactions that may occur will progress to completion. Wipes exhibiting activity above the MDA were recounted for two minutes, three times, and the results reported herein as the best estimate of removable radioactivity.

Locations of the wipe samples are indicated on the room diagrams contained in this report. Analytical results are presented with each diagram. Results are reported as less than the Minimum Detectable Activity (MDA) of the instruments where appropriate. The method used to calculate these values is included in the report.

The results of the liquid scintillation analyses are presented by channel number. Channel 1 is set for optimum tritium efficiency (0-19 kev); channel 2 is set for optimum carbon-14 efficiency (19-156 kev) and channel 3 is set for all other higher energy beta emitters (156-1000 kev).

Benchtops, sinks, equipment, and hood sashes were scanned with a 100 cm<sup>2</sup> gas proportional detector using the audio output to identify areas of elevated radioactivity. Contaminated areas are identified as areas greater than twice background. Each contaminated area is identified on the corresponding room diagram along with the results of an integral measurement. The reported results have been corrected for background, and are based on the meters efficiency to Carbon-14.

#### IV. Summary of Survey Results

*The following summary includes all removable and fixed contamination found to be greater than the MDA.*

##### Removable Activity

Room	Wipe #	Channel 1 (dpm/100 cm <sup>2</sup> )	Channel 2 (dpm/100 cm <sup>2</sup> )	Channel 3 (dpm/100 cm <sup>2</sup> )
None	N/A	N/A	N/A	N/A

##### Direct Activity

Room	Location	(cpm/100 cm <sup>2</sup> )
None	N/A	N/A

**V. List of Rooms Surveyed**

Radioisotope Receiving  
Area

Inc./Ref. Room

Rad Bench

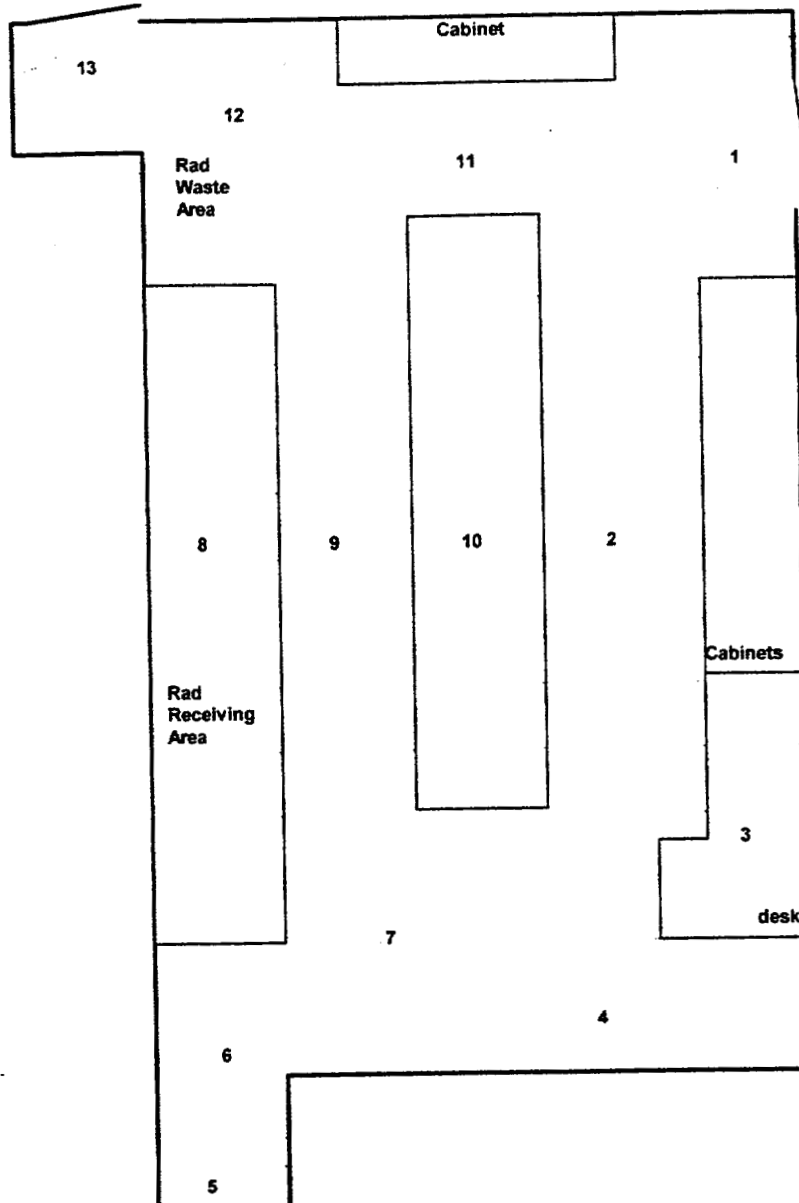
Sterility Room

## Appendix

Diagrams of Areas Surveyed and Smear Results

Name:

Notes:



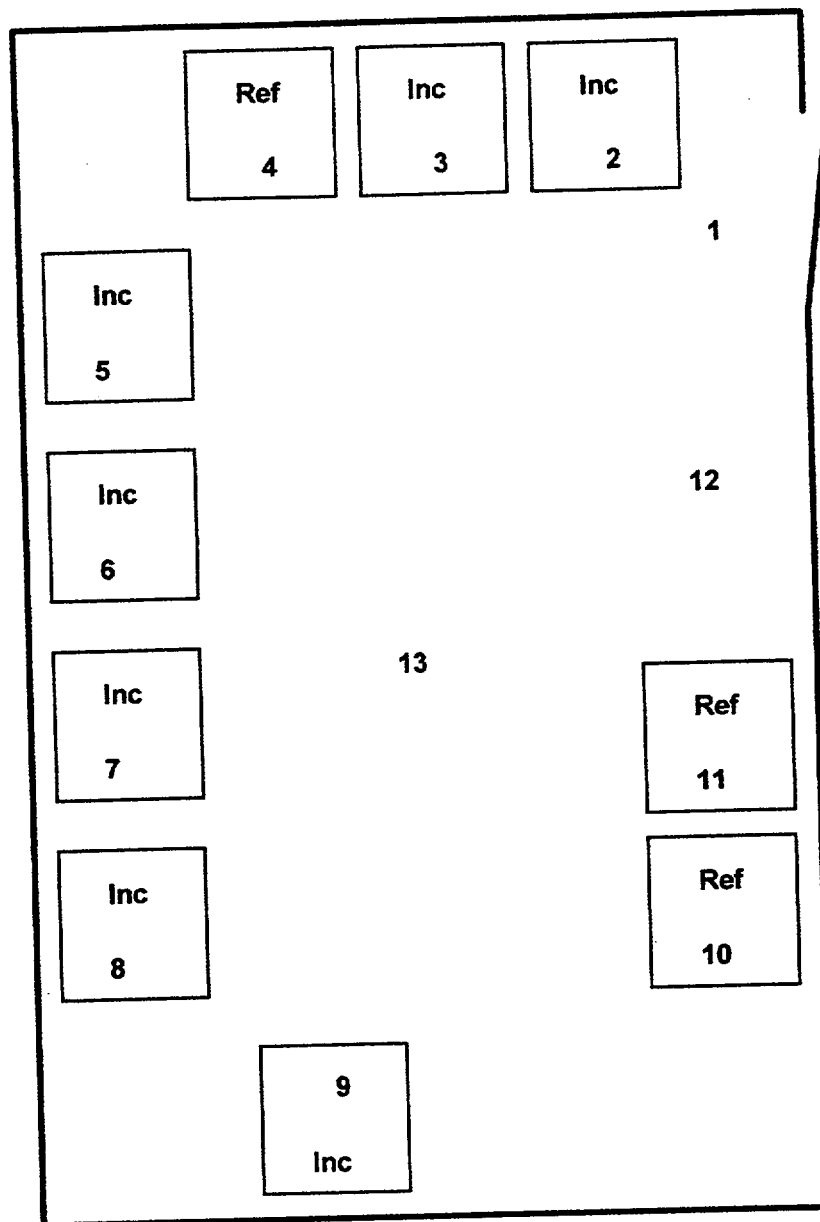
### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				

Room: Incubator & Refrigerator Room

Name:

Notes:



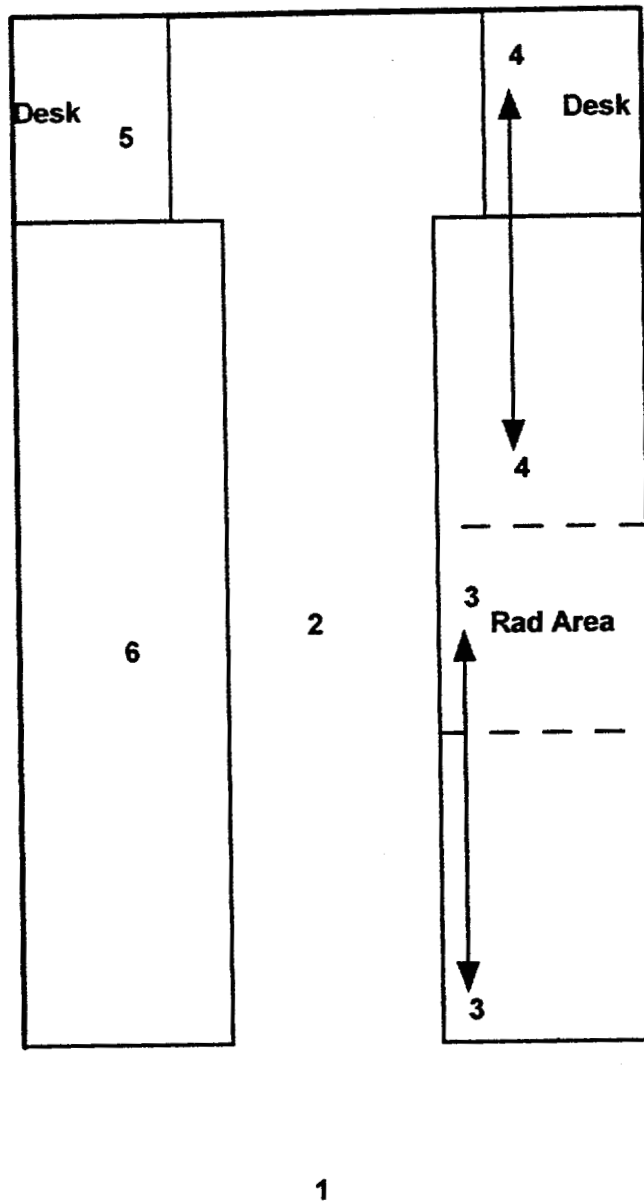
### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				

Room: Rad Bench

**Name:**

**Notes:**



### Smear Analysis Results - Analysis by Liquid Scintillation Counting

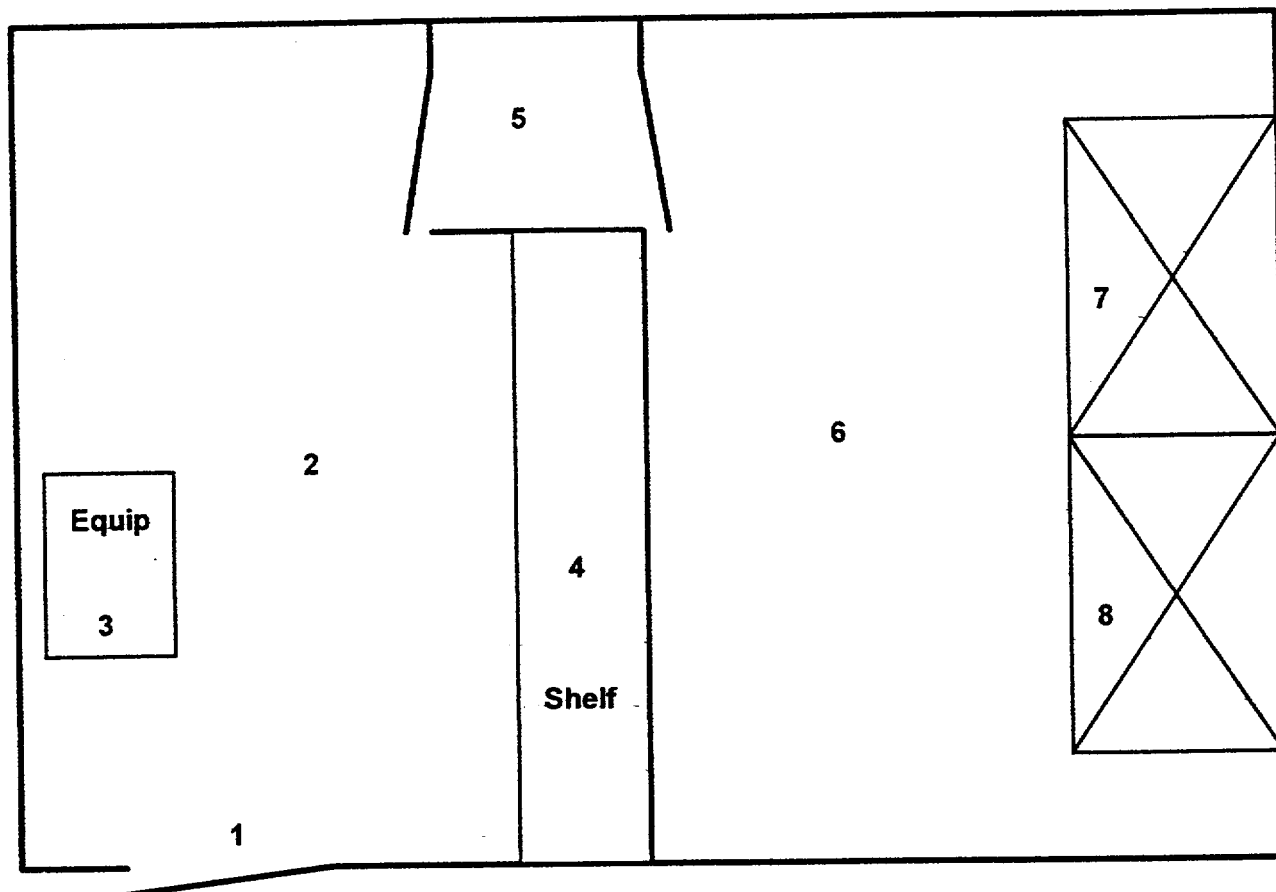
Smeared ID	Channel 1	Channel 2	Channel 3
1-Door	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA
5	<MDA	<MDA	<MDA
6	<MDA	<MDA	<MDA



Room: Sterility Room

Name:

Notes:



### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA				
2	<MDA	<MDA	<MDA				
3	<MDA	<MDA	<MDA				
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				



**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**February 2003**

Prepared by



NRC License # 29-30310-01



**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**February 2003**

*Survey Date:* February 25, 2003

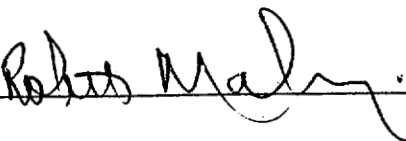
*Survey performed by:*

Robert Mahoney

*Report prepared by:*

Joel Antkowiak

Reviewed and Approved by:



Date: 3/7/03

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## I. Introduction

This report has been prepared by Radiation Science, Inc. for Gibraltar Laboratories, Inc. to summarize the results of the monthly radiation safety surveys performed in the radioactive materials use areas at your facility in Fairfield, New Jersey. The purpose of the survey was to identify and define the extent of fixed and removable radioactive contamination in the rooms where radioactive materials are used so that the researchers will be able to decontaminate the areas as soon as possible.

The survey was performed on February 25, 2003 by Robert Mahoney.

## II. Survey Instrumentation

Table 2-1 provides a description of the instrumentation used to perform the routine monthly surveys.

Instrument	Use	Serial Number	Calibration Date
Ludlum Model 12  W/Model 43-68 probe	Direct measurements for beta and gamma radiation.	105685  PR110377	02/14/03
Packard 1900CA Liquid Scintillation Analyzer	Liquid scintillation counting of samples for removable radioactive contamination	102312	At time of use.

All meters and instrumentation used for this survey have been calibrated within the past twelve months to standards traceable to the National Institute of Standards and Testing (NIST). The hand held meters response to a dedicated check source was verified prior to use. The liquid scintillation counter was calibrated prior to use by running the manufacturer's calibration protocol, allowing the machine to adjust the gain.

### Minimum Detectable Activity Calculations\*

#### Equation

$$MDA = \frac{2.71 + 4.65 \sqrt{Br \times t}}{t \times E \times A / 100}$$

where:

- MDA = activity in dpm/100 cm<sup>2</sup>
- Br = background rate in counts per minute
- t = counting time in minutes
- E = detector efficiency in counts per disintegration (4π)
- A = probe area or area wiped in cm<sup>2</sup>

## II. Survey Instrumentation (cont)

Table 2-2 provides the lower limits of detection for the instrumentation used to perform the surveys. The MDA for the Ludlum survey meter uses a background count rate of 280 cpm and an efficiency of 8 % for carbon-14.

Instrument	Serial Number	Minimum Detectable Activity
Ludlum Model 12 W/Model 43-68 probe	105685  PR110377	1,006 dpm/100 cm <sup>2</sup>
Packard Model 1900CA Liquid Scintillation Analyzer	102312	Channel 1: 33 dpm/sample  Channel 2: 28 dpm/sample  Channel 3: 29 dpm/sample

## III. Survey Methodology

Wipe samples were obtained by wiping at least 100 cm<sup>2</sup> with a 4.25 cm diameter, dry filter paper. The samples were placed directly into plastic 7 milliliter vials in an LSC rack labeled with a unique identification number. Upon returning to the Emerson laboratory, 5 milliliters of an ecologically safe liquid scintillation cocktail were added to each vial. The vial was then capped, shaken, and returned to the rack. All vials were allowed to sit for at least 15 minutes before counting was initiated so that any chemical reactions that may occur will progress to completion. Wipes exhibiting activity above the MDA were recounted for two minutes, three times, and the results reported herein as the best estimate of removable radioactivity.

Locations of the wipe samples are indicated on the room diagrams contained in this report. Analytical results are presented with each diagram. Results are reported as less than the Minimum Detectable Activity (MDA) of the instruments where appropriate. The method used to calculate these values is included in the report.

The results of the liquid scintillation analyses are presented by channel number. Channel 1 is set for optimum tritium efficiency (0-19 kev); channel 2 is set for optimum carbon-14 efficiency (19-156 kev) and channel 3 is set for all other higher energy beta emitters (156-1000 kev).

Benchtops, sinks, equipment, and hood sashes were scanned with a 100 cm<sup>2</sup> gas proportional detector using the audio output to identify areas of elevated radioactivity. Contaminated areas are identified as areas greater than twice background. Each contaminated area is identified on the corresponding room diagram along with the results of an integral measurement. The reported results have been corrected for background, and are based on the meters efficiency to Carbon-14.



#### IV. Summary of Survey Results

*The following summary includes all removable and fixed contamination found to be greater than the MDA.*

##### Removable Activity

Room	Wipe #	Channel 1 (dpm/100 cm <sup>2</sup> )	Channel 2 (dpm/100 cm <sup>2</sup> )	Channel 3 (dpm/100 cm <sup>2</sup> )
None	N/A	N/A	N/A	N/A

##### Direct Activity

Room	Location	(cpm/100 cm <sup>2</sup> )
None	N/A	N/A

**V. List of Rooms Surveyed**

Radioisotope Receiving  
Area

Inc./Ref. Room

Rad Bench

Sterility Room



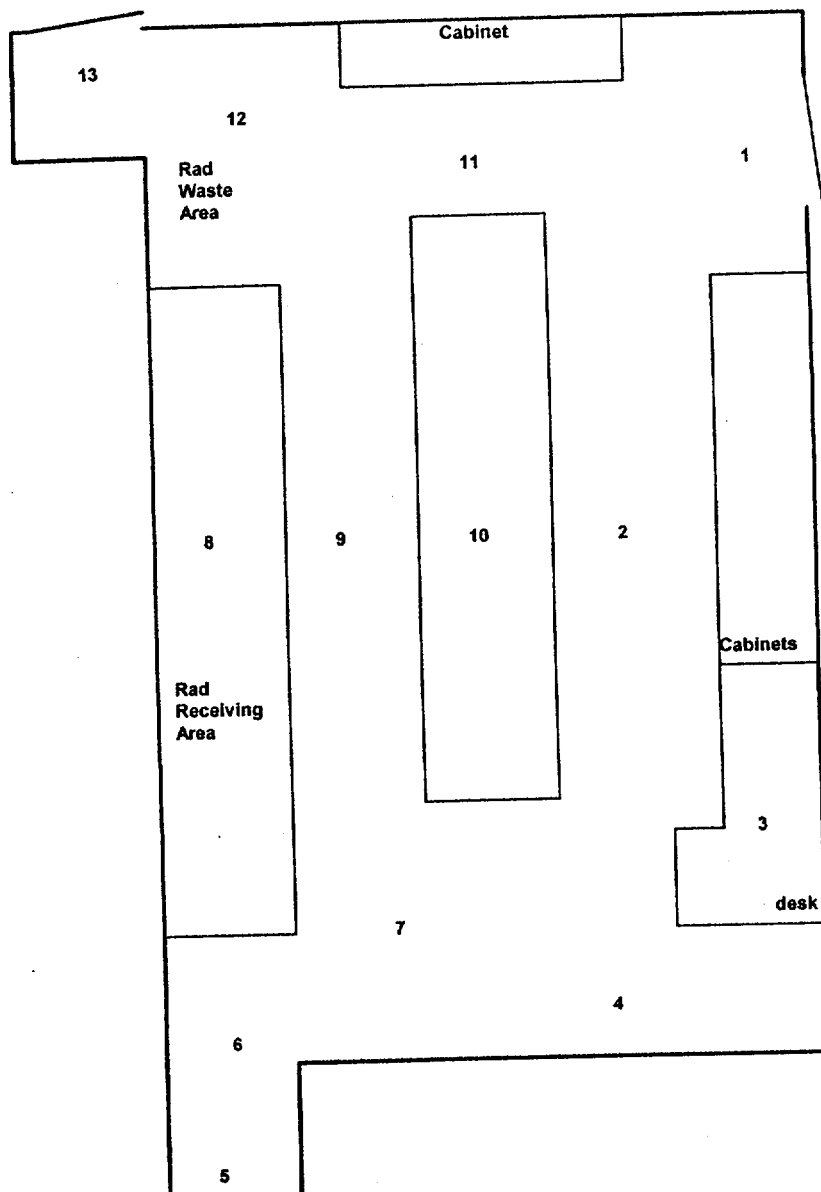
## Appendix

Diagrams of Areas Surveyed and Smear Results

Room: Radioisotope Receiving Room

Name:

Notes:



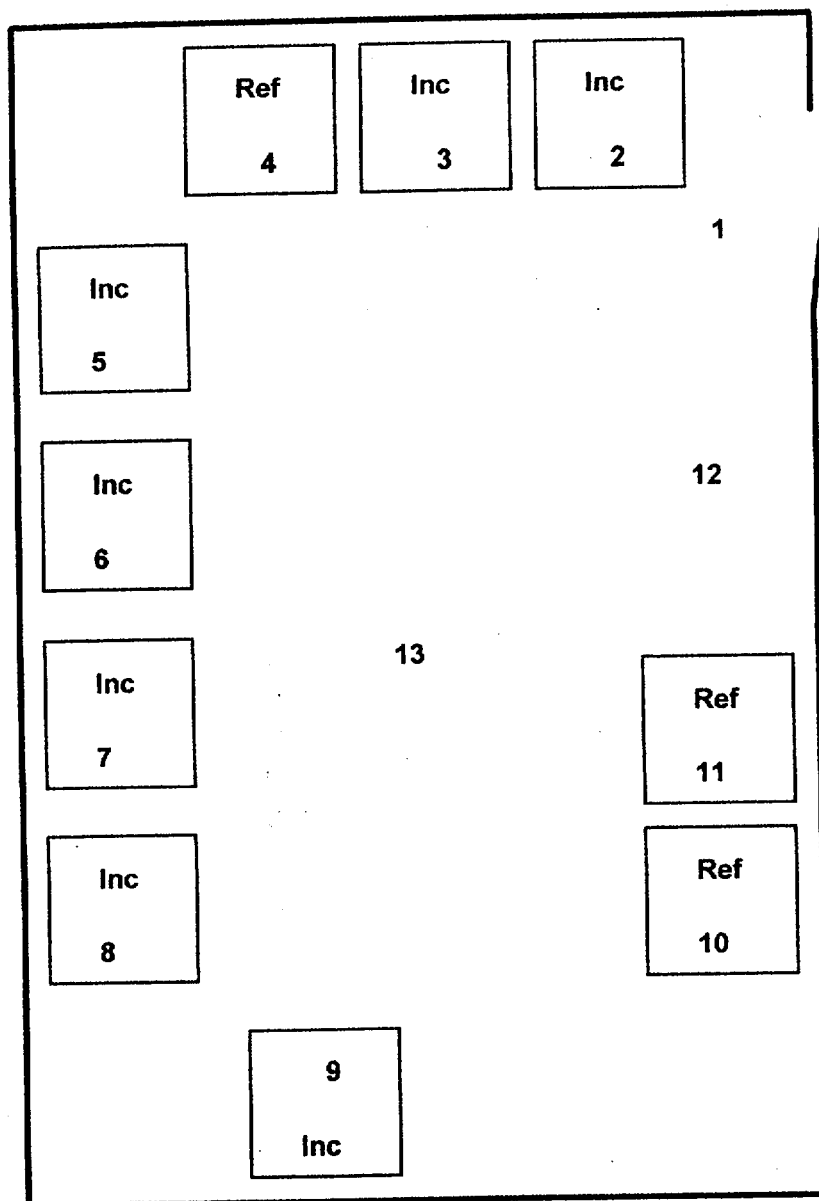
### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
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3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				

Room: Incubator & Refrigerator Room

Name:

Notes:



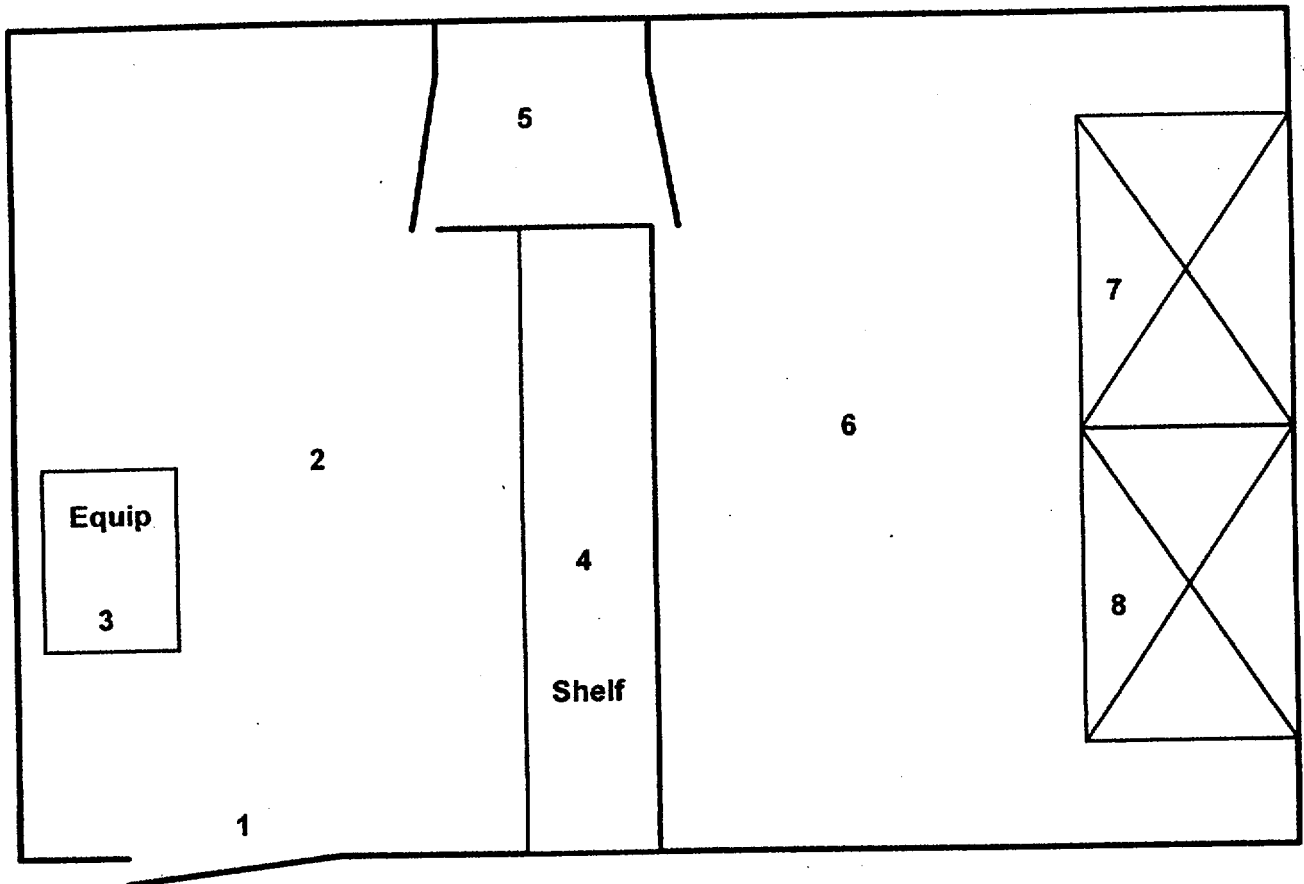
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4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				

Room: Sterility Room

Name:

Notes:



### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA				
2	<MDA	<MDA	<MDA				
3	<MDA	<MDA	<MDA				
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				





**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**January 2003**

Prepared by



NRC License # 29-30310-01



**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**January 2003**

*Survey Date:* January 30, 2003

*Survey performed by:*

Robert Mahoney

*Report prepared by:*

Robert Mahoney

Reviewed and Approved by:

Date:

2/4/03

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Approval

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## I. Introduction

This report has been prepared by Radiation Science, Inc. for Gibraltar Laboratories, Inc. to summarize the results of the monthly radiation safety surveys performed in the radioactive materials use areas at your facility in Fairfield, New Jersey. The purpose of the survey was to identify and define the extent of fixed and removable radioactive contamination in the rooms where radioactive materials are used so that the researchers will be able to decontaminate the areas as soon as possible.

The survey was performed on January 30, 2003 by Robert Mahoney.

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### Minimum Detectable Activity Calculations\*

#### Equation

$$MDA = \frac{2.71 + 4.65 \sqrt{Br \times t}}{t \times E \times A / 100}$$

where:

- MDA = activity in dpm/100 cm<sup>2</sup>
- Br = background rate in counts per minute
- t = counting time in minutes
- E = detector efficiency in counts per disintegration (4π)
- A = probe area or area wiped in cm<sup>2</sup>

## II. Survey Instrumentation (cont)

Table 2-2 provides the lower limits of detection for the instrumentation used to perform the surveys. The MDA for the Ludlum survey meter uses a background count rate of 280 cpm and an efficiency of 8 % for carbon-14.

Instrument	Serial Number	Minimum Detectable Activity
Ludlum Model 12 W/Model 43-68 probe	105685  PR110377	1,006 dpm/100 cm <sup>2</sup>
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## III. Survey Methodology

Wipe samples were obtained by wiping at least 100 cm<sup>2</sup> with a 4.25 cm diameter, dry filter paper. The samples were placed directly into plastic 7 milliliter vials in an LSC rack labeled with a unique identification number. Upon returning to the Emerson laboratory, 5 milliliters of an ecologically safe liquid scintillation cocktail were added to each vial. The vial was then capped, shaken, and returned to the rack. All vials were allowed to sit for at least 15 minutes before counting was initiated so that any chemical reactions that may occur will progress to completion. Wipes exhibiting activity above the MDA were recounted for two minutes, three times, and the results reported herein as the best estimate of removable radioactivity.

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#### IV. Summary of Survey Results

*The following summary includes all removable and fixed contamination found to be greater than the MDA.*

##### Removable Activity

Room	Wipe #	Channel 1 (dpm/100 cm <sup>2</sup> )	Channel 2 (dpm/100 cm <sup>2</sup> )	Channel 3 (dpm/100 cm <sup>2</sup> )
None	N/A	N/A	N/A	N/A

##### Direct Activity

Room	Location	(cpm/100 cm <sup>2</sup> )
None	N/A	N/A

**V. List of Rooms Surveyed**

Radioisotope Receiving  
Area

Inc./Ref. Room

Rad Bench

Sterility Room

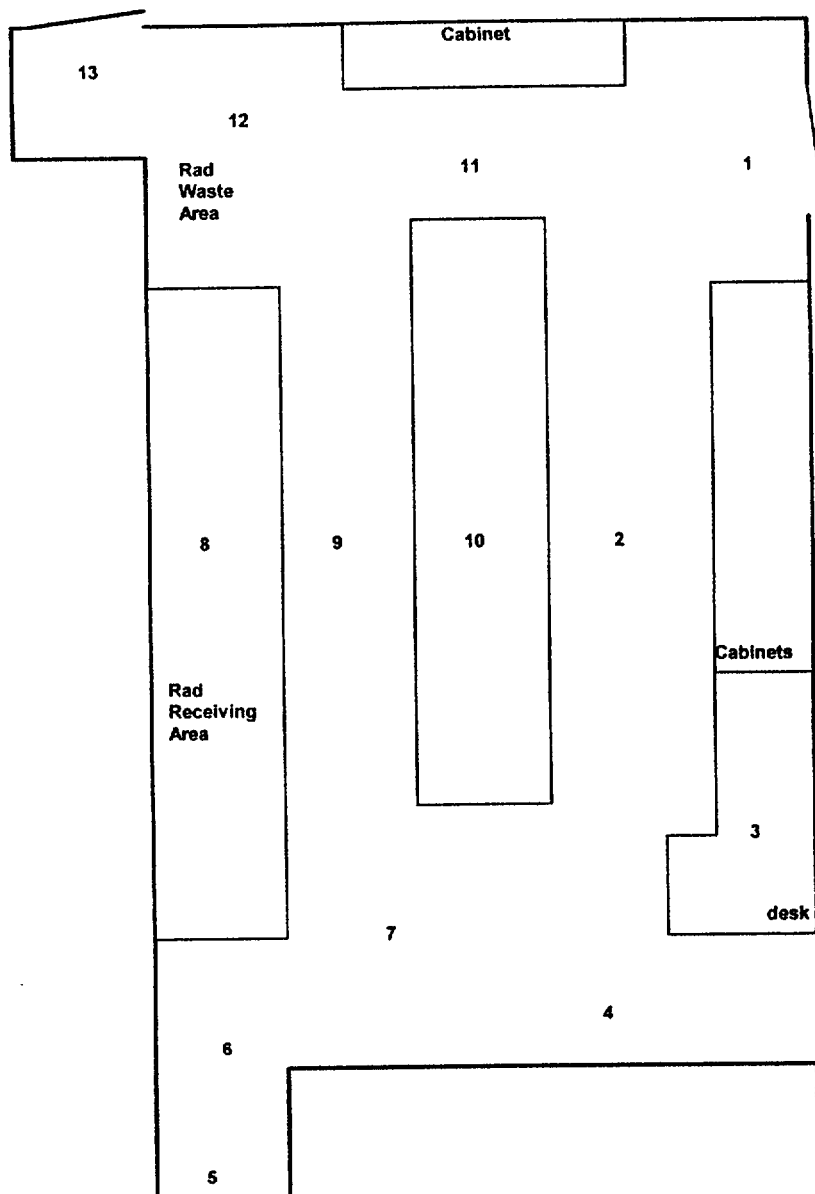
## Appendix

Diagrams of Areas Surveyed and Smear Results

Room: Radioisotope Receiving Room

Name:

Notes:

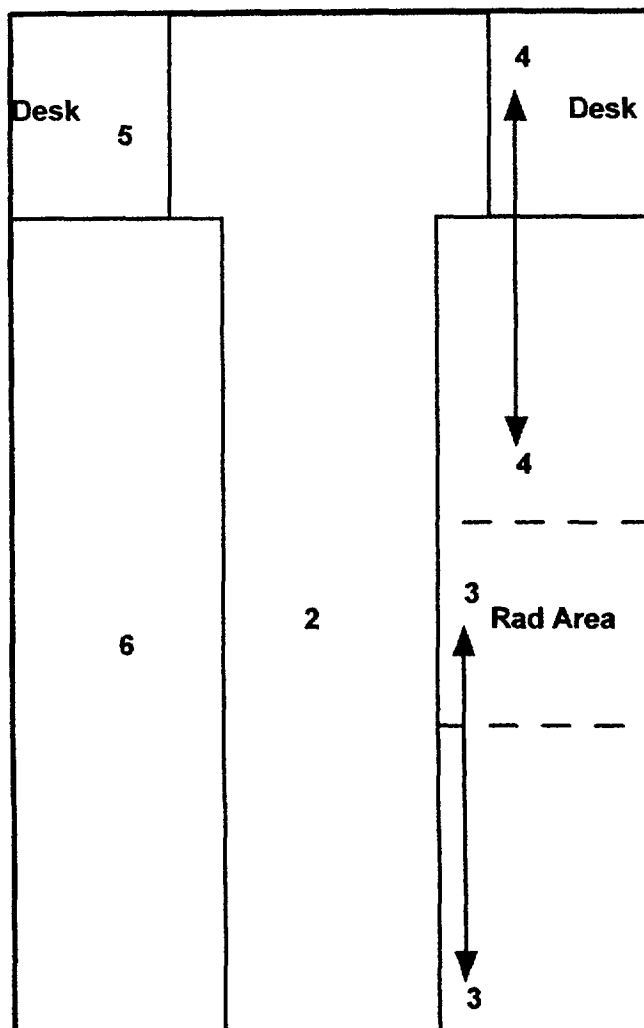


### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				

**RSI**

**Notes:**



1

[illegible]

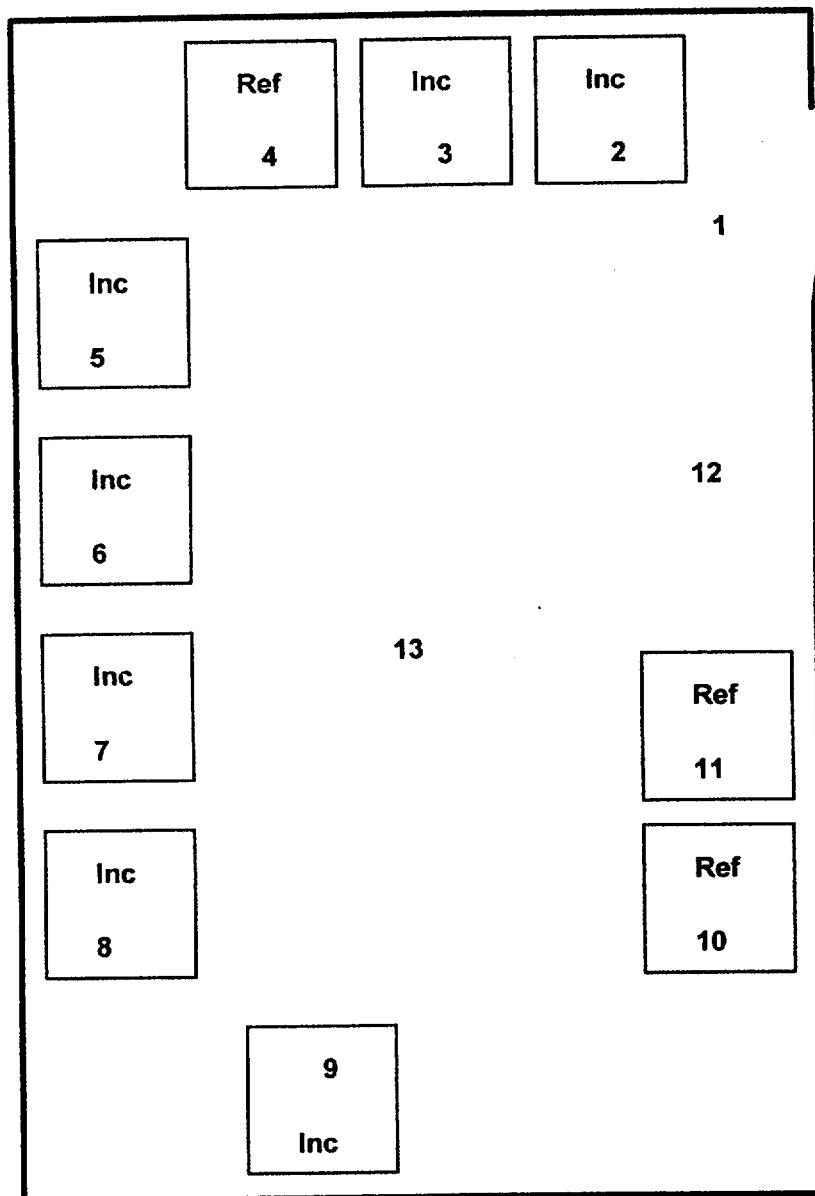
Smear ID	Channel 1	Channel 2	Channel 3
1-Door	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA
5	<MDA	<MDA	<MDA
6	<MDA	<MDA	<MDA

[illegible]

Room: Incubator & Refrigerator Room

Name:

Notes:



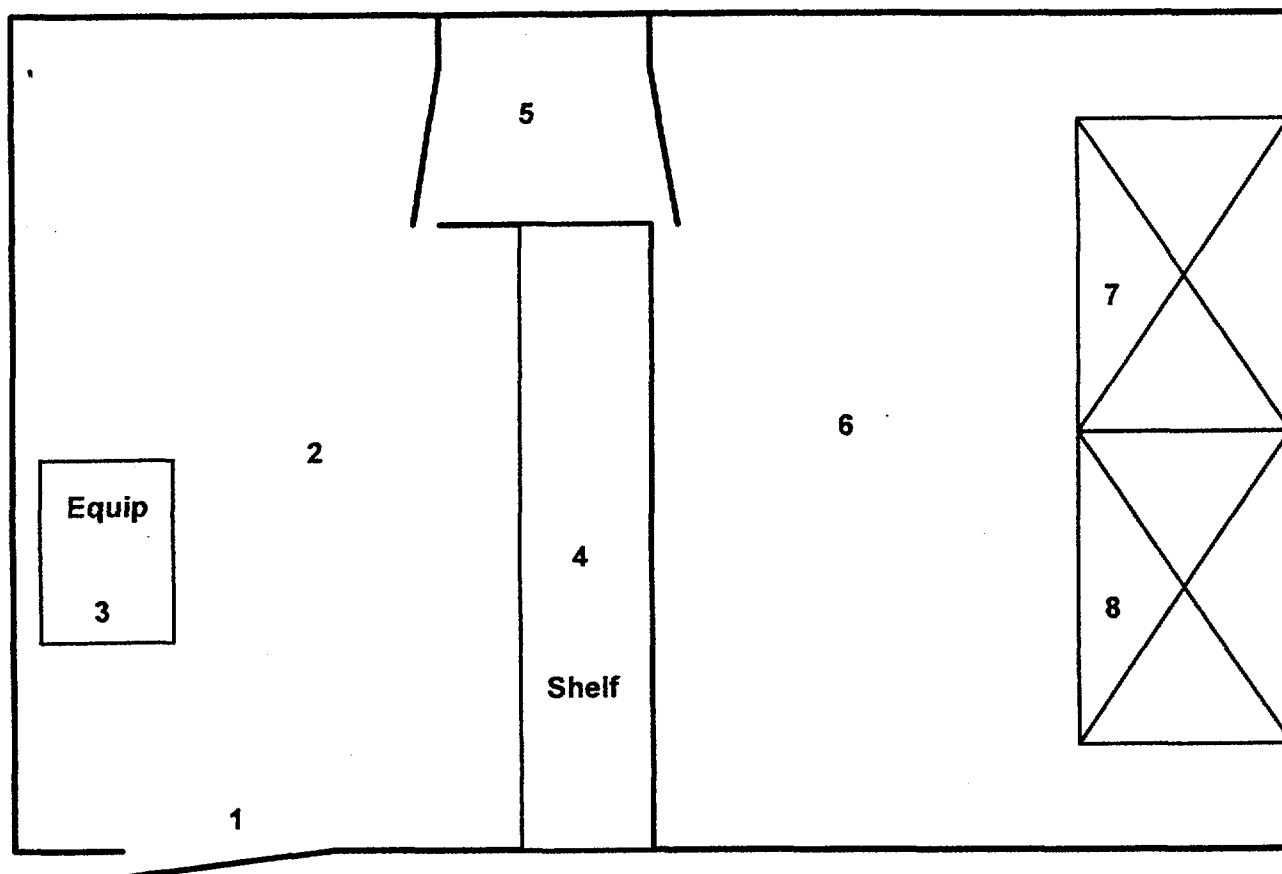
### Smear Analysis Results - Analysis by Liquid Scintillation Counting

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1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				



**α<sub>γ</sub>β RSI**

**Notes:**




Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA				
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6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
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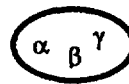


**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**December 2002**

Prepared by  
 **Emerson RSI**

NRC License # 29-30310-01



**Emerson RSI**

**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**December 2002**

*Survey Date:* December 20, 2002

*Survey performed by:*

Joel Antkowiak

*Report prepared by:*

Robert Mahoney

Reviewed and Approved by:  Date: 1/20/03



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**IV. Summary of Survey Results**

*The following summary includes all removable and fixed contamination found to be greater than the MDA.*

**Removable Activity**

Room	Wipe #	Channel 1 (dpm/100 cm <sup>2</sup> )	Channel 2 (dpm/100 cm <sup>2</sup> )	Channel 3 (dpm/100 cm <sup>2</sup> )
None	N/A	N/A	N/A	N/A

**Direct Activity**

Room	Location	(cpm/100 cm <sup>2</sup> )
None	N/A	N/A



**Emerson RSI**

**V. List of Rooms Surveyed**

Radioisotope Receiving  
Area

Inc./Ref. Room

Rad Bench

Sterility Room



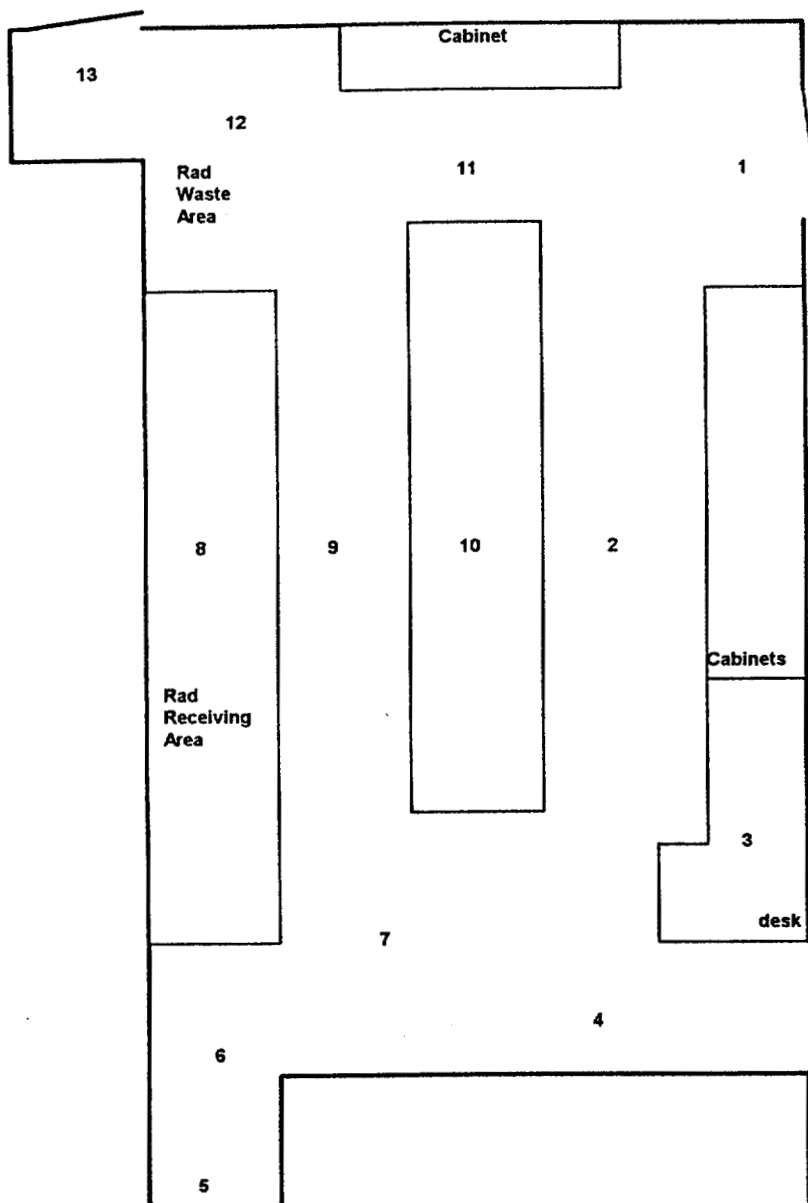
## **Appendix**

Diagrams of Areas Surveyed and Smear Results

Room: Radioisotope Receiving Room

Name:

Notes:



### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				

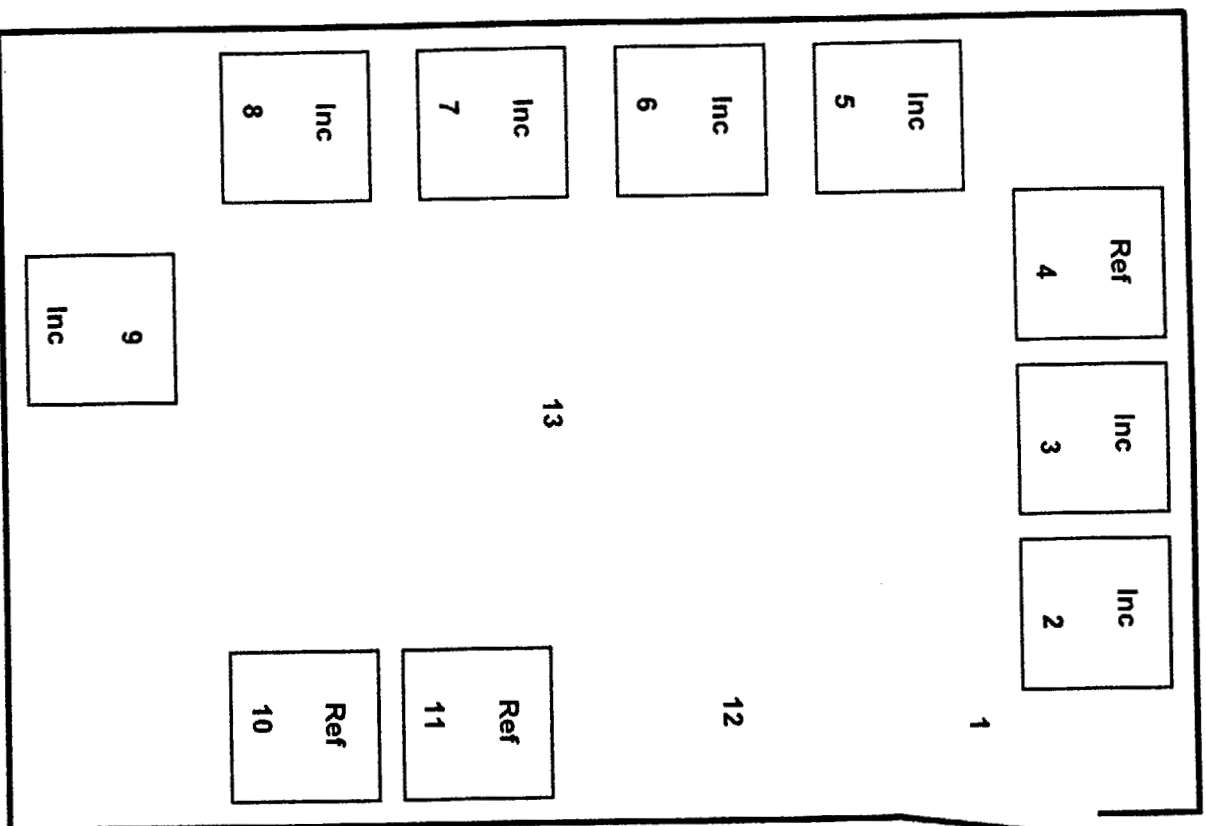


Emerson RSI

Room: Incubator & Refrigerator Room

Name:

Notes:



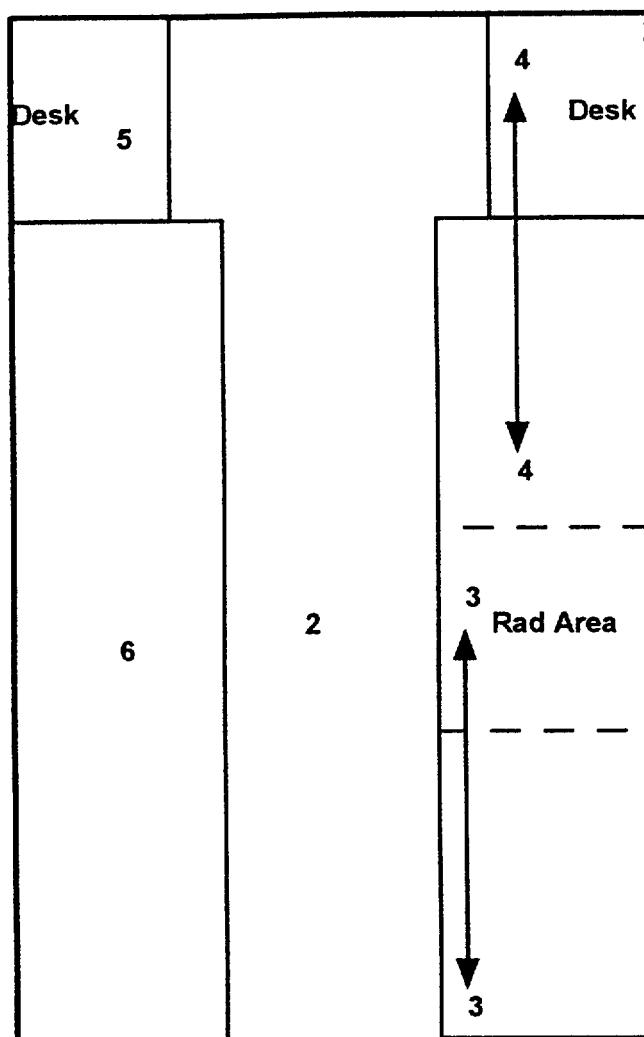
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Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				

Room: Rad Bench

Name:

**Notes:**



1

### Smear Analysis Results - Analysis by Liquid Scintillation Counting

[illegible]

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA				
2	<MDA	<MDA	<MDA				
3	<MDA	<MDA	<MDA				
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				

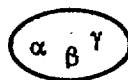


**RSI**

**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

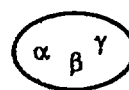
**November 2002**

Prepared by



**RSI**

NRC License # 29-30310-01



**RSI**

**Radiological Survey  
for  
Gibraltar Laboratories, Inc.**

**November 2002**

*Survey Date:* November 26, 2002

*Survey performed by:*

Joel Antkowiak

*Report prepared by:*

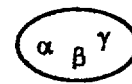
Joel Antkowiak

Reviewed and Approved by:

Robert Maly

Date:

12/4/02

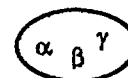
**RSI**

## **Table of Contents**

Approval

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**RSI**

## I. Introduction

This report has been prepared by RSI, Inc. for Gibraltar Laboratories, Inc. to summarize the results of the monthly radiation safety surveys performed in the radioactive materials use areas at your facility in Fairfield, New Jersey. The purpose of the survey was to identify and define the extent of fixed and removable radioactive contamination in the rooms where radioactive materials are used so that the researchers will be able to decontaminate the areas as soon as possible.

The survey was performed on November 26, 2002 by Joel Antkowiak.

## II. Survey Instrumentation

Table 2-1 provides a description of the instrumentation used to perform the routine monthly surveys.

Instrument	Use	Serial Number	Calibration Date
Ludlum Model 12  W/Model 43-68 probe	Direct measurements for beta and gamma radiation.	105685  PR110377	02/18/02
Packard Model 1600TR Liquid Scintillation Analyzer	Liquid scintillation counting of samples for removable radioactive contamination	404131	At time of use.

All meters and instrumentation used for this survey have been calibrated within the past twelve months to standards traceable to the National Institute of Standards and Testing (NIST). The hand held meters response to a dedicated check source was verified prior to use. The liquid scintillation counter was calibrated prior to use by running the manufacturer's calibration protocol, allowing the machine to adjust the gain.

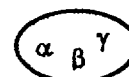
### Minimum Detectable Activity Calculations\*

#### Equation

$$MDA = \frac{2.71 + 4.65 \sqrt{Br \times t}}{t \times E \times A / 100}$$

where:

- MDA = activity in dpm/100 cm<sup>2</sup>
- Br = background rate in counts per minute
- t = counting time in minutes
- E = detector efficiency in counts per disintegration (4π)
- A = probe area or area wiped in cm<sup>2</sup>

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## II. Survey Instrumentation (cont)

Table 2-2 provides the lower limits of detection for the instrumentation used to perform the surveys. The MDA for the Ludlum survey meter uses a background count rate of 280 cpm and an efficiency of 8 % for carbon-14.

Instrument	Serial Number	Minimum Detectable Activity
Ludlum Model 12 W/Model 43-68 probe	105685  PR110377	1,006 dpm/100 cm <sup>2</sup>
Packard Model 1600TR Liquid Scintillation Analyzer	404131	Channel 1: 33 dpm/sample Channel 2: 27 dpm/sample Channel 3: 29 dpm/sample

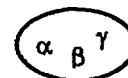
## III. Survey Methodology

Wipe samples were obtained by wiping at least 100 cm<sup>2</sup> with a 4.25 cm diameter, dry filter paper. The samples were placed directly into plastic 7 milliliter vials in an LSC rack labeled with a unique identification number. Upon returning to the Emerson laboratory, 5 milliliters of an ecologically safe liquid scintillation cocktail were added to each vial. The vial was then capped, shaken, and returned to the rack. All vials were allowed to sit for at least 15 minutes before counting was initiated so that any chemical reactions that may occur will progress to completion. Wipes exhibiting activity above the MDA were recounted for two minutes, three times, and the results reported herein as the best estimate of removable radioactivity.

Locations of the wipe samples are indicated on the room diagrams contained in this report. Analytical results are presented with each diagram. Results are reported as less than the Minimum Detectable Activity (MDA) of the instruments where appropriate. The method used to calculate these values is included in the report.

The results of the liquid scintillation analyses are presented by channel number. Channel 1 is set for optimum tritium efficiency (0-19 kev); channel 2 is set for optimum carbon-14 efficiency (19-156 kev) and channel 3 is set for all other higher energy beta emitters (156-1000 kev).

Benchtops, sinks, equipment, and hood sashes were scanned with a 100 cm<sup>2</sup> gas proportional detector using the audio output to identify areas of elevated radioactivity. Contaminated areas are identified as areas greater than twice background. Each contaminated area is identified on the corresponding room diagram along with the results of an integral measurement. The reported results have been corrected for background, and are based on the meters efficiency to Carbon-14.

**RSI****IV. Summary of Survey Results**

*The following summary includes all removable and fixed contamination found to be greater than the MDA.*

**Removable Activity**

Room	Wipe #	Channel 1 (dpm/100 cm <sup>2</sup> )	Channel 2 (dpm/100 cm <sup>2</sup> )	Channel 3 (dpm/100 cm <sup>2</sup> )
None	N/A	N/A	N/A	N/A

**Direct Activity**

Room	Location	(cpm/100 cm <sup>2</sup> )
None	None	None



**RSI**

**V. List of Rooms Surveyed**

Radioisotope Receiving  
Area

Inc./Ref. Room

Rad Bench

Sterility Room



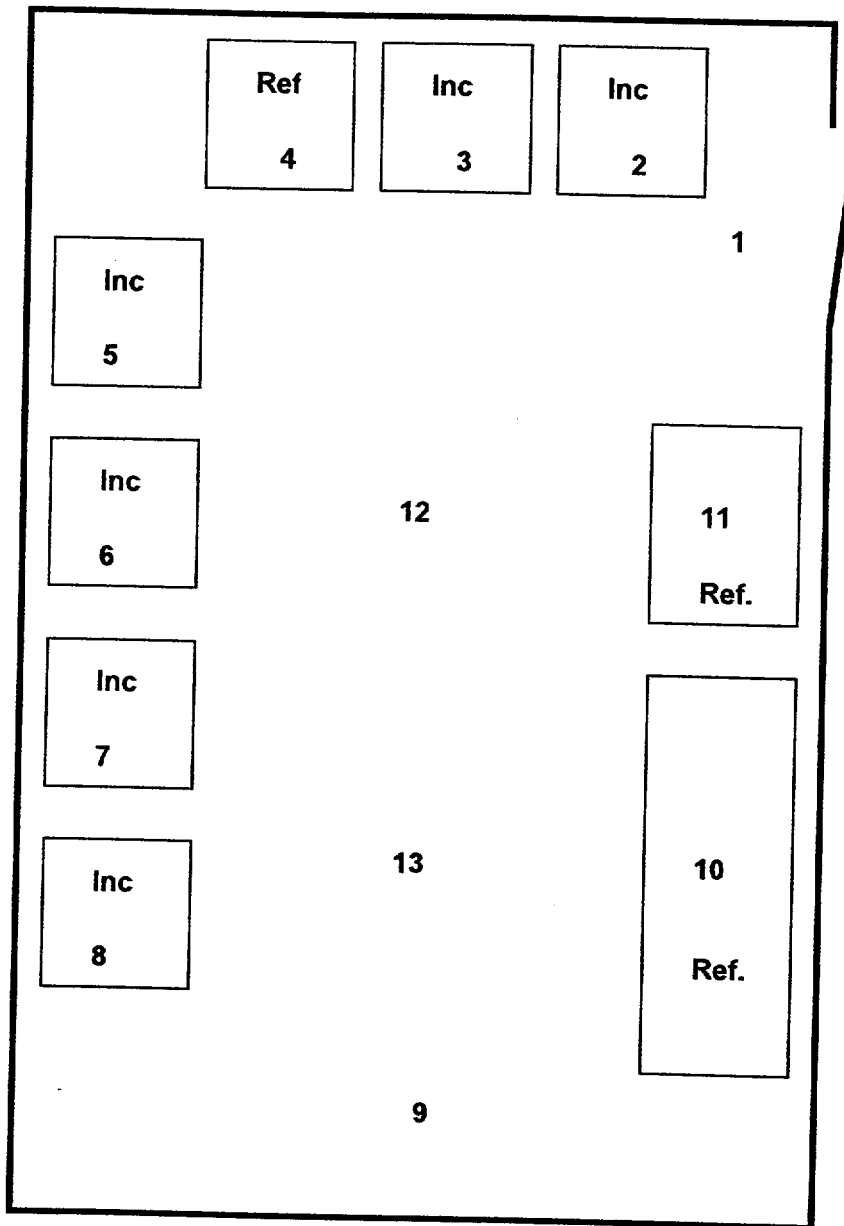
**RSI**

## **Appendix**

Diagrams of Areas Surveyed and Smear Results

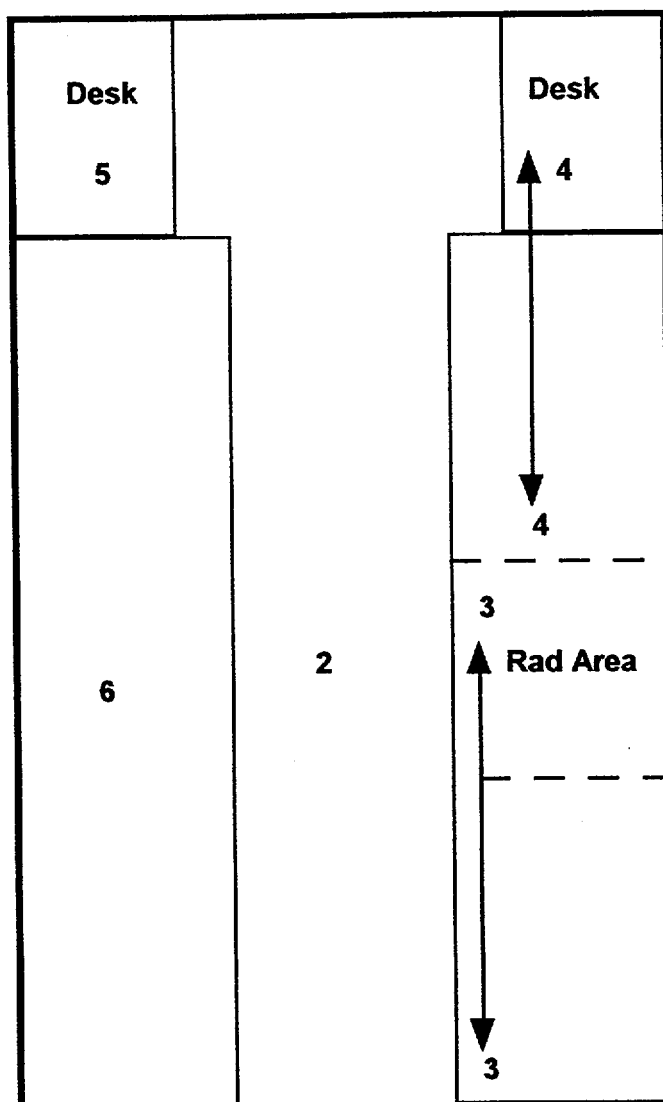
Name:

Notes:



### Smear Analysis Results - Analysis by Liquid Scintillation Counting

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				



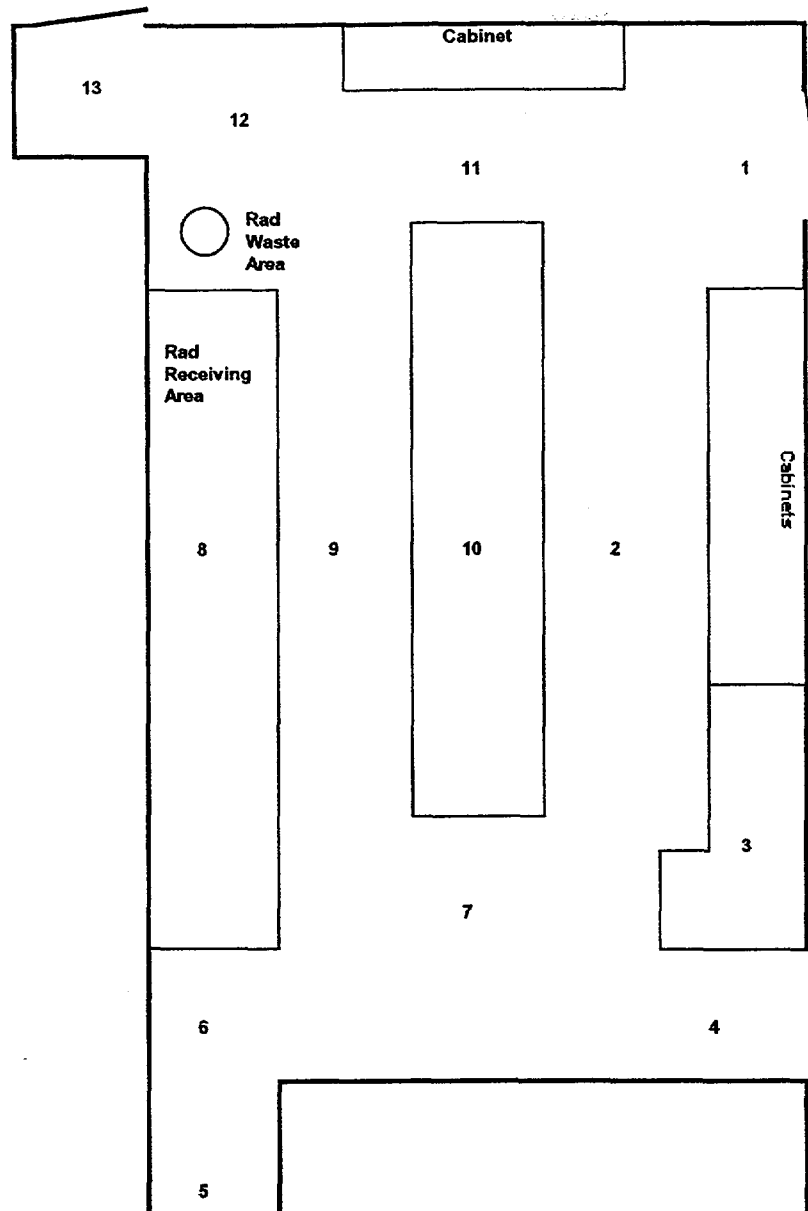
1

[illegible]

Room: Radioisotope Receiving Room

Name:

Notes:



### Smear Analysis Results - Analysis by Liquid Scintillation Counting

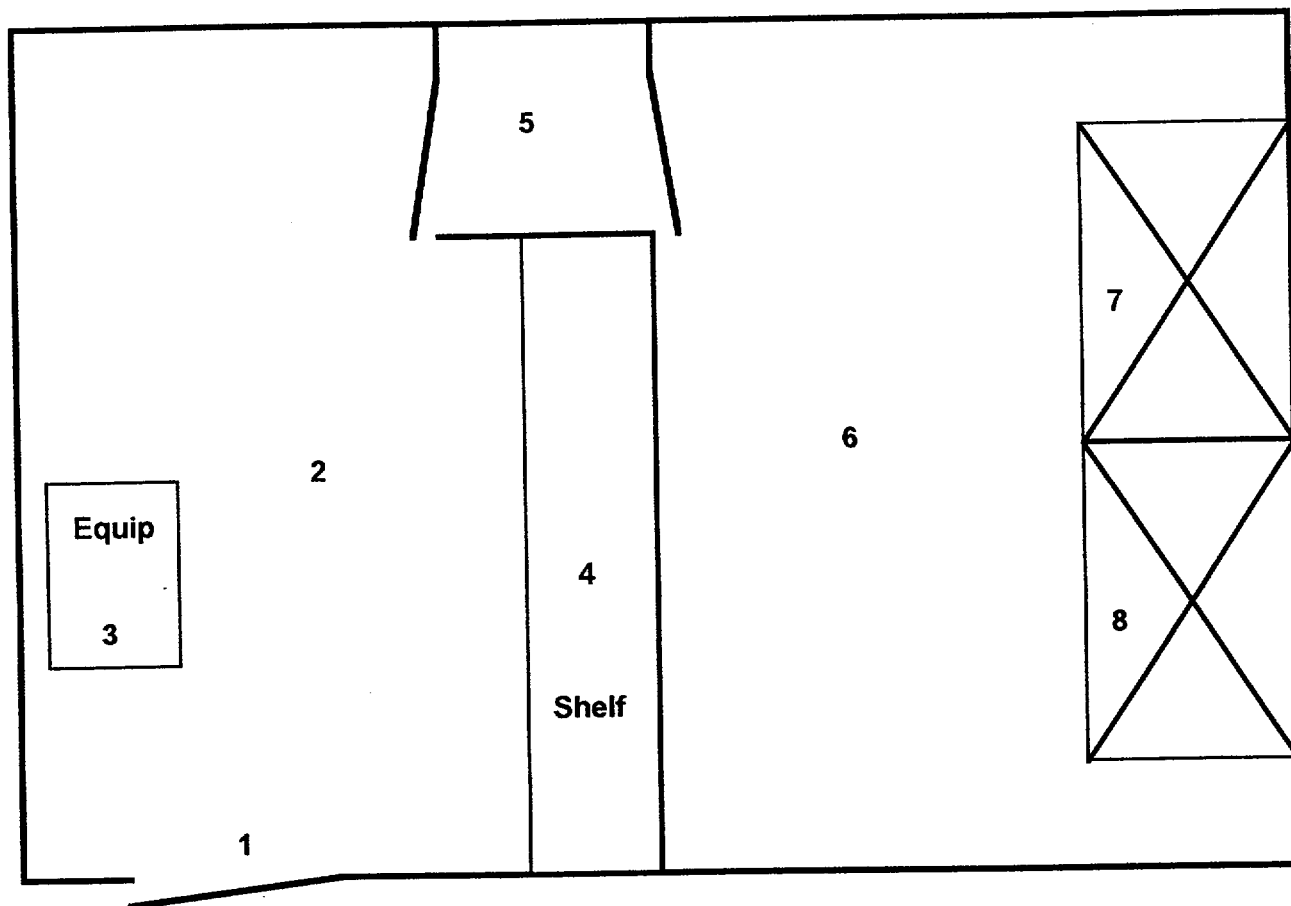
Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA	11	<MDA	<MDA	<MDA
2	<MDA	<MDA	<MDA	12	<MDA	<MDA	<MDA
3	<MDA	<MDA	<MDA	13	<MDA	<MDA	<MDA
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				
9	<MDA	<MDA	<MDA				
10	<MDA	<MDA	<MDA				



Room: Sterility Room

Name:

Notes:



**Smear Analysis Results - Analysis by Liquid Scintillation Counting**

Smear ID	Channel 1	Channel 2	Channel 3	Smear ID	Channel 1	Channel 2	Channel 3
1	<MDA	<MDA	<MDA				
2	<MDA	<MDA	<MDA				
3	<MDA	<MDA	<MDA				
4	<MDA	<MDA	<MDA				
5	<MDA	<MDA	<MDA				
6	<MDA	<MDA	<MDA				
7	<MDA	<MDA	<MDA				
8	<MDA	<MDA	<MDA				

FORM 542		GTS DURATEK		1. WASTE COLLECTOR/PROCESSOR						2. MANIFEST NUMBER					
<b>UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST</b>  MANIFEST INDEX AND REGIONAL COMPACT TABULATION  List all original "PROCESSED WASTE" generators (if any) before "COLLECTED WASTE" generators.				NAME Radiation Science Inc.		SHIPPER USE ONLY				R0048					
				IDENTIFICATION NUMBER 1424											
				SHIPPING DATE 10/11/02						3. PAGE 1 OF 1 PAGE(S)					
4. GENERATOR IDENTIFICATION NUMBER	5. GENERATOR NAME PERMIT NUMBER (IF APPLICABLE) AND TELEPHONE NUMBER	6. GENERATOR FACILITY ADDRESS	7. PREPROCESSED WASTE (OR MATERIAL) VOLUME (m3) (ft3)		8. MANIFEST NUMBER(S) UNDER WHICH WASTE (OR MATERIAL) RECEIVED AND DATE OF RECEIPT	9. WASTE CODE P = PROCESSED C = COLLECTED	10. ORIGINATING COMPACT REGION OR STATE	11. AS PROCESSED/COLLECTED TOTAL							
								A. SOURCE MATERIAL (kg) (lb)		B. SNM (g)	C. ACTIVITY (MBq) (mCi)		D. VOLUME (m3) (ft3)		
1511	Gibraltar Laboratories 973-227-6882	122 Fairfield Road Fairfield, NJ 07004-2406	0.2362	8.3413	R0048 (10/11/2002)	C	NJ	0.0000E+00	0.0000E+00	0.0000E+00	5.2744E+01	1.4266E+00	0.2362	8.3400	
TOTALS OF ALL PAGES (FORMS 542 AND 542A)								0.0000E+00	0.0000E+00	0.0000E+00	5.2744E+01	1.4266E+00	0.2362	8.3400	

FORM 541		GTS DURATEK		1. MANIFEST TOTALS							2. MANIFEST NUMBER R0048				
<b>UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST</b> CONTAINER AND WASTE DESCRIPTION Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste				NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME	NET WASTE WEIGHT	SPECIAL NUCLEAR MATERIAL (grams)			TOTAL					
				3	m3 0.2362	kg 45.3592	U-233	U-235	Pu						
					R3	8.3400	lb 100.0000	NP	NP	NP	NP				
				ACTIVITY			SOURCE								
ALL NUCLIDES		TRITIUM	C-14	Tc-99	L-129										
MBq	5.2744E+01	NP	5.2744E+01	NP	NP	(kgs)	NA								
mCi	1.4255E+00	NP	1.4255E+00	NP	NP	(lbs)	NA								
DISPOSAL CONTAINER DESCRIPTION				WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER											
5. CONTAINER IDENTIFICATION NUMBER / GENERATOR ID NUMBER	6. CONTAINER DESCRIPTION (See Note 1) PROCESS REQUESTED (See Note 1A) BURIAL/DISPOSITION (See Note 2A)	7. VOLUME (m3) (R3)	8. WASTE AND CONTAINER WEIGHT (kg) (lb)	9. SURFACE RADIATION LEVEL mSv/hr mrem/hr	10. SURFACE CONTAMINATION MBq/100 cm2 dpm/100 cm2		11. WASTE DESCRIPTOR (See Note 2)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	15. RADIOLOGICAL DESCRIPTION WEIGHT % CHELATING AGENT IF > 0.1% INDIVIDUAL RADIONUCLIDES AND ACTIVITY AND CONTAINER TOTAL OR TOTAL ACTIVITY AND RADIONUCLIDE PERCENT	16. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C			
					ALPHA	BETA-GAMMA							RADIONUCLIDES		MBq
1/91911	3 DI E	0.0190	11.3398	<6.000E-03	<3.6740E-06	<3.6740E-06	25	0.0190	83-CAREFRESH 100	aqueous liquids/NA	0.00	C-14	1.8500E+01	5.0000E-01	NA
		0.6700	26.0000	<6.000E-01	<2.200E+02	<2.200E+03		0.6700				Subtotal	1.8500E+01	5.0000E-01	
		Total		1.8500E+01	5.0000E-01										
2/91911	3 DI E	0.0190	11.3398	<6.000E-03	<3.6740E-06	<3.6740E-06	25	0.0190	83-CAREFRESH 100	aqueous liquids/NA	0.00	C-14	1.8500E+01	5.0000E-01	NA
		0.6700	26.0000	<6.000E-01	<2.200E+02	<2.200E+03		0.6700				Subtotal	1.8500E+01	5.0000E-01	
		Total		1.8500E+01	5.0000E-01										
3/91911	19 FIBER DRUM/BOX DI E	0.1982	22.6796	<6.000E-03	<3.6740E-06	<3.6740E-06	69-INCINERABLE DAW	0.1982	100	paper, plastic/NA	0.00	C-14	1.5744E+01	4.2550E-01	NA
		7.0000	60.0000	<6.000E-01	<2.200E+02	<2.200E+03		7.0000				Subtotal	1.5744E+01	4.2550E-01	
		Total		1.5744E+01	4.2550E-01										
Shipment Totals		0.2362	45.3592										5.2744E+01	1.4255E+00	
		8.3400	100.0000												

**NOTE 1: Container Description Codes.** For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

Wooden Box or Crate	9. Demineralizer
Metal Box	10. Gas Cylinder
Plastic Drum or Pail	11. Bulk, Unpackaged Waste
Metal Drum or Pail	12. Unpackaged Components
Metal Tank or Liner	13. High Integrity Container
Concrete Tank or Liner	19. Other. Describe in item 6, or additional page.
Polyethylene Tank or Liner	
Fiberglass Tank or Liner	

**Note 1A: Process Requested**

C. Compaction
SR. Steam Reforming
DI. Direct Incineration
SI. Sort & Incinerate
D. Decon
G. Green is Clean
M. Metal Melt
T. Trans-Ship
U. Liquid for Incineration
OI. Oil for Incineration
O. Other (describe)

**NOTE 2: Waste Descriptor Codes.** (Choose up to three which predominate by volume.)

20. Charcoal	29. Demolition Rubble	38. Evaporator Bottoms/Sludges/ Concentrates
31. Incinerator Ash	30. Cation Ion-exchange Media	
22. Soil	31. Anion Ion-exchange Media	39. Compactible Trash
23. Gas	32. Mixed Bed Ion-exchange Media	40. Noncompactible Trash
24. Oil	33. Contaminated Equipment	41. Animal Carcass
25. Aqueous Liquid	34. Organic Liquid (except oil)	42. Biological Material (except animal carcass)
26. Filter Media	35. Glassware or Labware	43. Activated Material
27. Mechanical Filter	36. Sealed Source/Device	59. Other. Describe in item 11, or additional page
28. EPA or State Hazardous	37. Paint or Plating	

**Note 2A: Burial/Disposition Site**

B. Barnwell Waste Management Facility
E. Envirocare
R. Richland, WA
PR. Process and Return
O. Other

**Note 3: Solidification and Stabilization Media Codes.** (Choose up to three which predominate by volume. For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S" and the media vendor and brand name must also be identified in item 13. Code 100=NONE REQUIRED.)

90. Cement	94. Vinyl Ester Styrene
91. Concrete	99. Other. Describe in item 13, or additional page
92. Bitumen	
93. Vinyl Chloride	100. None Required.

FORM 540		GTS DURATEK		SHIPMENT I.D. NUMBER		7. FORM 540 AND 540A		8. MANIFEST NUMBER	
UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER		5. SHIPPER - NAME AND FACILITY		NA		PAGE 1 OF 1		(Use this number on all continuation pages)	
1. EMERGENCY TELEPHONE NUMBER (Include Area Code)		RADIATION SCIENCE INC.		COLLECTOR		FORM 541 AND 541A		R0048	
2. IS THIS AN "EXCLUSIVE USE" SHIPMENT?		10 South River Road		PROCESSOR		FORM 542 AND 542A			
3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST		Cranbury, NJ 08512		GENERATOR TYPE (Specify)		ADDITIONAL INFORMATION		None	
4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT?		CONTACT		TELEPHONE NUMBER (Include Area Code)		9. CONSIGNEE - Name and Facility Address		CONTACT	
5. EPA MANIFEST NUMBER		Hector Martos		603-396-1396		GTS Duratek		Chad Powers	
6. CARRIER - Name and Address		Truck #: X-3214M		EPA I.D. NUMBER		1560 Bear Creek Road		TELEPHONE NUMBER (Include Area Code)	
7. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION		Trailer #:		SHIPPING DATE		Oak Ridge, TN 37830		865-481-0222	
8. DOT LABEL "RADIOACTIVE"		Cranbury, NJ 08512		10/11/02		SIGNATURE - Authorized consignee acknowledging waste receipt		DATE	
9. TRANSPORT INDEX		CONTACT		TELEPHONE NUMBER (Include Area Code)		This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.			
10. PHYSICAL AND CHEMICAL FORM		Hector A. Martos		603-396-1396		AUTHORIZED SIGNATURE		TITLE	
11. TOTAL PACKAGE ACTIVITY		SIGNATURE - Authorized carrier acknowledging waste receipt		DATE		10/11/02		10/11/02	
12. LSA/SCO CLASS		13. TOTAL WEIGHT OR VOLUME		14. IDENTIFICATION NUMBER OF PACKAGE					
15. RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, 7, UN2910		25. LBS; 0.67 FT3		1					
16. RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, 7, UN2910		25. LBS; 0.67 FT3		2					
17. RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, 7, UN2910		50. LBS; 7. FT3		3					
18. THIS PACKAGE CONFORMS TO THE CONDITIONS AND LIMITATIONS SPECIFIED IN 49 CFR 173.421 FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-LIMITED QUANTITY OF MATERIAL, UN 2910									
19. FOR CONSIGNEE USE ONLY		20. GENERATOR CERTIFICATION STATEMENT							
TENNESSEE "LICENSE FOR DELIVERY" NO		A) Radioactive Materials. Certification is hereby made to GTS Duratek, Inc. that this shipment of low-level radioactive material/waste has been prepared in accordance with radioactive waste management program which has been approved by the Nuclear Regulatory Commission or an Agreement State regulatory agency and with the current revision of the GTS Duratek Material Acceptance Criteria.							
SOUTH CAROLINA TRANSPORT PERMIT NO		B) Hazardous Materials. Generator hereby certifies that this material does not contain a hazardous waste as defined in 40 CFR 261.							
IS ECOLOGY GENERATOR NO		C) Data. Generator hereby represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and GTS Duratek State of Tennessee Radioactive Material Licenses.							
US ECOLOGY PERMIT NO		ARJUR LENANDOWSKI		10/11/02					
		Print Name		Signature					

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

8/27/2003, and to inform you that the initial processing which includes an administrative review has been performed.

☒ AMEND 29-30516-9  
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 133587.  
When calling to inquire about this action, please refer to this control number.  
You may call us on (610) 337-5398, or 337-5260.

BETWEEN: : (FOR LFMS USE)  
: INFORMATION FROM LTS  
: -----  
:   
License Fee Management Branch, ARM : Program Code: 03620  
and : Status Code: 0  
Regional Licensing Sections : Fee Category: 3M  
: Exp. Date: 20090331  
: Fee Comments: \_\_\_\_\_  
: Decom Fin Assur Req'd: N  
: ::

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED

Applicant/Licensee: GIBRALTAR LABORATORIES, INC.  
Received Date: 20030902  
Docket No: 3034998  
Control No.: 133587  
License No.: 29-30516-01  
Action Type: Amendment

2. FEE ATTACHED

Amount: \_\_\_\_\_  
Check No.: \_\_\_\_\_

3. COMMENTS

Signed M. A. Perkins  
Date 9/3/2003

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered /\_\_/)

1. Fee Category and Amount: \_\_\_\_\_

2. Correct Fee Paid. Application may be processed for:

Amendment \_\_\_\_\_  
Renewal \_\_\_\_\_  
License \_\_\_\_\_

3. OTHER \_\_\_\_\_

Signed \_\_\_\_\_  
Date \_\_\_\_\_