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Global Research & Development

May 17, 2006

Ms. Patricia J. Pelke
United States Nuclear Regulatory Commission
Region III Materials Licensing Branch
2443 Warrenville Rd., Suite 210
Lisle, IL 60532-4352

Subject: License Termination Request for NRC License Number 21-32115-01

Dear Ms. Pelke:

This letter and the enclosed NRC Form 314 are to request the termination of radioactive materials license number 21-32115-01 authorizing unrestricted release of the Esperion Therapeutics facilities (a wholly owned subsidiary of Pfizer, Inc.) for return to the landlord. The facilities are located at 3621 South State Street, 695 KMS Place, Ann Arbor, MI and Suite V, Cayman Chemical Building, 1180 East Ellsworth Road, Ann Arbor, MI.

Licensed activities have ceased and the facilities have undergone decommissioning. Decommissioning was conducted under the provisions of the Esperion Therapeutics radioactive materials license and in accordance with a MARSSIM-based Decommissioning Work Plan. The enclosed Final Status Report provides conclusive evidence that the facility meets the criteria for unrestricted use specified in 10 CFR 20 Subpart E. Additionally, each final status measurement indicates that residual licensed material at the facility is less than the Pfizer ALARA goal of 500 dpm/100cm^2 total activity, and 100 dpm/100cm^2 removable activity. Dose modeling indicates that the TEDE to the maximally exposed individual is < 0.007 mrem/year (0.03% of the NRC release criterion of 25 mrem/yr).

I have personally inspected the facility and verified that all licensed radioactive material and all radioactive markings have been removed from the facility. I appreciate your time and efforts with this matter and look forward to hearing back from you. If you have any questions or concerns, please contact me at 734-622-4318, or Carol Lentz at 734-622-4467.

Sincerely yours,

Reynold Homan
Esperion Therapeutics
Radiation Safety Officer

RECEIVED MAY 1 9 2006

Esperion Facilities
Decommissioning Final Status Report
NRC License Number: 21-32115-01

Pfizer Global Research and Development
2800 Plymouth Road
Ann Arbor, MI 48106-1047

May 17, 2006

Prepared by:
Chase Environmental Group
3501 Workman Rd., Suite H
Knoxville, TN 37921

NRC FORM 314 (6-2004)
10 CFR 30.36(j)(1); 40.42(j)(1); 70.38(j)(1); and 72.54(j)(1)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0028 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 30 minutes. This submittal 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 and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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 means 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.

CERTIFICATE OF DISPOSITION OF MATERIALS

LICENSEE NAME AND ADDRESS	LICENSE NUMBER	DOCKET NUMBER
Esperion Therapeutics 3621 South State Street 695 KMS Place Ann Arbor. MI 48108	21-32115-01	030-34810
	LICENSE EXPIRATION DATE 09/30/2008	

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:

Warner-Lambert, LLC NRC License No. 21-01443-06 (Note: Some materials that were suitable for use were transferred to the aforementioned licensee. Materials that were no longer useful and waste generated during decommissioning were disposed of through the contractor indicated below.

☑ b. Disposal of radioactive materials:

☐ 1. Directly by the licensee:

☐ 2. By licensed disposal site:

☑ 3. By waste contractor:

Duratek
1560 Bear creek Rd.
Oak Ridge, TN 37831-2530

☑ 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
Carol Lentz	Radiation Safety Officer - NRC License No. 21-01443-06	(734) 622-4467	carol.lentz@pfizer.com

Mail all future correspondence regarding this license to:
Carol Lentz 2800 Plymouth Road Ann Arbor MI 48105

C. CERTIFYING OFFICIAL

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

PRINTED NAME AND TITLE	SIGNATURE	DATE
Carol Lentz - Radiation Safety Officer		05/17/2006

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.

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Esperion Facilities Decommissioning Final Status Report

NRC License Number:
21-32115-01

Pfizer Global Research and Development
2800 Plymouth Road
Ann Arbor, MI 48106-1047

May 17, 2006

Prepared by:
Chase Environmental Group
3501 Workman Rd., Suite H
Knoxville, TN 37921

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ACRONYM LIST

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
D&D	Decontamination and Decommissioning
$DCGL_{EMC}$	Derived Concentration Guideline Level – Elevated Measurement Comparison
$DCGL_W$	Derived Concentration Guideline Level – Wilcoxon Rank Sum
DQO	Data Quality Objective
DSV	Default Screening Value
GSF	Gross Square Feet
HSA	Historical Site Assessment
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDC	Minimum Detectable Concentration
NRC	U.S. Nuclear Regulatory Commission
RSO	Radiation Safety Officer
TEDE	Total Effective Dose Equivalent

1.0 Introduction

Pfizer Global Research and Development has decided to permanently decommission two rented facilities associated with their Esperion Therapeutics (a wholly-owned subsidiary) operations and terminate NRC radioactive materials license number 21-32115-01:

- **State Street Facility** – a laboratory facility located at 3621 South State Street, 695 KMS Place, Ann Arbor, MI.
- ***Ellsworth Road Facility*** – *a vivarium facility located at Suite V, Cayman Chemical* Building, 1180 East Ellsworth Rd., Ann Arbor, MI.

Radioactive materials used at the facilities consisted of a variety of radionuclides for research. Primarily these included H-3, C-14, P-32, P-33 and S-35. Based on an analysis of the quantities used, physical forms, half-lives, and receipt and distribution records, H-3 and C-14 are the only nuclides of concern for decommissioning.

Principal activities involving radioactive materials have ceased and all remaining radioactive materials (waste) were removed from the facilities on May 17, 2006. Licensed activities formerly performed at the facilities have been relocated to other licensed Pfizer facilities as part of Pfizer's reorganization and consolidation plan. The facilities have been decommissioned for unrestricted release in accordance with 10 CFR 20 Subpart E in preparation for return of control to the landlord. *This will require termination of NRC license number* 21-32115-01.

This facility was decommissioned under a Decommissioning Plan developed using the guidance provided in NUREG 1757, "Consolidated NMSS Decommissioning Guidance"; and NUREG 1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM). The Plan provided the approach, methods, and techniques used for the radiological decommissioning of impacted areas of the facility. Final status surveys were designed to implement the protocols and guidance provided in MARSSIM to demonstrate compliance with the default screening values specified in NUREG 1757, Appendix B. These methods ensure technically defensible data were generated to aid in determining whether or not the facility meets the release criteria for unrestricted use specified in 10 CFR 20 Subpart E. Pfizer procured Chase Environmental Group (Chase) to perform all decommissioning activities. Decommissioning was conducted under the provisions of the Pfizer radioactive materials license and in accordance with the Decommissioning Plan (DP). On-site decommissioning activities at the Esperion facilities were performed from May 2 to May 9, 2006. All radioactive materials (wastes) were properly packaged for shipment during decommissioning and removed from the facilities for disposal on May 17, 2006.

This report demonstrates that building structural surfaces and associated systems included in the scope of this report are orders of magnitude below release criteria and are suitable to release for unrestricted use. **Based on the Building Occupancy Scenario of the NRC DandD Version 2.1, the TEDE to a maximally exposed individual is < 0.007 mrem/year (0.03% of the NRC release criterion of 25 mrem/yr) using the results of the survey unit with the highest average activity.**

2.0 Site Description

The State Street site is approximately a 20,000 ft^2, one-story steel frame building with brick, glass and metal exterior walls. Interior walls are made of sheetrock. Floors are poured concrete with various coverings. Floors in laboratory areas are covered in vinyl tile or epoxy paint. Office area floors are carpeted.

The Ellsworth Road site is approximately a 5,000 ft^2 one-story concrete block building attached to a chemical R&D facility occupied by Cayman Chemical. The facility is a vivarium with interior concrete block walls and a poured concrete floor.

The State Street site was initially licensed in 1998 and the Ellsworth Road site was initially licensed in 2003. Due to the nature of the radiological operations conducted, only the interior portions of the facility and system exhausts need to be considered for decommissioning. Building floor plans are included in Appendix A.

2.1 Historical Site Assessments

Chase performed a Historical Site Assessment (HSA) in January 2006. The purpose of the HSA was to determine the current status of the facility including potential, likely, or known sources of radioactive contamination by gathering data from various sources. This included physical characteristics and location of the site as well as information found in site operating records, including radiological surveys. The records review included: radioactive materials licenses, license applications, amendment requests, meeting minutes, radiological surveys, radionuclide receipt and distribution records, incident reports, facility renovation records, blueprints, plans and design specifications. Personnel interviews included radiation safety, maintenance, operations, and facilities personnel.

2.2 Potential Contaminants

Table 2-1 lists the radionuclides used in unsealed form at the facilities. This list was compiled through review of Radiation Safety authorizations for radioactive material use (isotope and quantity) in individual laboratories, review of radionuclide receipt and distribution records and interviews with facility personnel.

Table 2-1 - Radionuclides Used in Unsealed Form

Isotope	Half-Life	DSV (dpm/100 cm^2)	DSV Basis
H-3	12.3 y	1.2E8	NUREG 1757
C-14	5730 y	3.7E6	NUREG 1757
P-32	14.3 d	9.5E6	DandD[1]
P-33	24.4 d	4.1E7	DandD
S-35	87.9 d	1.3E7	NUREG 1757

Note 1: These values were generated using DandD v.2.1; Bldg. Occupancy scenario and default parameters; 0.9 quantile ≤25 mrem/y.

After considering the quantities of radionuclides used, the locations of use, and the impact of radioactive decay, the nuclides of concern are H-3 and C-14.

2.3 License History

License number 21-32115-01 was initially issued on September 24, 1998 and authorized the use of the following radionuclides for in vitro studies in Rooms 575, 576 and 578:

- C-14, H-3 and S-35 in any form with a maximum possession limit of 100 mCi each
- P-32 and P-33 in any form with a maximum possession limit of 50 mCi. each

Amendments to the license are summarized in Table 2.2.

Table 2.2 Esperion License Amendments

Amendment	Date	Description
1	2/4/2000	Added Room 573 for waste storage, changed the decay-in-storage half-life from 65 to 90 days, and changed for H-3 and C-14 possession limits to quantities below that requiring financial assurance for decommissioning (98 mCi each).
2	7-25-00	Changed the C-14 possession limit to 90 mCi.
3	11-28-00	Added Room 574 as an additional use area.
4	7-9-01	Added Room 572 for waste storage and Room 577 as a use area.
5	Jan 2003	Added animal studies to authorized activities and added the Ellsworth Road Facility. Small animal metabolism experiments using µCi-mCi quantities were authorized in Room V9 (Room 222 on the floor plan) of the vivarium facilities located at the Ellsworth Road facility.
6	10-2-03	Added rooms 616, 617, 618, 619 and 621 to use µCi-mCi quantities for metabolic radiolabeling of cellular metabolites and in the formulation of experimental drug formations.
7	7-2-04	Changed authorized users and RSO

The State Street facility used radionuclides in studies involving the radiolabeling of nucleic acids using standard molecular biology techniques. No P-32, P-33 or S-35 has been used or brought into the facility in nearly four years, since early 2002. Typical usage is about 5 mCi/yr of H-3 and up to 15 mCi/yr of C-14. The Ellsworth Road facility received radiolabeled chemicals from the Esperion site in Room V-9 (Room 222). All packages received in Room V-9 and all waste exiting Room V-9 were properly packaged for DOT shipment. Sewer disposal of small quantities of licensed materials was performed via laboratory sinks at the Esperion site and via vivarium drains in Room V-9 of the Ellsworth Road site per license authorization and within regulatory limits.

Monthly routine surveys were performed. Records indicate that in only one instance did results exceed the administrative limits of 200 dpm/100cm^2 (one location with 360 dpm/100cm^2 was found and remediated). Incident records indicate two spills of C-14. The first was on 10/6/03 where up to 41Kdpm/100cm^2 was spilled inside cell culture hood #1 in Room 576. The second was on 10/22/03 and resulted in up to 7000 dpm/100cm^2 inside the laminar air flow hood in Room 618. Both spills were remediated to less than the administrative limit.

2.4 Operational and Closeout Radiological Surveys

During the HSA, the radiological status of the facility was determined by reviewing historical survey records and interviewing Radiation Safety personnel. Facility surfaces were maintained

<200 dpm/100cm^2 removable surface contamination. The facility conducted routine periodic surveys, which were performed by researchers and Radiation Safety personnel. Laboratory closeout procedures were used when researchers completed experiments involving radioactive materials. In addition to removable contamination measurements, laboratory closeout procedures involved scan surveys using a pancake GM detector for all experiments except those using only H-3 and C-14.

In preparation for decommissioning and upon vacancy of each room where radioactive materials were used, Pfizer Radiation Safety personnel performed extensive removable contamination surveys. The survey protocol consisted of the following elements:

- Random on floors and benches at approximately a two- meter spacing.
- 100% of sink drains.
- Four locations in 100% of fume hoods: sash, air foil, horizontal working surface and baffle.

This protocol resulted in a total of 296 removable contamination measurements. All measurements were below the license action level of 200 dpm/100cm^2. Additionally, no measurements were elevated above typical background levels. The survey results will be maintained with other decommissioning records in the license files.

2.5 Previous Decommissioning Activities

There have been no previous decommissioning activities performed at the sites.

3.0 Release Criteria

The radiological release criteria of NRC 10CFR20 Subpart E for unrestricted use were used for decommissioning these facilities. Specifically, the facilities were surveyed in accordance with the guidance contained in MARSSIM to demonstrate compliance with the criteria of 10CFR20.1402, Radiological Criteria for Unrestricted Use. The criteria are that residual radioactivity results in a TEDE to an average member of the critical group that does not exceed 25 mrem per year and that the residual radioactivity has been released to levels that are as low as reasonably achievable (ALARA).

4.0 Derived Concentration Guideline Levels

Surface contamination limits were derived using the Building Occupancy scenario together with default parameter values. Screening values were selected such that the 0.9 quantile of projected doses was less than or equal to 25 mrem/y (i.e., when probabilistic dose assessment calculations were performed, there was a 90% probability the calculated dose would be less than 25 mrem/y). The isotopes of concern screening values for surfaces under default conditions (generic screening levels) from NUREG 1757 are provided in Table 4-1.

Table 4-1 - Default Screening Values for Nuclides of Concern

Isotope	Half-life	Radiation Type	Default Screening Value (dpm/100cm^2)
H-3	12.3 years	Beta	1.2E8
C-14	5730 years	Beta	3.7E6

The default screening values are the basis for developing the derived concentration guideline levels (DCGL's) for the project. The DCGL is the radionuclide specific surface area concentration that could result in a dose equal to the release criterion. $DCGL_W$ is the concentration limit if the residual activity is essentially evenly distributed over a large area. For this project, $DCGL_W$ is equal to the DSV. In the case of non-uniform contamination, MARSSIM allows for evaluation of higher levels of activity are permissible over small areas using the $DCGL_{EMC}$. Due to the radiological cleanliness of the facility and Pfizer's conservative ALARA goal, small areas of elevated activity are not considered. Additionally, due to Pfizer's conservative ALARA goal, application of the unity rule for multiple radionuclides is not required to demonstrate compliance with the release criteria.

5.0 ALARA Goal

Pfizer has established an extremely conservative ALARA goal. As a result, radiation detection methods must have a sensitivity sufficient to detect and quantify radiation at near background levels. This allows Pfizer to make informed decisions regarding the levels of residual radioactivity left at the facility and to ensure residual radioactivity is minimized. The site-specific ALARA goal is that each individual total contamination measurement will be less than 10% of the limits specified in Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors." Specifically, the average total surface contamination shall not exceed 500 dpm/100cm^2 and each removable contamination measurements will be less than 100 dpm/100cm^2.

Because of the extreme conservatism of the ALARA goal, these criteria are applied on a nuclide-specific basis and the unity rule is not applied. While it is feasible to perform direct static measurements and smear analyses at a detection sensitivity below the ALARA goals, it is not feasible to perform scanning surveys to that sensitivity. Therefore, scanning was conducted at a rate to achieve an MDC of less than three times background as determined by a one-minute timed count on the same type of instrument being used to perform the scans. The number of measurements required by MARSSIM to demonstrate compliance with the release criteria were calculated using the release critieria and not the ALARA goal.

6.0 ALARA Analysis

Due to the extremely low doses associated with the facility, a quantitative ALARA analysis is not required. Default screening values are being used to establish DCGLs. Furthermore, Pfizer routinely maintains all laboratory areas of the facility to levels less than 200 dpm/100cm^2 removable activity. Additionally, Chase made efforts to decontaminate all locations of identified activity detected during characterization surveys. These efforts included simple hand wiping and removal of contaminated material. Areas of elevated activity identified during decommissioning are provided in tables in Section 12.0.

NUREG 1757, Volume 2, Appendix N states in part: "For ALARA during decommissioning, all licensees should use typical good-practice efforts such as floor and wall washing, removal of readily removable radioactivity in buildings or in soil areas, and other good housekeeping practices. In addition, licensees should provide a description in the FSSR of how these practices were employed to achieve the final activity levels. In light of the conservatism in the building surface and surface soil generic screening levels developed by NRC, NRC staff presumes, absent information to the contrary, that licensees who remediate building surfaces or soil to the generic screening levels do not need to provide analyses to demonstrate that these screening levels are

ALARA. In addition, if residual radioactivity cannot be detected, it may be assumed that it has been reduced to levels that are ALARA. Therefore, the licensee may not need to conduct an explicit analysis to meet the ALARA requirement."

7.0 Area Classifications

Based on the results of the HSA and previous survey results, facility areas were classified as impacted areas or non-impacted areas. Non-impacted areas are areas without the potential for residual radioactivity from licensed activities and were not surveyed during final status surveys. Impacted areas are those areas that have some potential for residual radioactivity from licensed activities. Impacted areas were subdivided into Class 2 or Class 3 areas. Class 2 areas consisted of laboratory and storage areas where radioactive materials were used. Class 3 areas consisted of hallways, offices, breakroom and other support areas where radioactive materials were not used. Upper walls (>2m) and ceilings in all areas were classified non-impacted since there is little or no potential to exceed even a small fraction of the DCGLs on these surfaces. Other non-impacted areas included building exterior surfaces, surface and subsurface soils of outside grounds, and indoor areas not occupied by Pfizer.

8.0 Survey Units

Survey units were established in accordance with the Decommissioning Plan. The assigned survey units were homogeneous in construction, contamination potential, and contamination distribution. Table 8-1 provides a list of building structural surface survey units. See Appendix B for a facility floor plan showing the structural surface survey units. Table 8-2 provides a list of building systems survey units.

Table 8-1 - Building Structural Surface Survey Units

Survey Unit	Rooms	Class	GSF
State Street Facility			
ESP-ES01	616, 617, 618, 619, 620, 621	2	2,701
ESP-ES02	572, 574, 575, 576, 577, 578, 579, 581	2	4,703
ESP-ES03	all not listed	3	12,691
Ellsworth Road Facility			
ERF-ER01	V-9 (Room 222)	2	120
ERF-ER02	all not listed	3	4,800

Table 8-2 - Building Systems Survey Units[1]

Survey Unit	Description
ESP-DR01	State Street Facility Drain System - including laboratory sink drains and fume hood cup sink drains.
ESP-VE01	State Street Facility Ventilation Exhaust System - including general ventilation exhaust ducts, fume hood exhaust ducts, fans and discharge ducts.
ERF-DR01	Ellsworth Road Facility Drain System - including laboratory sink drains and fume hood cup sink drains.
ERF-VE01	Ellsworth Road Facility Ventilation Exhaust System - including general ventilation exhaust ducts, fume hood exhaust ducts, fans and discharge ducts.

Note 1: Neither facility contains a central vacuum system

9.0 Survey Instrumentation

9.1 Instrument Specifications

The instrumentation used for final status surveys is summarized in Table 9-1 and Table 9-2. Table 9-1 lists the standard features of each instrument such as probe size and efficiency. Table 9-2 lists the operational parameters such as scan rate, count time, and the associated Minimum Detectable Concentrations (MDC).

Table 9-1 - Instrumentation Specifications

Detector Model	Detector Type	Detector Area	Meter Model	Window Thickness	Typical Total Efficiency
Ludlum 43-68	Gas Flow Proportional	126 cm^2	Ludlum 2221	0.8 mg/cm^2	6.5 % (C-14)
Ludlum 43-37 Floor Monitor	Gas Flow Proportional	582 cm^2	Ludlum 2360	0.8 mg/cm^2	7 % (C-14)
Packard 1900CA	Liquid Scintillation	N/A	N/A	N/A	64% (H-3) 96% (C-14)

Table 9-2 - Typical Instrument Operating Parameters and Sensitivities

Measurement Type	Detector Model	Meter Model	Scan Rate	Count Time (min.)		Bkg. (cpm)	MDC ($dpm/100cm^2$)
				Bkg.	Sample		
Surface Scans	Ludlum 43-68	Ludlum 2221	5 in./sec.	N/A	N/A	500	4969 (C-14)
Surface Scans	Ludlum 43-37 Floor Monitor	Ludlum 2360	5 in./sec.	N/A	N/A	1000	1145 (C-14)
Total Surface Activity	Ludlum 43-37 Floor Monitor	Ludlum 2360	N/A.	1	1	1000	369 (C-14)
Total Surface Activity	Ludlum 43-68	Ludlum 2221	N/A	10	5	500	499 (C-14)
Removable Activity	Packard 1900CA	N/A	N/A	60	1	56 (H-3) 65 (C-14)	43 (H-3) 31 (C-14)

9.2 Instrument Calibration

Laboratory instruments and portable field instruments were calibrated within the last twelve months with National Institute of Standards and Technology (NIST) traceable ^{3}H and ^{14}C sources. See Appendix C for instrument calibration records.

9.3 Functional Checks

Functional checks were performed at least daily when an instrument was in use. The background and source readings were taken as part of the functionality check and compared with the acceptance range for the instrument. The background, source check and field measurement count times for radiation detection instrumentation were specified by procedure to ensure measurements were statistically valid.

9.4 Determination of Counting Times and Minimum Detectable Concentrations

All minimum detectable concentrations (MDC) and associated count times were calculated in accordance with the Decommissioning Plan. For all final status measurements, MDC values were less than the ALARA goal.

9.4.1 Static Counting

Static counting Minimum Detectable Concentration at a 95% confidence level is calculated using the following equation, which is an expansion of NUREG 1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions", Table 3.1 (Strom & Stansbury, 1992).

Equation 9-1

$$MDC_{STATIC} = \frac{3 + 3.29\sqrt{B_R \cdot t_s \cdot \left(1 + \frac{t_s}{t_b}\right)}}{t_s \cdot E_{tot} \cdot \frac{A}{100}}$$

Where:

MDC_{STATIC}	=	Minimum detectable concentration level in dpm/100cm^2.
B_R	=	Background count rate in counts per minute
t_b	=	background count times in minutes
t_s	=	sample count times in minutes
E_{tot}	=	total detector efficiency for radionuclide emission of interest (includes combination of instrument efficiency and surface efficiency of 0.25)
A	=	Active area of the detector in cm^2

A typical static MDC calculation for the Ludlum Model 43-68 gas flow proportional detector is shown below:

$$MDC_{STATIC} = \frac{3 + 3.29\sqrt{(500)(5)\left(1 + \frac{5}{10}\right)}}{(5)(0.065)\frac{126}{100}} = 499 \text{ dpm/100cm}^2$$

A typical static MDC calculation for the Ludlum Model 43-37 gas flow proportional detector is shown below:

$$MDC_{STATIC} = \frac{3 + 3.29\sqrt{(1000)(1)\left(1 + \frac{1}{1}\right)}}{(1)(0.07)\frac{582}{100}} = 369 \text{ dpm/100cm}^2$$

9.4.2 Beta Ratemeter Scanning

Beta Scanning Minimum Detectable Concentration at a 95% confidence level is calculated using the following equation which is a combination of MARSSIM equations 6-8, 6-9, and 6-10:

Equation 9-2

$$MDC_{SCAN} = \frac{d'\sqrt{b_i}\left(\frac{60}{i}\right)}{\sqrt{p}\cdot E_{TOT}\cdot\frac{A}{100cm^2}}$$

Where:

MDC_{Scan}	=	Minimum detectable concentration level in dpm/100cm^2.
d'	=	desired performance variable (1.38)
b_i	=	background counts during residence interval
i	=	residence interval in seconds
p	=	surveyor efficiency (0.5)
E_{TOT}	=	total detector efficiency for radionuclide emission of interest (includes combination of instrument efficiency and surface efficiency of 0.25)
A	=	active area of the detector in cm^2

A typical MDC_{SCAN} calculation for the Ludlum Model 43-37 gas flow proportional detector is shown below:

$$MDC_{SCAN} = \frac{1.38\sqrt{17.5}\left(\frac{60}{1.05}\right)}{\left(\sqrt{0.5}\right)(0.07)\left(\frac{582}{100}\right)} = 1145\,\text{dpm/100cm}^2$$

$$\text{i} = 13.3\,\text{cm}\cdot\frac{\text{inch}}{2.54\,\text{cm}}\cdot\frac{\text{sec}}{5\,\text{inch}}\cdot = 1.05\,\text{sec}$$

$$\text{b}_\text{i} = 1.05\,\text{sec}\cdot\frac{1000\,\text{counts}}{\text{minute}}\cdot\frac{\text{minute}}{60\,\text{sec}} = 17.5\,\text{counts}$$

A typical MDC_{SCAN} calculation for the Ludlum Model 43-68 gas flow proportional detector is shown below:

$$MDC_{SCAN} = \frac{1.38\sqrt{5.75}\left(\frac{60}{0.69}\right)}{\left(\sqrt{0.5}\right)(0.065)\left(\frac{126}{100}\right)} = 4969\,dpm/100cm^2$$

$$\text{i} = 8.8\,\text{cm}\cdot\frac{\text{inch}}{2.54\,\text{cm}}\cdot\frac{\text{sec}}{5\,\text{inch}}\cdot = 0.69\,\text{sec}$$

$$\text{b}_\text{i} = 0.69\,\text{sec}\cdot\frac{500\,\text{counts}}{\text{minute}}\cdot\frac{\text{minute}}{60\,\text{sec}} = 5.75\,\text{counts}$$

9.4.3 Smear Counting

Smear counting Minimum Detectable Concentration at a 95% confidence level is calculated using the following equation, which is an expansion of NUREG 1507, "*Minimum Detectable Concentrations with Typical Radiation Survey* Instruments for Various Contaminants and Field Conditions", Table 3.1 (Strom & Stansbury, 1992):

Equation 9-3

$$MDC_{SMEAR} = \frac{3 + 3.29\sqrt{B_R \cdot t_s \cdot \left(1 + \frac{t_s}{t_b}\right)}}{t_s \cdot E}$$

Where:

MDC_{SMEAR}	=	Minimum detectable concentration level in dpm/smear.
B_R	=	background count rate in counts per minute
t_b	=	background count times in minutes
t_s	=	sample count times in minutes
E	=	Instrument efficiency for the radionuclide emission of interest

Typical MDC calculations for ^{3}H and ^{14}C are shown below.

$$^{3}\text{H MDC}_{\text{SMEAR}} = \frac{3 + 3.29\sqrt{(56)(1)\left(1 + \frac{1}{60}\right)}}{(1)(0.64)} = 43 \text{ dpm}$$

$$^{14}\text{C MDC}_{\text{SMEAR}} = \frac{3 + 3.29\sqrt{(65)(1)\left(1 + \frac{1}{60}\right)}}{(1)(0.96)} = 31 \text{ dpm}$$

9.5 Determination of Uncertainty

The uncertainty for each measurement is calculated using equation 6-15 from MARSSIM:

Equation 9-4

$$\sigma = 1.96\sqrt{\frac{C_{s+b}}{T_{s+b}^{2}} + \frac{C_b}{T_b^{2}}}$$

where:

σ	=	uncertainty
1.96	=	multiplier to achieve a 95% confidence level
C_{s+b}	=	gross sample counts
T_{s+b}	=	sample count time (min.)
C_b	=	gross background counts
T_b	=	Background count time (min.)

10.0 Data Quality Objectives

The following Data Quality Objectives discussed in the Decommissioning Plan were used as the foundation of the final status survey planning process:

- Static measurements were taken to achieve an MDC_{static} of less than the ALARA goal of 500 dpm/100cm^2.
- Scanning was conducted at a rate to achieve an MDC_{scan} of less than three times background as determined by performing a one-minute timed count (8547 dpm/100cm^2 – see derivation below).
- Individual measurements were made to a 95% confidence interval.
- Decision error probability rates were set at 0.05 for both α and β.
- The null hypothesis (H_0) and alternate null hypothesis (H_A) were that of NUREG 1505 scenario A:
  H_0 is that the survey unit does not meet the release criteria
  H_A is that the survey unit meets the release criteria
- Characterization and remedial action support surveys were conducted under the same quality assurance criteria as final status surveys such that the data could be used as final status survey data to the maximum extent possible.

The scanning sensitivity requirement is based on three times background on a Ludlum 43-68 gas flow proportional detector. Assuming background conservatively at 350 cpm and total efficiency for C-14 at 6.5%, this equates to 8547 dpm/100cm^2 as shown below:

$$Activity = \frac{cpm_{sample} - cpm_{background}}{E_{total} \cdot \frac{A}{100cm^2}}$$

$$Activity = \frac{1050cpm - 350cpm}{0.065 \cdot \frac{126cm^2}{100cm^2}} = 8547dpm/100cm^2 \quad C-14$$

Instrument operating parameters and methodologies were established to meet the DQOs. Additionally, investigation levels were developed to verify the assumptions for classifying survey units. If these investigation levels were exceeded, an investigation was performed to verify the initial assumptions behind the classification and determine the appropriate resolution. This is further discussed in Section 14.0 of this report. The established investigation levels are summarized in Table 10-1.

Table 10-1 - Survey Investigation Levels

Survey Unit Classification	Flag Direct Measurement or Sample Result When:	Flag Scanning Measurement Result When:	Flag Removable Measurement Result When:
All	>500 dpm/100cm^2	>MDC	> 100 dpm/100cm^2

11.0 Characterization Surveys

The survey protocol for building surfaces consisted of performing the scanning portion of the final status survey protocol, and judgmental smears and static measurements on the highest probability areas for residual radioactivity on vertical surfaces to support the Class 2 and Class 3 final status survey protocols. The survey protocol for building system surveys consisted of removable contamination measurements on internal surfaces of ventilation exhaust and drain systems.

The purpose of scanning was to identify locations of elevated activity that exceeded the investigation levels. Where elevated activity was identified, a static measurement and smear were taken at the location of highest activity identified during the scan and the boundary of the elevated area was marked to aid in locating the area for remedial actions. Based on contamination potential, at least five locations in each survey unit were judgmentally selected to perform a static measurement and removable contamination measurement. The minimum scan percentages are presented in Table 13-1. In most cases, these minimum scan percentages were exceeded.

For areas that were partially contaminated, the characterization survey data along with the post remediation surveys were used as the scan portion of the final status survey. Contaminated areas were controlled during remediation activities such that adjacent non-contaminated surfaces could not have become cross-contaminated.

12.0 Remediation

12.1 Building Structures and Surfaces

There were two locations at the State Street facility where elevated activity was identified – on a benchtop in Room 578 and on vinyl floor tile in Room 576. Chase removed contaminated material to achieve the ALARA goal. After remediation, Survey Unit ES02 scans were upgraded to provide 100% coverage of accessible surfaces less than a two-meter height. No other areas of elevated activity were detected. Table 12-1 summarizes all building structural surfaces that were remediated.

12.2 Drain System

All drain traps and inlets met the ALARA goal for the project.

12.3 Ventilation Exhaust System

All ventilation exhaust ducts and equipment met the ALARA goal for the project.

Table 12-1 - Remediated Surfaces and Structures

Survey Unit	Location /Size	Activity (dpm/100cm^2)		Remediation Method	Post-Remediation Activity (dpm/100cm^2)	
		Total	Removable		Total	Removable
ES02	Room 578 Benchtop (8 ft^2)	41K	24 – ^{3}H 141 – ^{14}C	Removal of contaminated material	N/A	N/A
ES02	Room 576 Floor (18 ft^2)	7.8K	26 – ^{3}H 24 – ^{14}C	Removal of contaminated material	N/A	N/A

13.0 Design and Performance of Final Status Surveys

Final status surveys were performed using the Data Quality Objective (DQO) process to demonstrate that residual radioactivity in each survey unit satisfied the predetermined criteria for release for unrestricted use. Final status surveys were conducted by performing the appropriate combination of scan surveys, total activity measurements and removable activity measurements as discussed further in this section. All final status surveys were performed according to survey package instructions. Survey data were documented on survey maps and/or associated data information sheets. An example survey package is included in Appendix D.

13.1 *Background Determination*

For total surface activity measurements, ambient background levels were generally determined for each survey unit by performing a timed count with the probe at waist level and away from survey unit surfaces. Ambient background was subtracted from each total activity gross measurement. Material background, the contribution from naturally-occurring radioactivity in building structural materials, was not accounted for (subtracted) since it was a small fraction of the DCGL. For instances in which static measurements exceeded the investigation level, an investigation was performed to determine if it was due to naturally-occurring radioactivity in structural materials. The methods for this investigation are discussed in the Data Quality Assessment section of this report.

13.2 Surface Scans

Scanning is used to identify locations within the survey unit that exceed the investigation level of >MDC. Scan surveys were conducted by holding the detector probe within $^1/_8$ to ¼ inch from the surface and moving the detector at the prescribed scan rate and listening for an increase in the audible response.

In Class 2 and 3 survey units, scanning was performed on a minimum percentage of accessible surfaces with the highest potential to contain residual activity at the discretion of the survey technician. There were no Class 1 areas. Table 13-1 summarizes the minimum percentage of accessible building structural surfaces scanned based on classification.

Table 13-1 – Scan Survey Coverage by Classification

Structure	Class 2	Class 3
Floors	50%	20%
Other Structures	25%	10%

13.3 Total Surface Activity Measurements

Total surface activity (static) measurements were taken in impacted areas at each identified sample location. Scaler count times were determined to achieve the detection sensitivities stated in the DQOs. Field measurements were converted to an activity concentration using the following equation:

Equation 13-1

$$\text{Activity}\,(\text{dpm}/100\text{cm}^2) = \frac{cpm_{sample} - cpm_{background}}{E_{total} \cdot \frac{A}{100cm^2}}$$

13.3.1 Determining the Number of Samples Needed

The minimum number of samples required for the Sign Test was calculated using equations in Section 5 of MARSSIM in accordance with the Decommissioning Plan. A conservative estimate of the standard deviation of total surface activity measurements (2500 dpm/100cm^2) was determined. Final status survey standard deviations are typically less than 2,500 dpm/100cm^2 at these types of facilities. The LBGR was set at one half of the DCGL. The calculation performed to determine the required number of samples is provided below.

Determination of the Relative Shift

The number of required samples depends on the ratio of the activity level to be measured relative to the variability in the concentration. This ratio is called the Relative Shift, $\Delta/\sigma S$ and is defined in MARSSIM as:

Equation 13-2

$$\Delta / \sigma_S = \frac{DCGL - LBGR}{\sigma_S}$$

Where:

DCGL = Derived Concentration Guideline Level

LBGR = Concentration at the lower bound of the gray region. The LBGR is the average concentration to which the survey unit should be cleaned in order to have an acceptable probability of passing the test

σ_S = an estimate of the standard deviation of the residual radioactivity in the survey unit

The actual calculations are provided below:

$$\Delta/\sigma_S = \frac{3.7E6 - 1.85E6}{2500} = 740$$

Since MARRSIM Table 5.5 does not include relative shifts above 3 and the number of samples required decreases with an increasing relative shift, the relative shift was conservatively set at 3.

Determination of Acceptable Decision Errors

A decision error is the probability of making an error in the decision on a survey unit by failing a unit that should pass (β decision error) or passing a unit that should fail (α decision error). MARSSIM uses the terminology α and β decision errors; this is the same as the more common terminology of Type I and Type II errors, respectively.

The applicable decision errors (Type I Type II errors) were selected in accordance with the established Data Quality Objectives.

Determination of Number of Data Points

For the purposes of the final status survey it was assumed that the contaminant is not present in background at significant levels compared to the DCGLs. Therefore, material specific background was ignored and was not subtracted from the total surface activity measurements. Using this methodology, the Sign Test was chosen for the statistical evaluation of survey data.

The number of direct measurements for a survey unit, employing the Sign Test, is determined from MARSSIM Table 5.5, which is based on the following equation (MARSSIM equation 5-2):

Equation 13-3

$$N = \frac{\left(Z_{1-\alpha} + Z_{1-\beta}\right)^2}{4\left(SignP - 0.5\right)^2}$$

Where:

N	=	number of samples needed in the survey unit
$Z_{1-\alpha}$	=	percentile represented by the decision error α
$Z_{1-\beta}$	=	percentile represented by the decision error β
SignP	=	estimated probability that a random measurement will be less than the DCGL when the survey unit median is actually at the LBGR

Note: Percentiles $Z_{1-\alpha}$ and $Z_{1-\beta}$ are determined from MARSSIM Table 5.2. SignP is determined from MARSSIM Table 5.4

MARSSIM recommends increasing the calculated number of measurements by 20% to ensure sufficient power of the statistical tests and to allow for possible

data losses. Pfizer's approach was to predetermine a number of samples to be applied to all survey units. This approach would provide sufficient power for the statistical test while streamlining the survey planning process. The following calculations were made to determine this number:

$$N = \frac{(1.645 + 1.645)^2}{4(0.998650 - 0.5)^2} = 11$$

$Z_{1-\alpha}$ and $Z_{1-\beta}$ are equal to 1.645 using the error rate of 0.05 from MARSSIM Table 5.2. SignP is equal to 0.998650 from MARSSIM Table 5.4. Adding an additional 20% to account for data losses resulted in a value of 14.

Therefore, the determined number of samples for the final status surveys for planning purposes was 14.

13.3.2 Determining Class 1 and Class 2 Sample Locations

In Class 1 and Class 2 survey units, sample locations were established in a square grid pattern beginning with a random start location and a calculated sample spacing. After determining the number of samples needed in the survey unit, sample spacing (L) was determined from MARSSIM equation 5-8:

Equation 13-4

$$L = \sqrt{\frac{A}{N}}$$

for a square grid where:

L = sample spacing interval
A = total survey unit area
N = number of samples required in the survey unit

Maps for each survey unit were generated showing permanent surfaces. A random starting point was determined using MS Excel random numbers coinciding with the x and y coordinates of the survey unit. A grid was plotted across the survey unit surfaces based on the random start location and the calculated sample spacing. A measurement location was plotted at each grid intersection.

In laboratory areas, permanent counter tops and other horizontal or vertical surfaces that blocked floor or wall surfaces were included as replacement surfaces. Computer-generated survey unit maps are included in the survey packages and are available in project records. Copies of the maps are provided in Appendix E.

13.3.3 Determining Class 3 Sample Locations

For the Class 3 area, a map was generated showing the permanent surfaces. Sample locations were selected using MS Excel random numbers coinciding with the x and y coordinates of the survey unit. Due to the layout of the survey unit surfaces, some randomly chosen survey locations did not fall on a survey unit surface. In this case, random coordinates were selected until the required number of samples was obtained. A computer-generated survey unit map is included in the survey packages and available in project records. A copy of the maps is provided in Appendix E.

13.4 Removable Contamination Measurements

Removable contamination measurements were collected by wiping an area of approximately 100 cm^2 using glass fiber smears on structural surfaces and cotton swabs inside building systems. For swabs or smears where less than 100cm^2 of area was wiped, area corrections were applied to correct to 100cm^2. The smears/swabs were counted to achieve the detection sensitivities stated in the DQOs. The liquid scintillation counter was setup for dual label counting for ^{3}H and ^{14}C. As an additional check on assumptions made during the planning phase, removable samples were also analyzed for energies >156 keV (above Carbon-14 and Tritium). These results are reported in counts per minute (cpm) only since no particular nuclide efficiency is applied. An increased count rate in this range could indicate the presence of nuclides other than those used for survey planning. No elevated count rates were detected in these energy ranges on any removable contamination measurement collected during characterization, remediation or final status surveys. The liquid scintillation counter channel energies were set as follows:

Channel 1 (^{3}H):	0.0 – 18.6 keV
Channel 2 (^{14}C):	18.6 – 156 keV
Channel 3 (Other)	156 – 2000 keV

13.5 Building System Surveys

Removable activity measurements were completed on ventilation exhausts and building drains in accordance with the Decommissioning Plan. Scans and static measurements were not possible due to geometry. Neither facility has a central vacuum system. 100% of drains and ventilation exhausts in Class 2 Areas and 10% of drains and ventilation exhausts in Class 3 Areas were surveyed for internal removable activity.

13.6 Survey Documentation

A survey package was developed and approved by the Project Manager for each survey unit containing the following:

- Survey instruction sheet
- General survey requirements
- Instrument requirements with associated MDCs, count times and scan rates
- Survey maps detailing survey locations and placement methodology
- Survey data sheets

To ensure proper data management and organization a unique location code system was used so that survey data could be properly entered and organized in the Final Status

Survey Database. A breakdown of the location code and specific code components are provided in Table 13-2.

Table 13-2 - Location Code Description

A unique location code was assigned to each individual survey location to ensure proper data management of the survey results. The following format was used to ensure consistency throughout the final status survey process: **BBB-RRRR-SS-M-LLL** Where:		
BBB	=	Building Code. This field represents the facility. (3 characters) ESP = State Street Facility ERF = Ellsworth Road Facility
RRRR	=	Survey Unit Number. This is the assigned survey unit number. (4 characters)
SS	=	Structural Surface Code. This field represents the structural surface such as floor, wall, ceiling, etc. (2 characters) F1 = Floor B1 = Benchtop H1 = Fume Hood S1 = Other Structures
M	=	Structural Material Code. This field represents the type of structural material on which a particular measurement is taken. (1 Character) A = Carpet C = Concrete T = Vinyl Tile V = Vinyl Sheeting M = Miscellaneous
LLL	=	Numerical Identifier. This field represents the survey location number. The field "001" means survey point location number 1. Numerical identifiers are unique within a survey unit. (3-characters)

13.7 Data Validation

Field data was reviewed by the Project Manager and validated to ensure:

- Completeness of forms
- Proper types of surveys were performed
- The MDCs for measurements met the established data quality objectives
- Independent calculations were performed on a representative sample of data sheets
- Satisfactory instrument calibrations and daily functionality checks were performed as required

Additionally, all final status survey data was entered into the Final Status Survey Database. This provided the means to sort survey data, verify activity calculations, and to compute the associated MDC and counting errors. Once data entry for a survey unit was complete, a verification report was printed and compared to original data sheets to ensure correct data entry.

14.0 Data Quality Assessment and Interpretation of Survey Results

The statistical guidance contained in Section 8 of MARSSIM was used to determine if areas are acceptable for unrestricted release and whether additional surveys or sample measurements were required.

14.1 Preliminary Data Review

A preliminary data review was performed for each survey unit to identify any patterns, relationships or anomalies. Additionally, measurement data was reviewed and compared with the DCGLs and investigation levels to confirm the correct classification of survey units. All calculations of means, standard deviations, minimum and maximum values and comparisons between survey data and investigation levels are presented in the following tables.

Table 14-1 – Surfaces and Structures Total Activity Summary

Survey Unit	# of Sample Locations	MDC	Mean	Standard Deviation	Minimum	Maximum	Investigation Level	Any Result Exceeding Applicable Investigation Level?
		(dpm/100 cm^2)						
ES01	14	267	-26	202	-376	345	500	No
ES02	19	285	-57	335	-491	906	500	Yes[1]
ES03	14	268	57	119	-197	221	500	No
ER01	14	286	890	181	579	1306	500	Yes[1]
ER02	14	286	731	280	-79	1079	500	Yes[1]

Note 1: No measurement exceeded applicable DCGLs. See Section 14.2 for the detailed discussion of the investigation results.

Table 14-2 – Surfaces and Structures Removable ^{3}H Summary

Survey Unit	# of Sample Locations	Mean	Standard Deviation	Minimum	Maximum	Investigation Level	Any Result Exceeding Applicable Investigation Level?
		(dpm/100 cm^2)					
ES01	14	22	6	11	33	100	No
ES02	19	25	8	13	46	100	No
ES03	14	21	8	11	33	100	No
ER01	14	23	9	11	40	100	No
ER02	14	24	8	9	35	100	No

Table 14-3 – Surfaces and Structures Removable ^{14}C Summary

Survey Unit	# of Sample Locations	Mean	Standard Deviation	Minimum	Maximum	Investigation Level	Any Result Exceeding Applicable Investigation Level?
		(dpm/100 cm^2)					
ES01	14	18	5	11	26	100	No
ES02	19	20	4	12	29	100	No
ES03	14	18	4	13	28	100	No
ER01	14	20	7	8	30	100	No
ER02	14	19	6	9	31	100	No

Table 14-4 – Building Systems Removable ^{3}H Summary

Survey Unit	# of Sample Locations	Mean	Standard Deviation	Minimum	Maximum	Investigation Level	Any Result Exceeding Applicable Investigation Level?
		(dpm/100 cm^2)					
ESP-DR01	42	23	9	3	42	100	No
ESP-VE01	35	30	11	10	52	100	No
ERF-DR01	23	28	10	14	52	100	No
ERF-VE01	17	25	7	15	43	100	No

Table 14-5 – Building Systems Removable ^{14}C Summary

Survey Unit	# of Sample Locations	Mean	Standard Deviation	Minimum	Maximum	Investigation Level	Any Result Exceeding Applicable Investigation Level?
		(dpm/100 cm^2)					
ESP-DR01	42	17	5	8	35	100	No
ESP-VE01	35	18	6	6	31	100	No
ERF-DR01	23	21	6	11	31	100	No
ERF-VE01	17	17	6	9	28	100	No

14.2 Determining Compliance for Building Surfaces and Structures

Scan surveys were completed for all survey units at the prescribed coverage. Removable contamination measurements were compared directly to the applicable investigation levels and DCGLs to determine if an area required further actions or surveys. All removable contamination measurements collected during the final status surveys were less than the applicable investigation levels and significantly less than the established DCGL. Elevated activity detected during characterization surveys was remediated as discussed in Section 12.0.

All total surface activity measurements were compared directly to the DCGL and investigation levels to determine if an area required further surveillance. All total surface

activity measurement collected during final status surveys were significantly less than the DCGL.

At the State Street site, two measurements exceeded the Investigation Level. Both were taken on the epoxied concrete floor surface in Room 573 (576 and 906 dpm/100 cm^2). The elevated readings were suspected of being due to naturally-occurring radioactivity in the concrete, so eight additional measurements were taken uniformly across the floor surface. An analysis of the distribution of these measurements was performed with the following results:

Count:	10
Mean:	902
Median:	941
Standard Deviation:	194
Mean - 2 sigma:	514
Minimum:	576
Maximum:	1215
Mean + 2 sigma:	1290

At the Ellsworth Road site, 27 of 29 measurements exceeded the Investigation Level. All 27 elevated measurements were taken on epoxied concrete floor surfaces. The elevated readings were suspected of being due to naturally-occurring radioactivity in the concrete. An analysis of the distribution of all measurements taken on epoxied concrete was performed with the following results:

Count:	28
Mean:	845
Median:	814
Standard Deviation:	176
Mean - 3 sigma:	317
Mean - 2 sigma:	493
Minimum:	433
Maximum:	1306
Mean + 2 sigma:	1197
Mean + 3 sigma:	1373

In the absence of residual radioactivity, the measurements are expected to conform to a normal distribution based on the randomness of background radiation events. For each population, the elevated measurements are attributed to the structural material because:

- The median is within 20% of the mean.
- Approximately 5% of the measurements were more than two standard deviations from the mean.
- The elevated measurements are only slightly above the Investigation Level and orders of magnitude below the DCGL.

Because all measurements are less than the DCGL, all survey units pass the Sign Test by definition. Therefore, the null hypothesis can be rejected and all survey units meet the release criterion and are suitable for release for unrestricted use. Total activity and

removable activity measurement results for all surface and structure survey units are provided in Appendix F.

14.3 Determining Compliance for Building Systems

All removable surface activity measurements were compared directly to the Investigation Levels to determine if an area required further examination. The geometry of building systems precluded scanning and total activity measurements. All removable activity measurements were less than the investigation level. Therefore, all systems survey units meet the release criteria and are suitable for release. Removable activity measurement results for all building systems surveys units are provided in Appendix G.

15.0 Quality Assurance Surveys

The Project Manager directly observed performance of approximately 10% of the final status surveys. Additionally, the Project Manager performed verification surface scans of more than 5% of the surfaces required to be scanned by the Decommissioning Plan. The conclusions reached based on the initial surveys would be the same as those based on the QA survey.

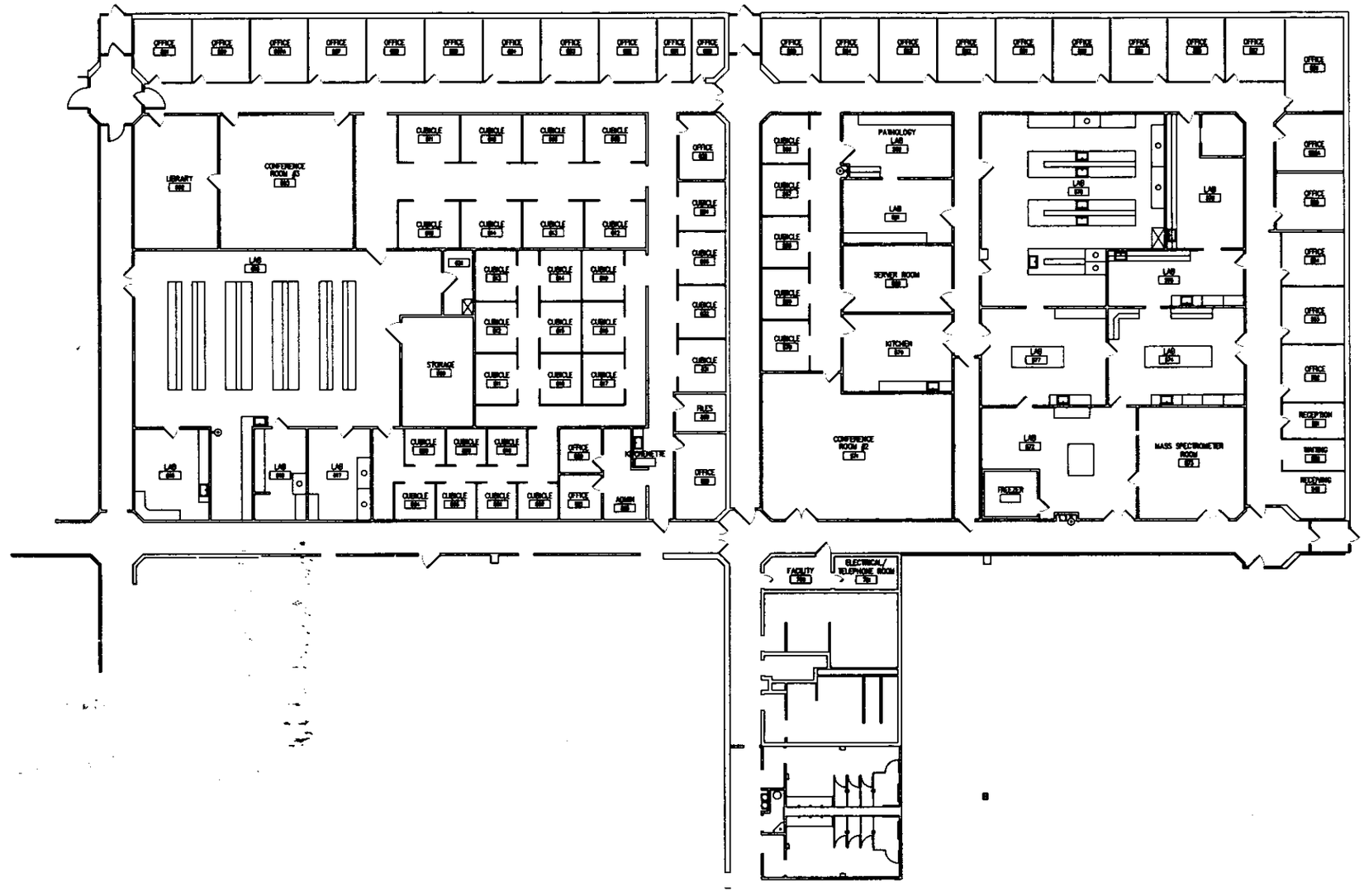
16.0 References

- "Ann Arbor Satellite Facilities Decommissioning Plan," Revision 1, January, 2006
- NRC Regulations 10 CFR 20 Subpart E
- NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM)
- NUREG-1505, "A Nonparametric Statistical Methodology for the Design and Analysis of Final Decommissioning Surveys"
- NUREG 1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions"
- NUREG 1757, Volume 1 "Consolidated NMSS Decommissioning Guidance," September, 2002
- Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors," June, 1974
- Pfizer Radioactive Materials License Number 21-01443-06

17.0 Certification

Prepared: _____ Project Manager Date: 5/17/06

Approved: _____ Certified Health Physicist Date: 5/17/06



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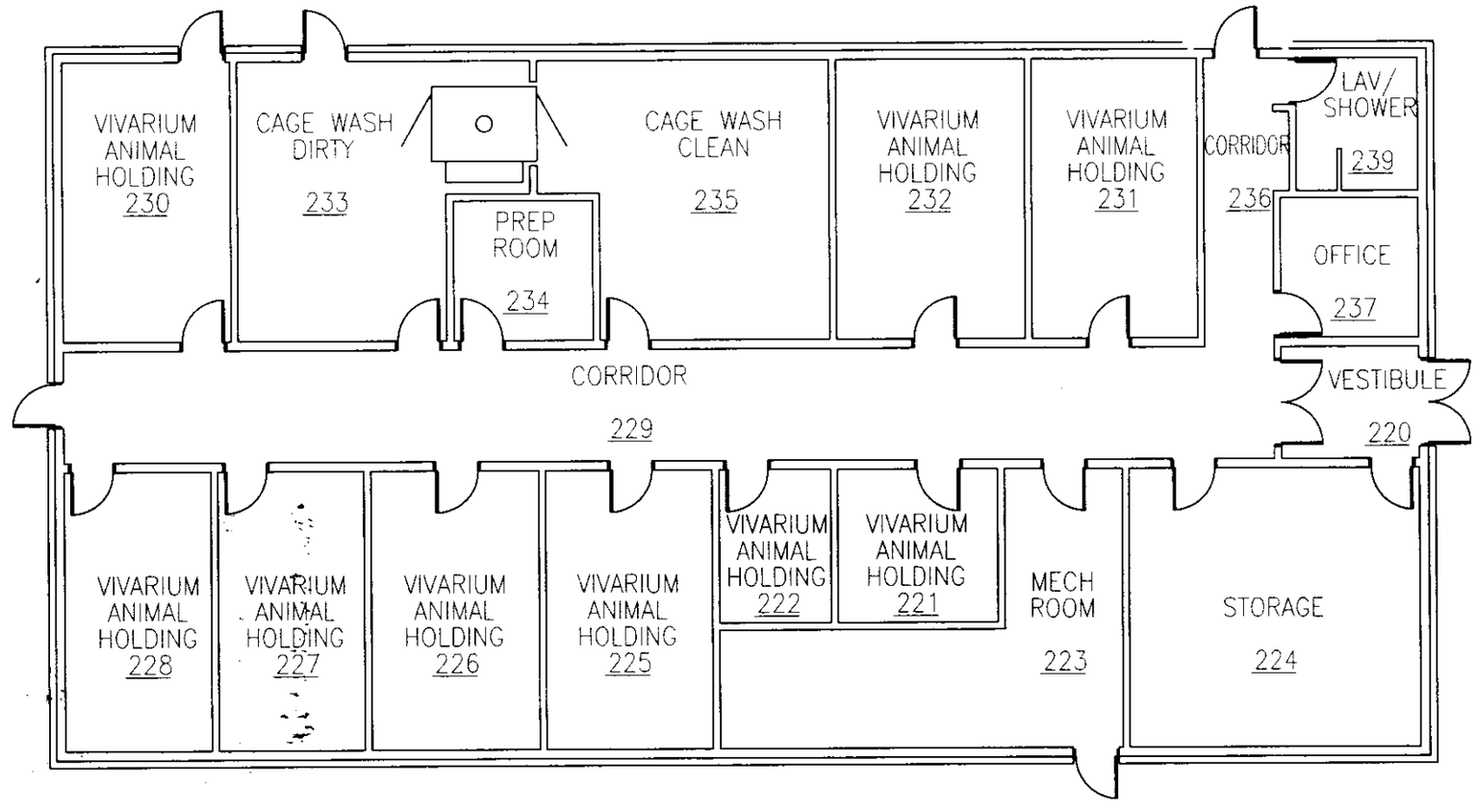
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CORRIDOR 236
LAV/ SHOWER 239
OFFICE 237
CORRIDOR 229
VESTIBULE 220
VIVARIUM ANIMAL HOLDING 228
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VIVARIUM ANIMAL HOLDING 226
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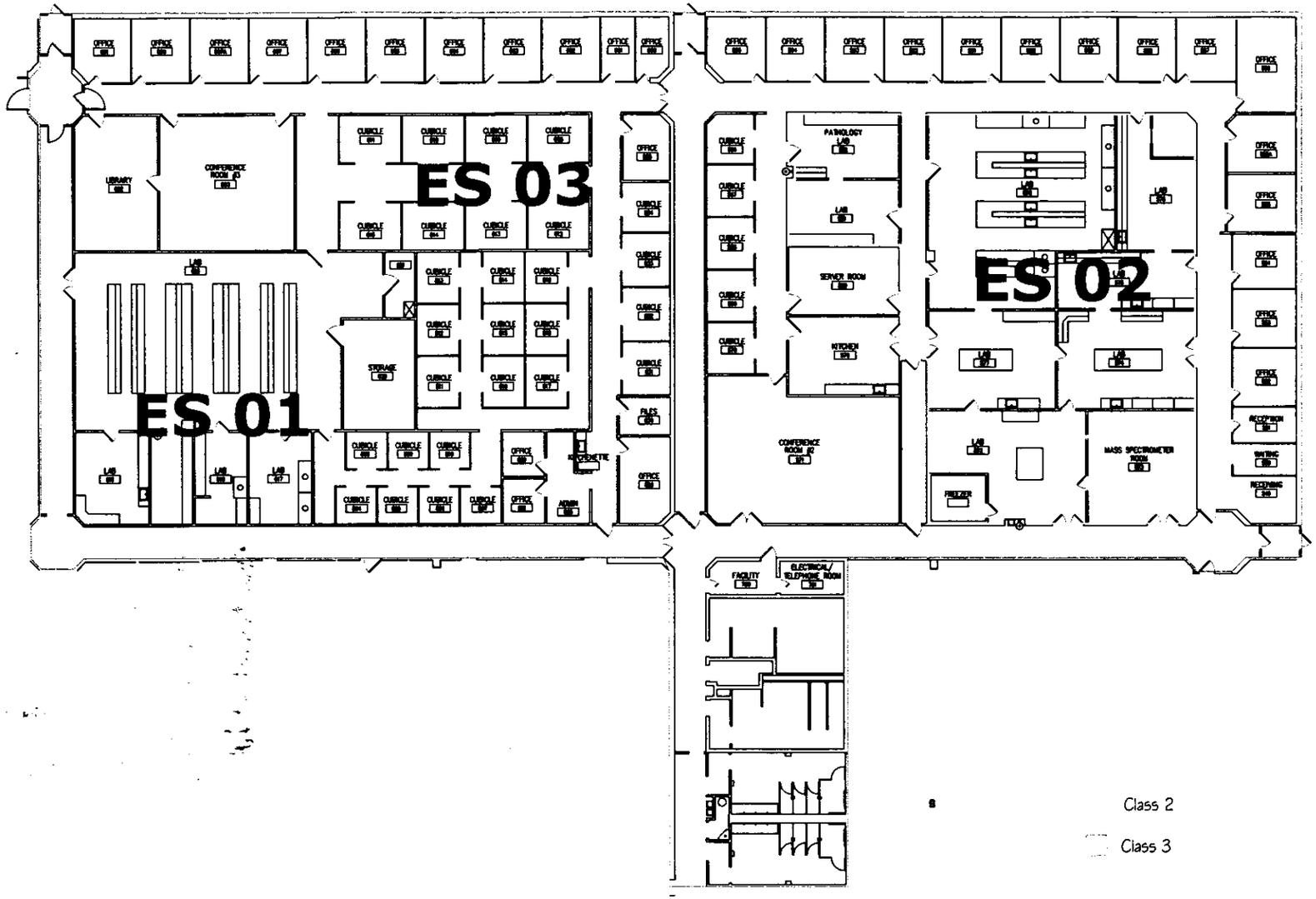
MECH ROOM 223
STORAGE 224



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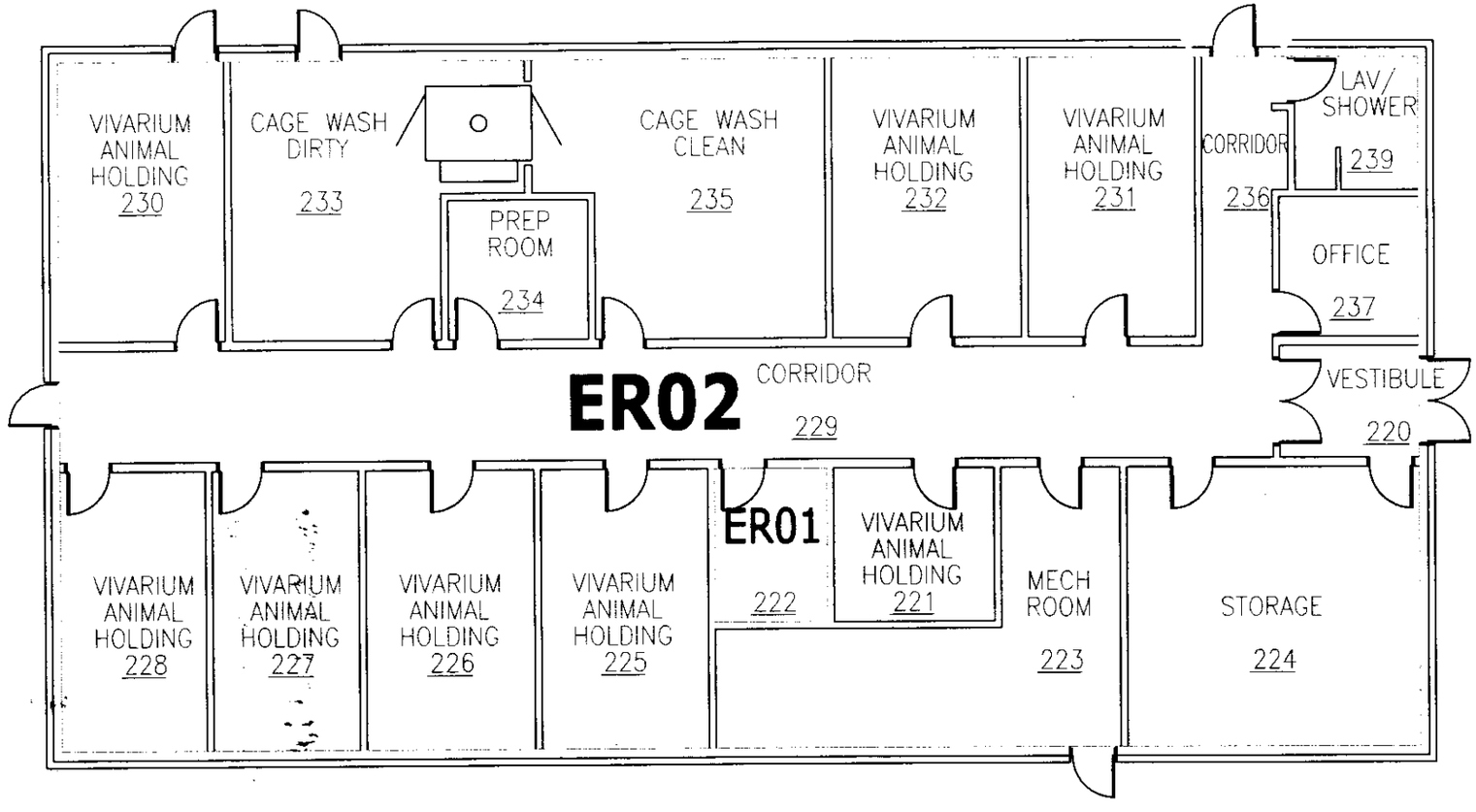

Class 2

Class 3

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2221 SERIAL# 126501

Owner: CHASE ENV

DATE: 01/07/06 LOCATION: Griffin Inst

TECH: J Glenn DATE LAST CAL EXPIRES: 02/01/06

Reason For Calibration: (•) Due For Calibration ( ) Repair (See Remarks)

( ) Other (See Remarks) ( ) Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 114512 CAL. DUE: 11/14/06

MODEL: SERIAL #: CAL DUE:

☑ Fast/Slow Switch working properly ☑ Audio Response ☑ Geotropism

CONDITION: Sat AF MECHANICAL ZERO: 0 AL MECHANICAL ZERO: 0

NEW BATTERIES: ( ) Yes (•) No BATTERY CHECK: 5.8

HV	AS FOUND HV	AS LEFT HV
600 V:	583	596
1200 V:	1174	1198
1800 V:	1768	1803

INPUT SENSITIVITY (mV): 4 AL INPUT SENSITIVITY (mV): 4

RATE METER SCALER

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100		0.0%	A.F.					
	250	250		0.0%	A.F.		250	0.0%	A.F.	
	400	400		0.0%	A.F.					
x1 or x10	1000	1000		0.0%	A.F.					
	2500	2500		0.0%	A.F.					
	4000	4000		0.0%	A.F.					
x10 or x100	10K	10	K	0.0%	A.F.					
	25K	25	K	0.0%	A.F.					
	40K	40	K	0.0%	A.F.					
x100 or x1000	100K	100	K	0.0%	A.F.					
	250K	250	K	0.0%	A.F.					
	400K	400	K	0.0%	A.F.					

Is the As Found Data Within 20% of the Set Point?: (•) Yes ( ) No

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR
Log	200	200		0.0%	A.F.	
	2000	2000		0.0%	A.F.	
	20K	20	K	0.0%	A.F.	
	200K	200	K	0.0%	A.F.	

Is the As Found Data Within 20% of the Set Point?: (•) Yes ( ) No

GRIFFIN INSTRUMENTS

SERIAL # 126501

01/07/06

Audio Divide:	(•) Sat ( ) Unsat	Push Buttons:	(•) Sat ( ) Unsat
Lamp:	(•) Sat ( ) Unsat	Scaler/Digital:	(•) Sat ( ) Unsat

Remarks: Calibrated w/43-68 #PR149839

Does Instrument Meet Final Acceptance Criteria?:	(•) Yes	( ) No
Calibration Sticker Attached?:	(•) Yes	( ) No
Date Instrument is Due For Next Calibration:	01/07/07	

Performed/Reviewed by: Joanne Glenn Date: 1/7/2006 Entered by: CP Initials

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-68 PROBE # PR101550

Owner: GI

DATE: 01/24/06
TECH: J Glenn

LOCATION: Griffin Inst
DATE LAST CAL EXPIRES: 08/01/04

REASON FOR CALIBRATION:

(•) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL:	2221	SERIAL #:	126533	CAL. DUE:	01/08/07
MODEL:		SERIAL #:		CAL. DUE:	

NIST TRACEABLE SOURCES USED

SOURCE #:	2695-00	SOURCE #:	2697-00
ISOTOPE:	Tc99	ISOTOPE:	Sr90
ACTIVITY(dpm):	18400	ACTIVITY:	12,200 dpm
ASSAY DATE:	03/01/00	ASSAY DATE:	03/01/00

Condition: (•) Sat ( ) Unsat

Efficiency from last cal.: Pu: 18.03% Tc Ni: 29.66%
Th: 14.71% Sr: 29.36%

	HV	Vernier
Setpoints from last cal.:	1700	N/A

Source	Alpha Response CPM	Beta Response CPM	
Background:	113	113	
Pu-239:	5001		A-B XTLK:
Tc-99 Ni:		5489	B-A XTLK:
As Found Efficiencies Pu, Tc:	26.71%	29.22%	
Th-230 / Sr-90	10828 /	2948	24.63% / 23.24%
Background:			
Pu-239:			A-B XTLK:
Tc-99 Ni:			B-A XTLK:
As Found Efficiencies Pu, Tc:			
Th-230 / Sr-90	/		/

Is as found efficiency within 20% of the efficiency from the last cal? ( ) Yes (•) No (See Remarks)

Note. If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks

GRIFFIN INSTRUMENTS

PROBE #: PR101550

Date: 01/24/06

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	*B ch.*	*Net Eff.*	*A ch.*	*B ch.*	*Net Eff.*	*A ch.*	*B ch.*		
1650		4050	21.3%	4839		25.8%	125	125		
1700		5489	29.2%	5001		26.7%	113	113		
1750		6896	35.8%	5109		26.2%	311	311		
1800		7147	36.9%	5314		27.1%	356	356		

Alpha / Beta Bkg (cpm) 356 356

HV / Vernier		Pu-239	Tc-99 NI	Tc-99 SS	Th-230	Sr-90
1800	CPM:	5314	7147	10086	11683	4684
	AL Efficiencies:	**27.09%**	**36.91%**	**26.09%**	**26.04%**	**35.48%**

Th-230 Source #99TH470-1815 8/3/99 43,500 dpm Pu-239 Source #2696-00 3/1/00 18,300dpm

Tc-99 on Stainless Steel Source #99TC470-1814 8/3/99 37,300 dpm

Remarks: Calibrated w/a 2221. Previous cal was with a 2224. C-14 eff = 8879 cpm - 356 bkg= 8523/67800 dpm= 12.57% (C14 #DX295, 67,800 dpm, assay date 5/3/94)

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **01/24/07**

Performed/Reviewed by: Joanne Glenn **Date:** 1/24/2006 **Entered by:** ____ Initials

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2221 SERIAL# 126523

Owner: GI

DATE: 10/05/05 LOCATION: Griffin Inst

TECH: J. Glenn DATE LAST CAL EXPIRES: 01/02/06

Reason For Calibration: ○ Due For Calibration ○ Repair (See Remarks)

◉ Other (See Remarks) ○ Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 42386 CAL. DUE: 08/30/06

MODEL: SERIAL #: CAL DUE:

☑ Fast/Slow Switch working properly ☑ Audio Response ☑ Geotropism

CONDITION: Sat AF MECHANICAL ZERO: 0 AL MECHANICAL ZERO: 0

NEW BATTERIES: ○ Yes ◉ No BATTERY CHECK: 5.6

HV	AS FOUND HV	AS LEFT HV
600 V:	595	A.F.
1200 V:	1195	A.F.
1800 V:	1785	A.F.

AF INPUT SENSITIVITY (mV): 10 AL INPUT SENSITIVITY (mV): 10

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100		0.0%	A.F.					
	250	250		0.0%	A.F.					
	400	400		0.0%	A.F.					
x1 or x10	1000	1000		0.0%	A.F.					
	2500	2500		0.0%	A.F.					
	4000	4000		0.0%	A.F.					
x10 or x100	10K	10	K	0.0%	A.F.					
	25K	25	K	0.0%	A.F.					
	40K	40	K	0.0%	A.F.					
x100 or x1000	100K	100	K	0.0%	A.F.					
	250K	250	K	0.0%	A.F.					
	400K	400	K	0.0%	A.F.					

Is the As Found Data Within 20% of the Set Point?: ◉ Yes ○ No

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR
Log	200	200		0.0%	A.F.	
	2000	2000		0.0%	A.F.	
	20K	20	K	0.0%	A.F.	
	200K	200	K	0.0%	A.F.	

Is the As Found Data Within 20% of the Set Point?: ◉ Yes ○ No

GRIFFIN INSTRUMENTS

SERIAL # 126523

10/05/05

Audio Divide:	(•) Sat ( ) Unsat	*Push Buttons:*	(•) Sat ( ) Unsat
Lamp:	(•) Sat ( ) Unsat	Scaler/Digital:	(•) Sat ( ) Unsat

Remarks: Cal'ed early for rental.

Does Instrument Meet Final Acceptance Criteria?:	(•) Yes	( ) No
Calibration Sticker Attached?:	(•) Yes	( ) No
Date Instrument Is Due For Next Calibration:	10/05/06	

Performed/Reviewed by: Joanne Glenn Date: 10/5/2005 Entered by: _____ Initials

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-68 PROBE # PR104150

Owner: GI

DATE: 01/24/06
TECH: J. Glenn
LOCATION: Griffin Inst
DATE LAST CAL EXPIRES: 07/28/04

REASON FOR CALIBRATION:

(•) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL:	2221	SERIAL #:	184007	CAL. DUE:	01/08/07
MODEL:		SERIAL #:		CAL. DUE:	

NIST TRACEABLE SOURCES USED

SOURCE #:	2695-00	SOURCE #:	2697-00
ISOTOPE:	Tc99	ISOTOPE:	Sr90
ACTIVITY(dpm):	18400	ACTIVITY:	12,200 dpm
ASSAY DATE:	03/01/00	ASSAY DATE:	03/01/00

Condition: (•) Sat ( ) Unsat Efficiency from last cal.: Pu: 19.39% Tc Ni: 29.24% Th: 16.02% Sr: 38.66%

	HV	Vernier	
Setpoints from last cal.:	1600	N/A	
Source	**Alpha Response CPM**	**Beta Response CPM**	
Background:	24	24	
Pu-239:	4778		A-B XTLK:
Tc-99 Ni:		2187	B-A XTLK:
As Found Efficiencies Pu, Tc:	25.98%	11.76%	
Th-230 / Sr-90	9554 /	763	21.91% / 6.06%
Background:			
Pu-239:			A-B XTLK:
Tc-99 Ni:			B-A XTLK:
As Found Efficiencies Pu, Tc:			
Th-230 / Sr-90	/		/

Is as found efficiency within 20% of the efficiency from the last cal? ( ) Yes (•) No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks

GRIFFIN INSTRUMENTS

PROBE #: PR104150

Date: 01/24/06

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
1600		2187	11.8%	4778		26.0%	24	24		
1650		3849	20.6%	4724		25.5%	62	62		
1700		5278	28.0%	4932		26.3%	121	121		
1750		6716	35.4%	5084		26.7%	205	205		
1850		7094	36.9%	5418		27.9%	312	312		
1900				8082		42.4%	316	316		

Alpha / Beta Bkg (cpm) 312 312

HV / Vernier		Pu-239	Tc-99 NI	Tc-99 SS	Th-230	Sr-90
1850	CPM:	5418	7094	10310	11977	5036
	AL Efficiencies:	**27.90%**	**36.86%**	**26.80%**	**26.82%**	**38.72%**

Th-230 Source #99TH470-1815 8/3/99 43,500 dpm Pu-239 Source #2696-00 3/1/00 18,300dpm

Tc-99 on Stainless Steel Source #99TC470-1814 8/3/99 37,300 dpm

Remarks: Calibrated w/a 2221. *Previous cal was with a 2224.* C-14 Eff = 9183 cpm - 312 bkg= 8871/67800 dpm = 13.08%. (C14 #DX295, 67,800 dpm, assay date 5/3/94)

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **01/24/07**

Performed/Reviewed by: Joanne Glenn **Date:** 1/24/2006 **Entered by:** _____ *Initials*

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

ALIBRATION CERTIFICATE FOR 2221 SERIAL# 202370

Owner: GI

DATE: 04/19/06 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES: 02/28/05

Reason For Calibration: (•) Due For Calibration ( ) Repair (See Remarks)

( ) Other (See Remarks) ( ) Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 114512 CAL. DUE: 11/14/06

MODEL: SERIAL #: CAL DUE:

✓ Fast/Slow Switch working properly ☑ Audio Response ☑ Geotropism CABLE LENGTH 6'

CONDITION: Sat AF MECHANICAL ZERO: 0 AL MECHANICAL ZERO: 0

NEW BATTERIES: (•) Yes ( ) No BATTERY CHECK: 6.1

HV	AS FOUND HV	AS LEFT HV
600 V:	572	589
1200 V:	1166	1200
1800 V:	1762	1775

INPUT SENSITIVITY (mV): 4 AL INPUT SENSITIVITY (mV): 10

COUNTER

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100		0.0%	A.F.					
	250	250		0.0%	A.F.		250	0.0%		
	400	400		0.0%	A.F.					
x1 or x10	1000	1000		0.0%	A.F.					
	2500	2500		0.0%	A.F.					
	4000	4000		0.0%	A.F.					
x10 or x100	10K	10	K	0.0%	A.F.					
	25K	25	K	0.0%	A.F.					
	40K	40	K	0.0%	A.F.					
x100 or x1000	100K	100	K	0.0%	A.F.					
	250K	250	K	0.0%	A.F.					
	400K	400	K	0.0%	A.F.					

Is the As Found Data Within 20% of the Set Point?: (•) Yes ( ) No

LOG

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR
Log	200	200		0.0%	A.F.	
	2000	2000		0.0%	A.F.	
	20K	20	K	0.0%	A.F.	
	200K	200	K	0.0%	A.F.	

Is the As Found Data Within 20% of the Set Point?: (•) Yes ( ) No

GRIFFIN INSTRUMENTS

SERIAL # 202370

04/19/06

Audio Divide:	(•) Sat ( ) Unsat	Push Buttons:	(•) Sat ( ) Unsat
Lamp:	(•) Sat ( ) Unsat	Scaler/Digital:	(•) Sat ( ) Unsat

Remarks: Calibrated w/43-37 #PR190617.

Does Instrument Meet Final Acceptance Criteria?:	(•) Yes	( ) No
Calibration Sticker Attached?:	(•) Yes	( ) No
Date Instrument is Due For Next Calibration:	04/19/07	

Performed/Reviewed by: Jeanne Glenn Date: 4/19/2006 Entered by: _____ Initials

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-37 PROBE # PR190617

Owner: GI

DATE: 04/19/06 LOCATION: Griffin Inst

TECH: Joanne Glenn DATE LAST CAL EXPIRES:

REASON FOR CALIBRATION:

(•) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

CABLE LENGTH: 6' INPUT SENSITIVITY: 4 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL:	2221	SERIAL #:	202370	CAL. DUE:	04/19/07
MODEL:		SERIAL #:		CAL. DUE:	

NIST TRACEABLE SOURCES USED

SOURCE #:	2695-00	SOURCE #:	D2-091
ISOTOPE:	Tc99	ISOTOPE:	C14
ACTIVITY(dpm):	18400	ACTIVITY:	45,600 dpm
ASSAY DATE:	03/01/00	ASSAY DATE:	04/01/06

Condition: (•) Sat ( ) Unsat Efficiency from last cal.: Pu: Tc Ni:

Th: C-14:

HV Vernier

Setpoints from last cal.:

Source	Alpha Response CPM	Beta Response CPM	
Background:			
Pu-239:			A-B XTLK:
Tc-99 Ni:			B-A XTLK:

As Found Efficiencies Pu, Tc:

Th-230 / C-14	/		/
Background:			
Pu-239:			A-B XTLK:
Tc-99 Ni:			B-A XTLK:

As Found Efficiencies Pu, Tc:

Th-230 / C-14	/		/

Is as found efficiency within 20% of the efficiency from the last cal? ( ) Yes (•) No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks

GRIFFIN INSTRUMENTS

PROBE #: PR190617

Date: 04/19/06

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
1650		4181	20.6%	4235		21.0%	386	386		n/a
1700		5285	25.2%	3808		17.2%	657	657		n/a
1750		7077	33.2%	5201		23.1%	969	969		n/a
1800		7356	34.1%	5423		23.7%	1090	1090		n/a
1850		7401	33.8%	5171		21.8%	1182	1182		n/a

Alpha / Beta Bkg (cpm) 1059 1059

HV / Vernier		Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14
1800	CPM:	5341	7474	10764	9589	6408
	AL Efficiencies:	**23.40%**	**34.86%**	**26.02%**	**28.43%**	**11.73%**

Th-230 Source #99TH470-1815 4/11/06 30,000 dpm Pu-239 Source #2696-00 3/1/00 18,300dpm

Tc-99 on Stainless Steel Source #99TC470-1814 8/3/99 37,300 dpm

Remarks: No previous cal data. Calibrated w/2221 #202370.

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **04/19/07**

Performed/Reviewed by: Jeanine Glenn **Date:** 4/19/2006 **Entered by:** _____ Initials

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2221 SERIAL# 127245

Owner: GI

DATE: 03/09/06 LOCATION: Griffin Inst

TECH: J. Glenn DATE LAST CAL EXPIRES: 03/22/05

Reason For Calibration: (•) Due For Calibration ( ) Repair (See Remarks)

( ) Other (See Remarks) ( ) Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500 SERIAL #: 114512 CAL. DUE: 11/14/06

MODEL: SERIAL #: CAL DUE:

[✓] Fast/Slow Switch working properly [✓] Audio Response [✓] Geotropism CABLE LENGTH 6'

CONDITION: Sat AF MECHANICAL ZERO: 0 AL MECHANICAL ZERO: 0

NEW BATTERIES: (•) Yes ( ) No BATTERY CHECK: Sat

HV	AS FOUND HV	AS LEFT HV
600 V:	572	590
1200 V:	1185	1200
1800 V:	1760	1791

AF INPUT SENSITIVITY (mV): 10 AL INPUT SENSITIVITY (mV): 4

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100		0.0%	A.F.					
	250	250		0.0%	A.F.		249	0.4%		
	400	400		0.0%	A.F.					
x1 or x10	1000	1000		0.0%	A.F.					
	2500	2500		0.0%	A.F.					
	4000	4000		0.0%	A.F.					
x10 or x100	10K	10	K	0.0%	A.F.					
	25K	25	K	0.0%	A.F.					
	40K	40	K	0.0%	A.F.					
x100 or x1000	100K	100	K	0.0%	A.F.					
	250K	250	K	0.0%	A.F.					
	400K	400	K	0.0%	A.F.					

Is the As Found Data Within 20% of the Set Point?: (•) Yes ( ) No

SCALE	RATE CPM	AS FOUND		% ERROR	AS LEFT	% ERROR
Log	200	200		0.0%	A.F.	
	2000	2000		0.0%	A.F.	
	20K	20	K	0.0%	A.F.	
	200K	200	K	0.0%	A.F.	

Is the As Found Data Within 20% of the Set Point?: (•) Yes No

GRIFFIN INSTRUMENTS

SERIAL # 127245

03/09/06

Audio Divide:	(•) Sat ( ) Unsat	**Push Buttons:**	(•) Sat ( ) Unsat
Lamp:	(•) Sat ( ) Unsat	**Scaler/Digital:**	(•) Sat ( ) Unsat

Remarks: Calibrated as a unit w/43-37 #PR161372.

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **03/09/07**

Performed/Reviewed by: Joanne Glenn **Date:** 3/9/2006 **Entered by** _____ **Initials**

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-37 PROBE # PR161372

Owner: GI

DATE: 03/09/06 LOCATION: Griffin Inst

TECH: J. Glenn DATE LAST CAL EXPIRES: 03/22/05

REASON FOR CALIBRATION:

(•) Due For Calibration ( ) Repair (See Remarks) ( ) Other (See Remarks) ( ) Due and Repair

CABLE LENGTH: 6' INPUT SENSITIVITY: 4 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL:	2221	SERIAL #:	127245	CAL. DUE:	03/09/07
MODEL:		SERIAL #:		CAL. DUE:	

NIST TRACEABLE SOURCES USED

SOURCE #:	2695-00	SOURCE #:	2697-00
ISOTOPE:	Tc99	ISOTOPE:	Sr90
ACTIVITY(dpm):	18400	ACTIVITY:	12,200 dpm
ASSAY DATE:	03/01/00	ASSAY DATE:	03/01/00

Condition: (•) Sat ( ) Unsat Efficiency from last cal.: Pu: 15.30% Tc Ni: 15.90%

Th: 12.28% Sr: 14.47%

	HV	Vernier	
Setpoints from last cal.:	1750	N/A	
Source	Alpha Response CPM	Beta Response CPM	
Background:	0	633	
Pu-239:	4965		A-B XTLK:
Tc-99 Ni:		6529	B-A XTLK: <1%
As Found Efficiencies Pu, Tc:	27.13%	32.04%	
Th-230 / Sr-90	/		/
Background:			
Pu-239:			A-B XTLK:
Tc-99 Ni:			B-A XTLK:
As Found Efficiencies Pu, Tc:			
Th-230 / Sr-90	/		/

Is as found efficiency within 20% of the efficiency from the last cal? ( ) Yes (•) No (See Remarks)

Note If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks

GRIFFIN INSTRUMENTS

PROBE #: PR161372
Date: 03/09/06

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
1700		5783	28.9%					460		
1750		6529	32.0%					633		
1800		7335	33.4%					1190		

Alpha / Beta Bkg (cpm) 0 818

HV / Vernier		Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	Sr-90
1750	CPM:	4862	6480	9003	10583	4270
	AL Efficiencies:	**26.57%**	**30.77%**	**21.94%**	**24.33%**	**28.30%**

Th-230 Source #99TH470-1815 8/3/99 43,500 dpm Pu-239 Source #2696-00 3/1/00 18,300dpm
Tc-99 on Stainless Steel Source #99TC470-1814 8/3/99 37,300 dpm

Remarks: Replaced mylar. Calibrated w/2221 #127245.

Does Instrument Meet Final Acceptance Criteria?: (•) Yes ( ) No

Calibration Sticker Attached?: (•) Yes ( ) No

Date Instrument is Due For Next Calibration: **03/09/07**

Performed/Reviewed by: Joanne Glenn **Date:** 3/9/2006 **Entered by:** _____ **Initials**

Calibrations performed to ANSI N323A-1997 standards

Pfizer Global Research and Development
Ann Arbor Satellite Facilities
Final Status Survey Package

Building: ESP	Survey Unit: ES01	Page ____ of ____

Instructions: **Complete checked items in accordance with survey package instructions. Indicate completion of each applicable line item by initialing and dating.**

Characterization and/or Post-Remediation scans may be used for Final Status. The Project Manager must initial and date the appropriate scan requirements indicating that Characterization/Remedial Action scans meet the Data Quality Objectives and are appropriate for use as Final Status data.

Floors	☐ N/A				
	☒ Scans	Date Completed	_____	Initials	_____
	☒ Statics	Date Completed	_____	Initials	_____
	☒ Smears	Date Completed	_____	Initials	_____

Lower Walls	☐ N/A				
	☒ Scans	Date Completed	_____	Initials	_____
	☐ Statics	Date Completed	_____	Initials	_____
	☐ Smears	Date Completed	_____	Initials	_____

Upper Walls	☒ N/A				
	☐ Scans	Date Completed	_____	Initials	_____
	☐ Statics	Date Completed	_____	Initials	_____
	☐ Smears	Date Completed	_____	Initials	_____

Overhead/ Ceiling	☒ N/A				
	☐ Scans	Date Completed	_____	Initials	_____
	☐ Statics	Date Completed	_____	Initials	_____
	☐ Smears	Date Completed	_____	Initials	_____

Structures	☐ N/A				
	☒ Scans	Date Completed	_____	Initials	_____
	☒ Statics	Date Completed	_____	Initials	_____
	☒ Smears	Date Completed	_____	Initials	_____

Pfizer Global Research and Development
Ann Arbor Satellite Facilities
Final Status Survey Package

Building: ESP	**Survey Unit:** ES01	**Page** ____ **of** ____

Classification:	☐ Class 1	☒ Class 2	☐ Class 3

Applicable Nuclides of Concern:				
Nuclide	☒ ^{3}H	☒ ^{14}C		
DCGL*$_W$ *(dpm/100cm^2)	1.2E8	3.7E6		

Applicable Survey Unit Surfaces:	**% of Surface Requiring Scan Surveys**			
☒ Floors	☐ 20%	☒ 50%	☐ 100%	☐ N/A
☒ Lower walls	☐ 10%	☒ 50%	☐ 100%	☐ N/A
☐ Upper Walls	☐ 10%	☐ 50%	☐ 100%	☒ N/A
☐ Ceiling	☐ 10%	☐ 50%	☐ 100%	☒ N/A
☒ Structures (Interior and Exterior Surfaces)	☐ 10%	☒ 50%	☐ 100%	☐ N/A

Required Survey Instrumentation	**Measurement Type**	**Static Count Time**	**Scan Rate**	**Based on:**	**Typical Static MDCR**
☒ Ludlum 43-68	Beta	300 sec. 600 sec bkg.	5 inches/sec.	^{14}C	33 cpm
☒ Ludlum 43-37 Floor Monitor	Beta	60 sec. 60 sec bkg.	5 inches/sec.	^{14}C	26 cpm
☐ Other: _____ (Specify)					
☒ A Liquid Scintillation Counter shall be used for analysis of any required removable contamination measurements.					

Completed Package
Reviewed By: _____ Date: _____
Printed Name/Signature

Pfizer Global Research and Development
Ann Arbor Satellite Facilities
Final Status Survey Package

Building: ESP	**Survey Unit:** ES01		**Page** ____ **of** ____
Classification:	☐ Class 1	☒ Class 2	☐ Class 3

General Survey Instructions:

1. The calculated number of static measurement locations needed for the statistical evaluation of this survey unit is **14**. For Class 1 survey units, these locations are selected on horizontal and vertical surfaces. For Class 2 and Class 3 survey units, these locations are selected on horizontal surfaces only.

2. For Class 1 and 2 survey units, the locations are determined by using a random start point and a systematic spacing from this point. For Class 3 survey units, these locations are selected by using randomly generated coordinates to determine sample locations. *Due to this method, the actual number of locations may vary. In this case, collect the actual locations provided on the survey map whether this number is greater than or less than 14.*

3. Locate and mark the required static measurements locations using the provided survey map(s). Survey Maps have been provided with the required static measurement locations. Sufficient detail has been provided on these maps to determine all of these locations.

4. Collect a static measurement and LSC smear at each sample location. Document the results on the associated data results sheets. Additional static measurements may be taken in suspect areas at the discretion of the Project Manager or survey technician. However, these additional locations are not included in the analysis of the statistical sample set.

5. Notify the Project Manager if any static measurement or applicable removable contamination measurements exceeds the applicable investigation level.

Investigation Levels

Survey Unit Classification	Flag Direct Measurement or Sample Result When:	Flag Beta Scanning Measurement Result When:	Flag Removable Measurement Result When:
All	> 500 dpm/100 cm^2	> MDC	> 100 dpm/100 cm^2

6. Ensure that all package information is completed and signed prior to turning in this Survey Package to the Project Manager for review.

Special Survey Instructions:

Pfizer Global Research and Development
Ann Arbor Satellite Facilities
Final Status Survey Package

Location Code Description		
A unique location code shall be assigned to each individual survey location to ensure proper data management of the survey results. The following format shall be used to ensure consistency throughout the final status survey process: **BBB-RRRR-SS-M-LLL** Where:		
BBB	=	Building code. This field represents the facility. This will be the building number or an assigned area number. (3 characters) Domino Farms Facility = DFF Esperion Therapeutics Facility = ETF Ellsworth Road Facility = ERF Traverwood Facility = TWF
RRRR	=	Survey unit number. (4 characters)
SS	=	Structural surface code. This field represents the structural surface such as floor, wall, ceiling, etc. (2 characters) F1 = Floor B1 = Benchtop H1 = Fume Hood ST = Other Structures
M	=	Structural material code. This field represents the type of structural material on which a particular measurement is taken. This field is used to for data sorting and analysis. The Project Manager will provide applicable codes that will be developed during characterization. The default character shall be "M". (1 Character)
LLL	=	Numerical identification number. This field represents the survey location number. The field "001" means survey point location number 1. Numerical identifiers shall not be duplicated within the same survey unit. (3-characters)

Prepared By: _____ Date: _____
Printed Name/Signature

Preparation Reviewed By: _____ Date: _____
Printed Name/Signature

Pfizer Global Research and Development
Ann Arbor Satellite Facilities
Sample Location Worksheet

Building: ESP	Survey Unit: ES01	Class: 2	Page ___ of ___

Survey Unit Area (ft^2):	2700.655	Maximum X-axis Dimension (ft):	65
Required Number of Samples:	14	Maximum Y-axis Dimension (ft):	52

Class 1 and Class 2 Calculations			
X Axis Random Number:[1]	0.897064865	X-Axis Start Location[2]:	58
Y Axis Random Number[1]	0.749473908	Y-Axis Start Location[2]:	39
		Sampling Spacing (ft):	14

Class 3 Calculations				
Survey Location Number	Random Numbers[3]		Locations (ft)	
	X	Y	X-Coordinate	Y-Coordinate
1			0	0
2			0	0
3			0	0
4			0	0
5			0	0
6			0	0
7			0	0
8			0	0
9			0	0
10			0	0
11			0	0
12			0	0
13			0	0
14			0	0
15			0	0
16			0	0
17			0	0
18			0	0
19			0	0
20			0	0
21			0	0

Note 1: Random Numbers between 0 and 1 were generated using the =RAND() Function of MS Excel. The value of the calculation is saved using the F9 function rather than the formula to prevent recalculation during any document edit.

Note 2: X-Axis and Y-Axis start locations were calculated by multiplying the appropriate dimension by the corresponding random number.

Note 3: Due to the layout of the survey unit surfaces, some randomly chosen survey location do not fall on a particular surface. In this case, extra random coordinates are generated to ensure the minimum number of locations is obtained.

Calculations Performed By: _____ Date: _____
Printed Name/Signature

Reviewed By: _____ Date: _____
Printed Name/Signature

Pfizer Global Research and Development
Ann Arbor Satellite Facilities
Final Status Survey Package

Building: ESP	Survey Unit: ES01		Page ____ of ____
Survey Unit Description	Rooms 616, 617, 618, 619, 621		
Survey Type:	☐ Characterization	☒ Final Status	
Survey Completed by:		Date:	
Survey Completed by:		Date:	

Inst. #1	Inst Type:	Inst. S/N	Cal Due Date:	MDCR:	BKG (cpm)
	Probe Type:	Probe S/N	Inst Eff:	Count Time:	

Inst. #2	Inst Type:	Inst. S/N	Cal Due Date:	MDCR:	BKG (cpm)
	Probe Type:	Probe S/N	Inst Eff:	Count Time:	

Inst. #3	Inst Type:	Inst. S/N	Cal Due Date:	MDCR:	BKG (cpm)
	Probe Type:	Probe S/N	Inst Eff:	Count Time:	

Comments:

Reviewed By: _____ Date _____

Pfizer Global Research and Development
Ann Arbor Satellite Facilities
Final Status Survey Package

Building: ESP	Survey Unit: ES01		Page ____ of ____
Survey Unit Description	Rooms 616, 617, 618, 619, 621		
Survey Type:	☐ Characterization	☒ Final Status	
Survey Completed by:		Date:	
Survey Completed by:		Date:	

Location Code (BBB-RRRR-SS-M-LLL)	Static Measurement Survey Results			Smear Results		
	Gross Counts (cpm/probe)	Net Counts (cpm/probe)	Net Activity (dpm/100cm^2)	Net Activity (dpm/100cm^2)		
				CH 1	CH 2	CH 3
___-___-___-___						
___-___-___-___						
___-___-___-___						
___-___-___-___						
___-___-___-___						
___-___-___-___						
___-___-___-___						
___-___-___-___						
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___-___-___-___						
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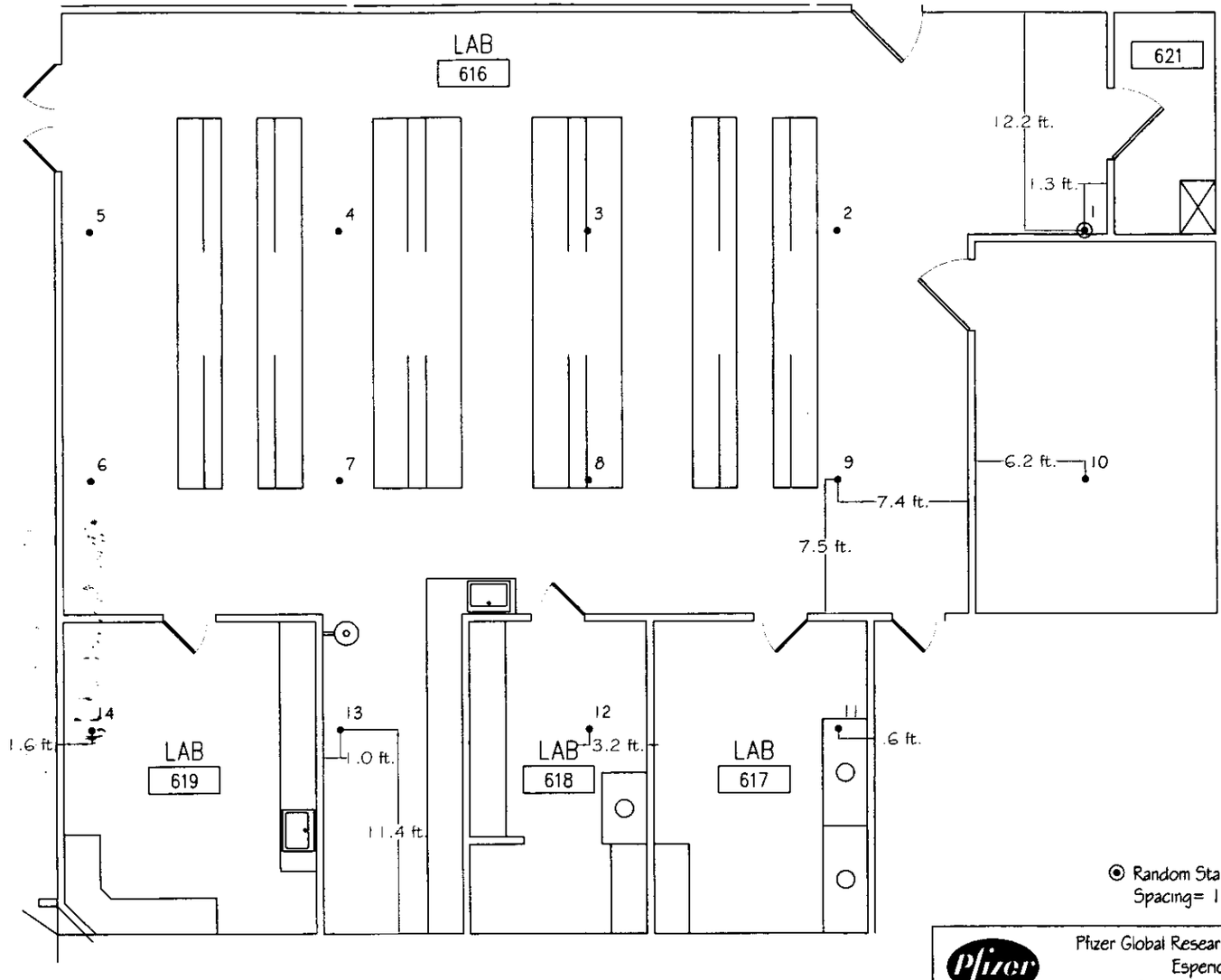
___-___-___-___						
___-___-___-___						
___-___-___-___						

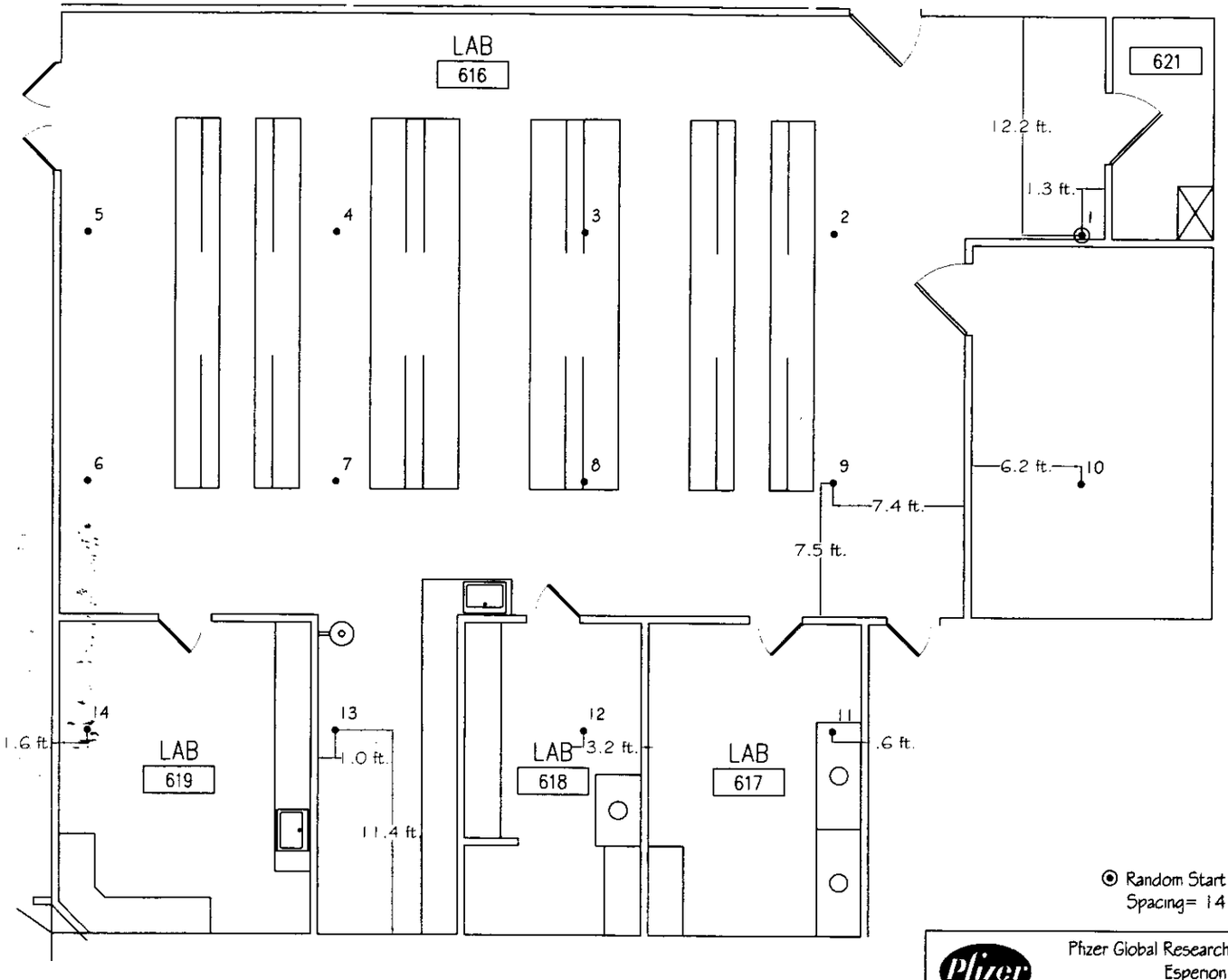
Reviewed By: _____ Date: _____



◉ Random Start Location
Spacing= 14 ft.

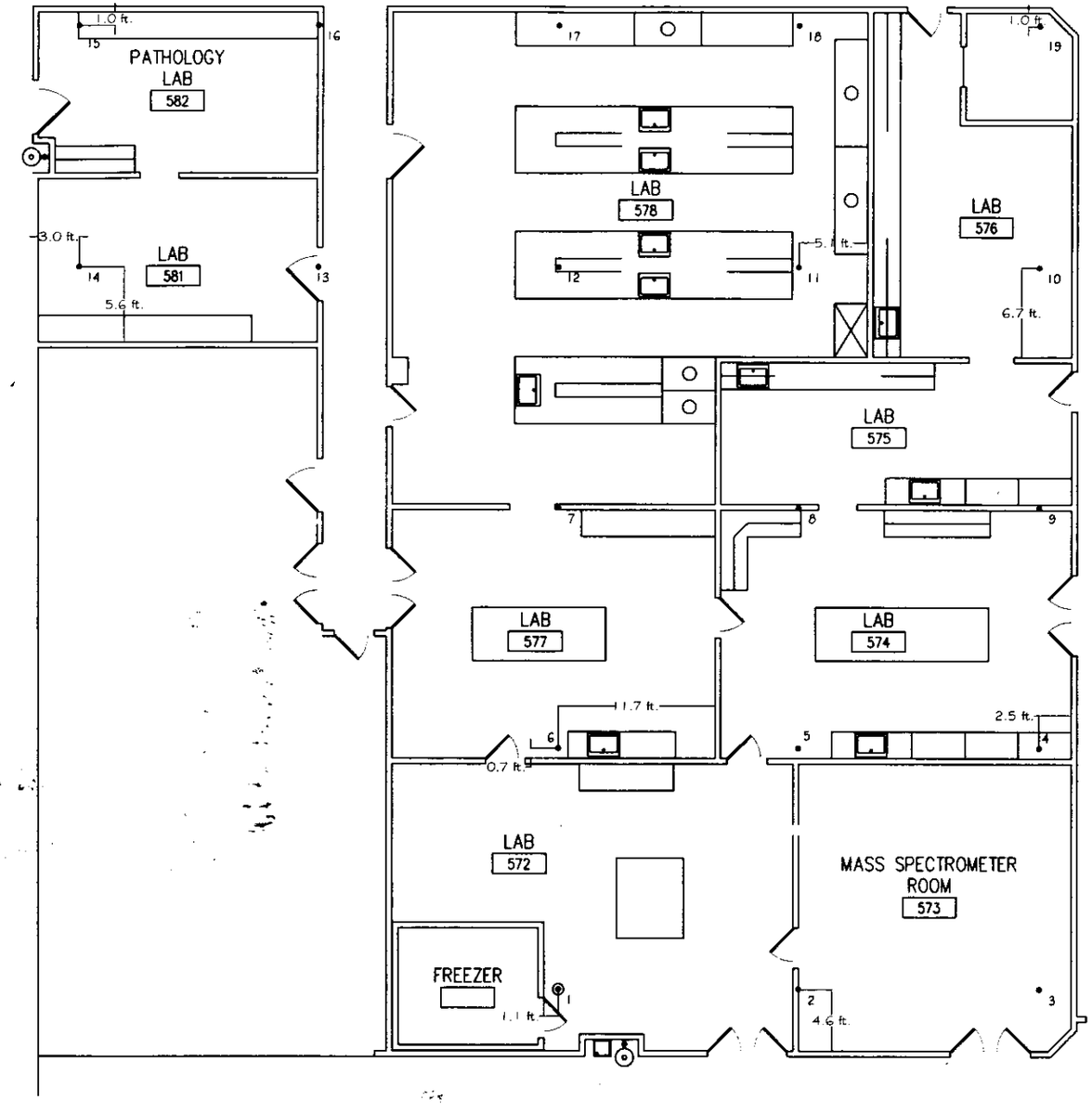
Pfizer Global Research and Development
Esperion Facilities
Final Status Survey Package

State Street Site, Survey Unit ES01 | Page: of



◉ Random Start Location
Spacing= 14 ft.

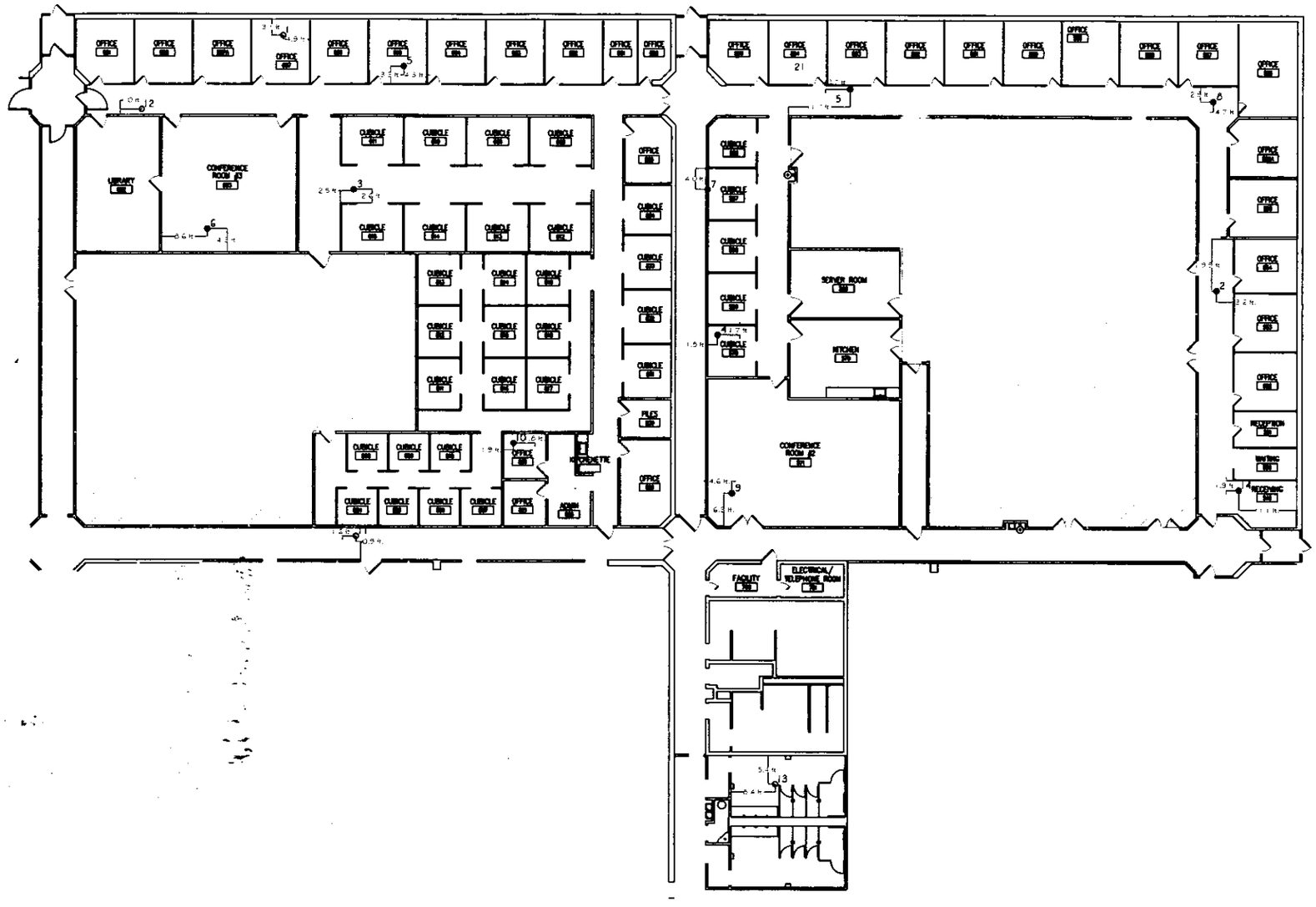
Pfizer Global Research and Development
Esperion Facilities
Final Status Report



◉ Random Start Location

Spacing 18 ft.

Pfizer Global Research and Development
Esperion Facilities
Final Status Report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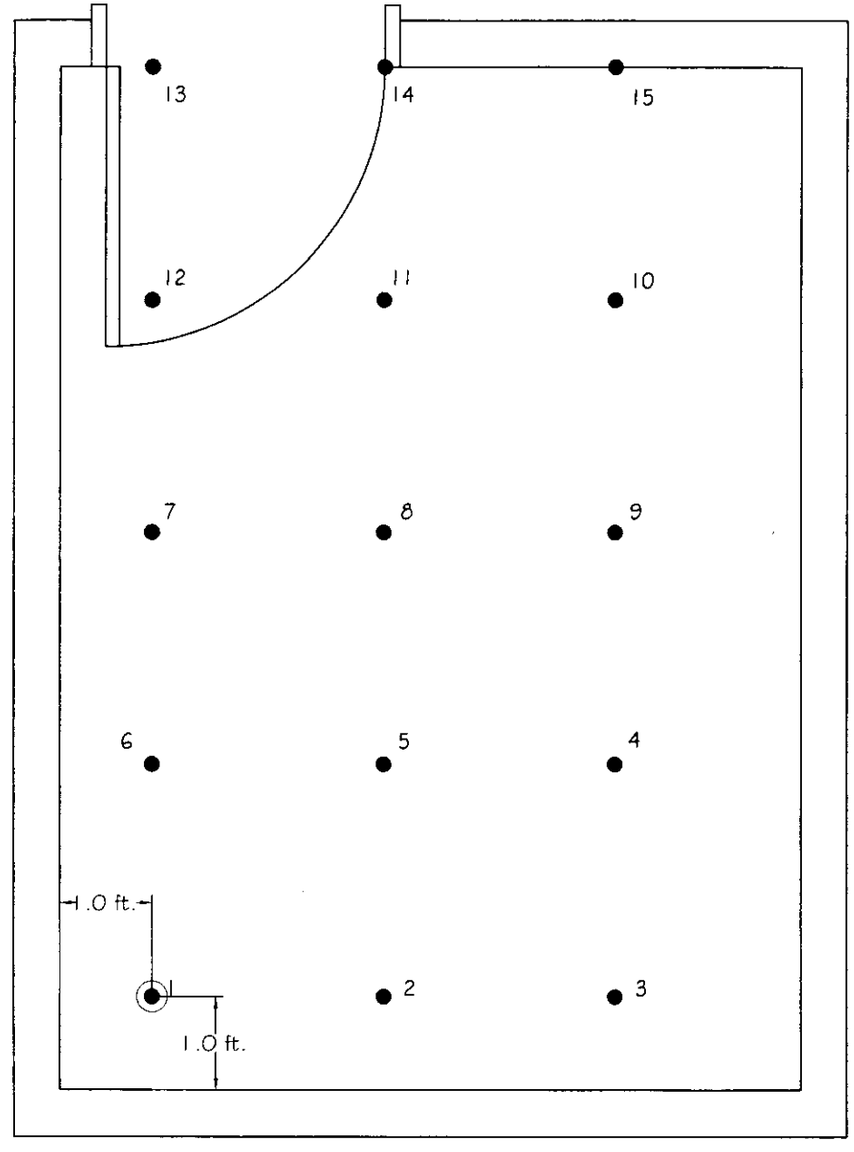
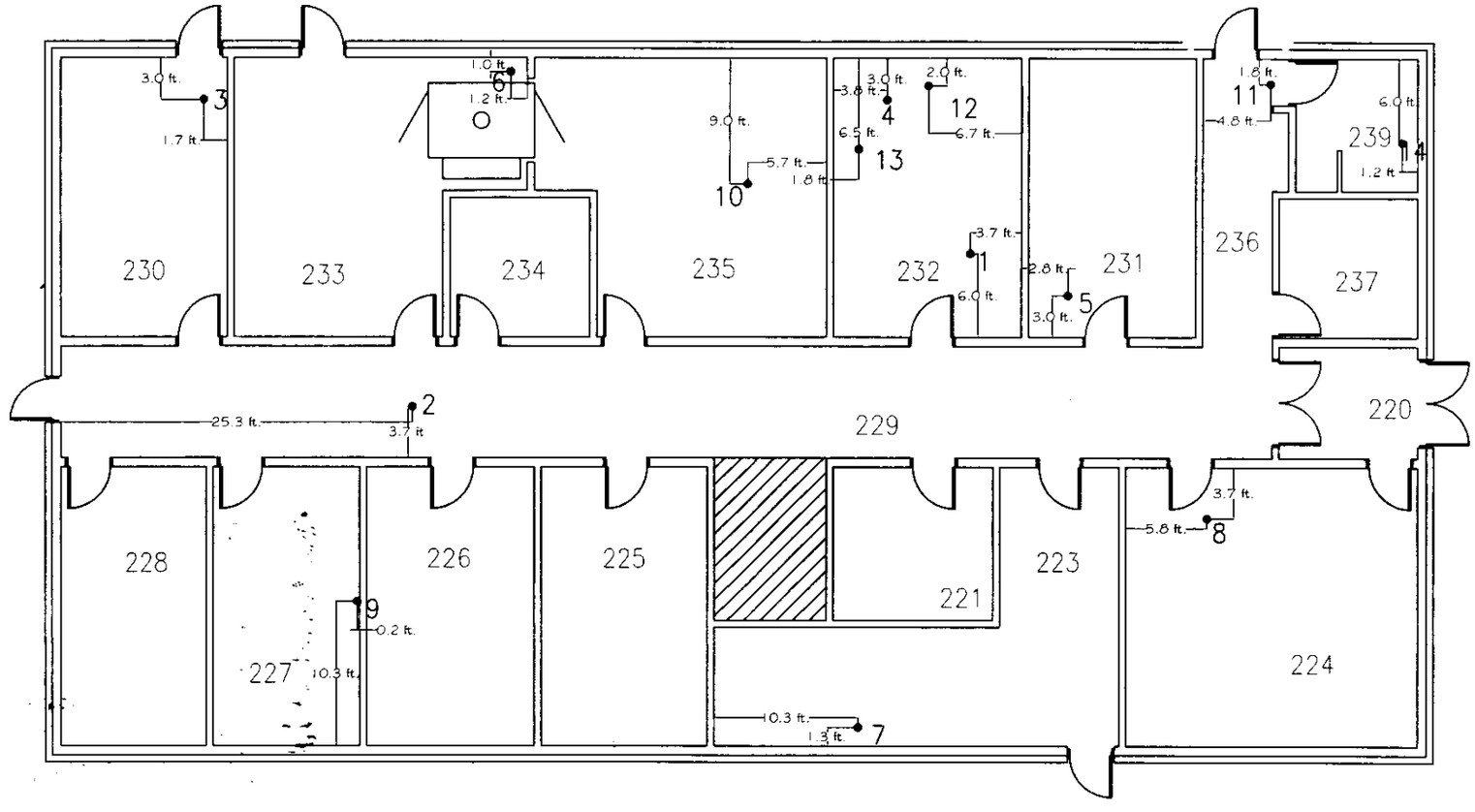
CONFERENCE ROOM #3
SERVER ROOM
KITCHEN
CONFERENCE ROOM #2
FACILITY
ELECTRICAL / TELEPHONE ROOM



Random Start Location

Spacing= 3 ft.

Pfizer Global Research and Development
Esperion Facilities
Final Status Report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14
3.0 ft.
1.7 ft.
1.0 ft.
1.2 ft.
9.0 ft.
5.7 ft.
1.8 ft.
3.0 ft.
3.8 ft.
6.5 ft.
2.0 ft.
6.7 ft.
3.7 ft.
6.0 ft.
2.8 ft.
3.0 ft.
1.8 ft.
4.8 ft.
6.0 ft.
1.2 ft.
25.3 ft.
3.7 ft
3.7 ft.
5.8 ft.
0.2 ft.
10.3 ft.
10.3 ft.
1.3 ft.

Surface and Structure Final Status Survey Results

Building ERF Survey Unit ER01 Class 2

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ERF-ER01-F1-C-001	700 ± 1060	286	17 ± 27	43	27 ± 15	31
ERF-ER01-F1-C-002	882 ± 1093	286	32 ± 29	43	8 ± 11	31
ERF-ER01-F1-C-003	758 ± 1071	286	23 ± 28	43	17 ± 13	31
ERF-ER01-F1-C-004	949 ± 1105	286	40 ± 31	43	29 ± 15	31
ERF-ER01-F1-C-005	579 ± 1037	286	16 ± 27	43	24 ± 14	31
ERF-ER01-F1-C-006	967 ± 1108	286	31 ± 29	43	22 ± 14	31
ERF-ER01-F1-C-007	712 ± 1062	286	21 ± 28	43	16 ± 13	31
ERF-ER01-F1-C-008	976 ± 1110	286	18 ± 27	43	16 ± 13	31
ERF-ER01-F1-C-009	1306 ± 1167	286	11 ± 26	43	13 ± 12	31
ERF-ER01-F1-C-010	758 ± 1071	286	16 ± 27	43	30 ± 15	31
ERF-ER01-F1-C-011	897 ± 1096	286	30 ± 29	43	11 ± 12	31
ERF-ER01-F1-C-012	1076 ± 1128	286	34 ± 30	43	15 ± 12	31
ERF-ER01-F1-C-013	1009 ± 1116	286	18 ± 27	43	25 ± 14	31
ERF-ER01-F1-C-014	788 ± 1076	286	15 ± 26	43	17 ± 13	31
ERF-ER01-F1-C-015	991 ± 1113	286	16 ± 27	43	30 ± 15	31
Summary for Survey Unit # ER01 (15 detail records)						
Average	890		23		20	
Minimum	579		11		8	
Maximum	1306		40		30	
Standard Deviation	181		9		7	

Note: All results are in units of dpm/100cm².

Surface and Structure Final Status Survey Results

Building ERF Survey Unit ER02 Class 3

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ERF-ER02-F1-C-001	724 ± 1064	286	27 ± 29	43	12 ± 12	31
ERF-ER02-F1-C-002	812 ± 1080	286	9 ± 25	43	19 ± 13	31
ERF-ER02-F1-C-003	815 ± 1081	286	29 ± 29	43	18 ± 13	31
ERF-ER02-F1-C-004	767 ± 1072	286	29 ± 29	43	15 ± 12	31
ERF-ER02-F1-C-005	906 ± 1098	286	35 ± 30	43	24 ± 14	31
ERF-ER02-F1-C-006	1079 ± 1128	286	13 ± 26	43	24 ± 14	31
ERF-ER02-F1-C-007	1021 ± 1118	286	27 ± 29	43	14 ± 12	31
ERF-ER02-F1-C-008	748 ± 1069	286	20 ± 27	43	9 ± 11	31
ERF-ER02-F1-C-009	761 ± 1071	286	16 ± 27	43	21 ± 14	31
ERF-ER02-F1-C-010	700 ± 1060	286	27 ± 29	43	18 ± 13	31
ERF-ER02-F1-C-011	679 ± 1056	286	21 ± 28	43	16 ± 13	31
ERF-ER02-F1-C-012	873 ± 1092	286	35 ± 30	43	18 ± 13	31
ERF-ER02-F1-C-013	433 ± 1009	286	25 ± 28	43	25 ± 14	31
ERF-ER02-F1-T-014	-79 ± 903	286	24 ± 28	43	31 ± 15	31
Summary for Survey Unit # ER02 (14 detail records)						
Average	731		24		19	
Minimum	-79		9		9	
Maximum	1079		35		31	
Standard Deviation	280		8		6	
Summary for Building # ERF (29 detail records)						
Avg	813		23		19	
Min	-79		9		8	
Max	1306		40		31	

Note: All results are in units of dpm/100cm².

Surface and Structure Final Status Survey Results

Building ESP Survey Unit ES01 Class 2

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ESP-ES01-F1-T-001	115 ± 884	267	23 ± 28	43	24 ± 14	31
ESP-ES01-F1-T-002	94 ± 879	267	17 ± 27	43	21 ± 14	31
ESP-ES01-B1-M-003	-218 ± 806	267	17 ± 27	43	26 ± 14	31
ESP-ES01-F1-T-004	188 ± 900	267	22 ± 28	43	11 ± 12	31
ESP-ES01-F1-T-005	27 ± 864	267	21 ± 28	43	18 ± 13	31
ESP-ES01-F1-T-006	18 ± 862	267	25 ± 28	43	11 ± 12	31
ESP-ES01-F1-T-007	12 ± 861	267	23 ± 28	43	17 ± 13	31
ESP-ES01-B1-M-008	-197 ± 811	267	18 ± 27	43	16 ± 13	31
ESP-ES01-F1-T-009	155 ± 893	267	11 ± 26	43	16 ± 13	31
ESP-ES01-F1-T-010	345 ± 934	267	32 ± 29	43	13 ± 12	31
ESP-ES01-H1-M-011	-376 ± 767	267	30 ± 29	43	16 ± 13	31
ESP-ES01-F1-T-012	-176 ± 817	267	33 ± 30	43	17 ± 13	31
ESP-ES01-S1-M-013	-267 ± 794	267	23 ± 28	43	23 ± 14	31
ESP-ES01-F1-T-014	-91 ± 837	267	14 ± 26	43	21 ± 14	31
Summary for Survey Unit # ES01 (14 detail records)						
Average	-26		22		18	
Minimum	-376		11		11	
Maximum	345		33		26	
Standard Deviation	202		6		5	

Note: All results are in units of dpm/100cm².

Surface and Structure Final Status Survey Results

Building ESP Survey Unit ES02 Class 2

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ESP-ES02-F1-T-001	-24 ± 912	285	21 ± 28	43	20 ± 13	31
ESP-ES02-F1-C-002	576 ± 1034	285	32 ± 29	43	20 ± 13	31
ESP-ES02-F1-C-003	906 ± 1095	285	18 ± 27	43	22 ± 14	31
ESP-ES02-B1-M-004	-491 ± 805	285	28 ± 29	43	17 ± 13	31
ESP-ES02-F1-T-005	-55 ± 905	285	22 ± 28	43	13 ± 12	31
ESP-ES02-B1-M-006	-367 ± 835	285	19 ± 27	43	23 ± 14	31
ESP-ES02-B1-M-007	-197 ± 874	285	24 ± 28	43	20 ± 13	31
ESP-ES02-F1-T-008	139 ± 947	285	22 ± 28	43	22 ± 14	31
ESP-ES02-F1-T-009	-36 ± 909	285	20 ± 27	43	21 ± 14	31
ESP-ES02-F1-T-010	33 ± 924	285	46 ± 32	43	15 ± 12	31
ESP-ES02-F1-T-011	-164 ± 881	285	13 ± 26	43	23 ± 14	31
ESP-ES02-B1-M-012	-406 ± 825	285	37 ± 30	43	19 ± 13	31
ESP-ES02-F1-T-013	-21 ± 913	285	23 ± 28	43	19 ± 13	31
ESP-ES02-F1-T-014	-230 ± 866	285	24 ± 28	43	22 ± 14	31
ESP-ES02-F1-T-015	85 ± 935	285	34 ± 30	43	18 ± 13	31
ESP-ES02-F1-T-016	-115 ± 892	285	16 ± 27	43	29 ± 15	31
ESP-ES02-B1-M-017	-406 ± 825	285	35 ± 30	43	12 ± 12	31
ESP-ES02-F1-T-018	-224 ± 868	285	32 ± 29	43	14 ± 12	31
ESP-ES02-F1-T-019	-85 ± 899	285	18 ± 27	43	26 ± 14	31
Summary for Survey Unit # ES02 (19 detail records)						
Average	-57		25		20	
Minimum	-491		13		12	
Maximum	906		46		29	
Standard Deviation	335		8		4	

Note: All results are in units of dpm/100cm².

Surface and Structure Final Status Survey Results

Building ESP Survey Unit ES03 Class 3

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ESP-ES03-F1-A-001	221 ± 908	268	11 ± 26	43	16 ± 13	31
ESP-ES03-F1-A-002	130 ± 888	268	12 ± 26	43	17 ± 13	31
ESP-ES03-F1-A-003	36 ± 867	268	25 ± 28	43	19 ± 13	31
ESP-ES03-F1-A-004	218 ± 907	268	14 ± 26	43	14 ± 12	31
ESP-ES03-F1-A-005	-36 ± 850	268	27 ± 29	43	13 ± 12	31
ESP-ES03-F1-A-006	109 ± 883	268	29 ± 29	43	20 ± 13	31
ESP-ES03-F1-A-007	-58 ± 845	268	12 ± 26	43	20 ± 13	31
ESP-ES03-F1-A-008	-3 ± 858	268	20 ± 27	43	17 ± 13	31
ESP-ES03-F1-A-009	18 ± 863	268	33 ± 30	43	23 ± 14	31
ESP-ES03-B1-M-010	-197 ± 812	268	21 ± 28	43	18 ± 13	31
ESP-ES03-F1-A-011	18 ± 863	268	18 ± 27	43	15 ± 12	31
ESP-ES03-F1-A-012	179 ± 899	268	26 ± 28	43	14 ± 12	31
ESP-ES03-F1-T-013	164 ± 896	268	32 ± 29	43	16 ± 13	31
ESP-ES03-F1-A-014	0 ± 859	268	14 ± 26	43	28 ± 15	31
Summary for Survey Unit # ES03 (14 detail records)						
Average	57		21		18	
Minimum	-197		11		13	
Maximum	221		33		28	
Standard Deviation	119		8		4	
Summary for Building # ESP (47 detail records)						
Avg	-14		23		19	
Min	-491		11		11	
Max	906		46		29	

Note: All results are in units of dpm/100cm².

Building System Survey Results

Building ERF Survey Unit DR01 Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ERF-DR01-D1-M-001	N/A	N/A	28 ± 29	43	21 ± 14	31
ERF-DR01-D1-M-002	N/A	N/A	19 ± 27	43	24 ± 14	31
ERF-DR01-D1-M-003	N/A	N/A	19 ± 27	43	23 ± 14	31
ERF-DR01-D1-M-004	N/A	N/A	25 ± 28	43	20 ± 13	31
ERF-DR01-D1-M-005	N/A	N/A	38 ± 30	43	24 ± 14	31
ERF-DR01-D1-M-006	N/A	N/A	34 ± 30	43	17 ± 13	31
ERF-DR01-D1-M-007	N/A	N/A	24 ± 28	43	16 ± 13	31
ERF-DR01-D1-M-008	N/A	N/A	16 ± 27	43	26 ± 14	31
ERF-DR01-D1-M-009	N/A	N/A	46 ± 32	43	30 ± 15	31
ERF-DR01-D1-M-010	N/A	N/A	23 ± 28	43	22 ± 14	31
ERF-DR01-D1-M-011	N/A	N/A	26 ± 28	43	31 ± 15	31
ERF-DR01-D1-M-012	N/A	N/A	14 ± 26	43	27 ± 15	31
ERF-DR01-D1-M-013	N/A	N/A	34 ± 30	43	26 ± 14	31
ERF-DR01-D1-M-014	N/A	N/A	32 ± 29	43	13 ± 12	31
ERF-DR01-D1-M-015	N/A	N/A	21 ± 28	43	28 ± 15	31
ERF-DR01-D1-M-016	N/A	N/A	46 ± 32	43	11 ± 12	31
ERF-DR01-D1-M-017	N/A	N/A	29 ± 29	43	17 ± 13	31
ERF-DR01-D1-M-018	N/A	N/A	32 ± 29	43	21 ± 14	31
ERF-DR01-D1-M-019	N/A	N/A	30 ± 29	43	11 ± 12	31
ERF-DR01-D1-M-020	N/A	N/A	24 ± 28	43	20 ± 13	31
ERF-DR01-D1-M-021	N/A	N/A	21 ± 28	43	23 ± 14	31
ERF-DR01-D1-M-022	N/A	N/A	15 ± 26	43	15 ± 12	31
ERF-DR01-D1-M-023	N/A	N/A	52 ± 33	43	12 ± 12	31
Summary for Survey Unit # DR01 (23 detail records)						
Average			28		21	
Minimum			14		11	
Maximum			52		31	
Standard Deviation			10		6	

Note: All results are in units of dpm/100cm².

Building System Survey Results

Building ERF Survey Unit VE01 Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ERF-VE01-E1-M-001	N/A	N/A	36 ± 30	43	11 ± 12	31
ERF-VE01-E1-M-002	N/A	N/A	19 ± 27	43	28 ± 15	31
ERF-VE01-E1-M-003	N/A	N/A	26 ± 28	43	21 ± 14	31
ERF-VE01-E1-M-004	N/A	N/A	20 ± 27	43	25 ± 14	31
ERF-VE01-E1-M-005	N/A	N/A	23 ± 28	43	21 ± 14	31
ERF-VE01-E1-M-006	N/A	N/A	25 ± 28	43	13 ± 12	31
ERF-VE01-E1-M-007	N/A	N/A	25 ± 28	43	16 ± 13	31
ERF-VE01-E1-M-008	N/A	N/A	43 ± 31	43	22 ± 14	31
ERF-VE01-E1-M-009	N/A	N/A	25 ± 28	43	9 ± 11	31
ERF-VE01-E1-M-010	N/A	N/A	21 ± 28	43	9 ± 11	31
ERF-VE01-E1-M-011	N/A	N/A	16 ± 27	43	15 ± 12	31
ERF-VE01-E1-M-012	N/A	N/A	25 ± 28	43	19 ± 13	31
ERF-VE01-E1-M-013	N/A	N/A	30 ± 29	43	13 ± 12	31
ERF-VE01-E1-M-014	N/A	N/A	19 ± 27	43	20 ± 13	31
ERF-VE01-E1-M-015	N/A	N/A	22 ± 28	43	14 ± 12	31
ERF-VE01-E1-M-016	N/A	N/A	29 ± 29	43	21 ± 14	31
ERF-VE01-E1-M-017	N/A	N/A	15 ± 26	43	20 ± 13	31
Summary for Survey Unit # VE01 (17 detail records)						
Average			25		17	
Minimum			15		9	
Maximum			43		28	
Standard Deviation			7		6	
Summary for Building # ERF (40 detail records)						
Avg			27		19	
Min			14		9	
Max			52		31	

Note: All results are in units of dpm/100cm².

Building System Survey Results

Building ESP Survey Unit DR01 Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ESP-DR01-D1-M-001	N/A	N/A	33 ± 30	43	19 ± 13	31
ESP-DR01-D1-M-002	N/A	N/A	20 ± 27	43	22 ± 14	31
ESP-DR01-D1-M-003	N/A	N/A	15 ± 26	43	19 ± 13	31
ESP-DR01-D1-M-004	N/A	N/A	14 ± 26	43	18 ± 13	31
ESP-DR01-D1-M-005	N/A	N/A	42 ● 31	43	35 ± 16	31
ESP-DR01-D1-M-006	N/A	N/A	38 ± 30	43	18 ± 13	31
ESP-DR01-D1-M-007	N/A	N/A	36 ± 30	43	14 ± 12	31
ESP-DR01-D1-M-008	N/A	N/A	34 ± 30	43	15 ± 12	31
ESP-DR01-D1-M-009	N/A	N/A	14 ± 26	43	17 ± 13	31
ESP-DR01-D1-M-010	N/A	N/A	13 ± 26	43	22 ± 14	31
ESP-DR01-D1-M-011	N/A	N/A	14 ± 26	43	13 ± 12	31
ESP-DR01-D1-M-012	N/A	N/A	30 ± 29	43	19 ± 13	31
ESP-DR01-D1-M-013	N/A	N/A	16 ± 27	43	23 ± 14	31
ESP-DR01-D1-M-014	N/A	N/A	19 ± 27	43	23 ± 14	31
ESP-DR01-D1-M-015	N/A	N/A	22 ± 28	43	15 ± 12	31
ESP-DR01-D1-M-016	N/A	N/A	22 ± 28	43	22 ± 14	31
ESP-DR01-D1-M-017	N/A	N/A	13 ± 26	43	13 ± 12	31
ESP-DR01-D1-M-018	N/A	N/A	40 ± 31	43	10 ± 11	31
ESP-DR01-D1-M-019	N/A	N/A	11 ± 26	43	27 ± 15	31
ESP-DR01-D1-M-020	N/A	N/A	21 ± 28	43	8 ± 11	31
ESP-DR01-D1-M-021	N/A	N/A	19 ± 27	43	13 ± 12	31
ESP-DR01-D1-M-022	N/A	N/A	21 ± 28	43	14 ± 12	31
ESP-DR01-D1-M-023	N/A	N/A	33 ± 30	43	10 ± 11	31
ESP-DR01-D1-M-024	N/A	N/A	10 ± 26	43	12 ± 12	31
ESP-DR01-D1-M-025	N/A	N/A	31 ± 29	43	11 ± 12	31
ESP-DR01-D1-M-026	N/A	N/A	33 ± 30	43	18 ± 13	31
ESP-DR01-D1-M-027	N/A	N/A	10 ± 26	43	19 ± 13	31
ESP-DR01-D1-M-028	N/A	N/A	16 ± 27	43	22 ± 14	31
ESP-DR01-D1-M-029	N/A	N/A	25 ± 28	43	16 ± 13	31
ESP-DR01-D1-M-030	N/A	N/A	19 ± 27	43	21 ± 14	31
ESP-DR01-D1-M-031	N/A	N/A	24 ± 28	43	19 ± 13	31

Note: All results are in units of dpm/100cm².

Building System Survey Results

Building ESP Survey Unit DR01 Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ESP-DR01-D1-M-032	N/A	N/A	29 ± 29	43	10 ± 11	31
ESP-DR01-D1-M-033	N/A	N/A	25 ± 28	43	17 ± 13	31
ESP-DR01-D1-M-034	N/A	N/A	24 ± 28	43	23 ± 14	31
ESP-DR01-D1-M-035	N/A	N/A	23 ± 28	43	15 ± 12	31
ESP-DR01-D1-M-036	N/A	N/A	3 ± 24	43	23 ± 14	31
ESP-DR01-D1-M-037	N/A	N/A	28 ± 29	43	18 ± 13	31
ESP-DR01-D1-M-038	N/A	N/A	17 ± 27	43	12 ± 12	31
ESP-DR01-D1-M-039	N/A	N/A	31 ± 29	43	14 ± 12	31
ESP-DR01-D1-M-040	N/A	N/A	21 ± 28	43	11 ± 12	31
ESP-DR01-D1-M-041	N/A	N/A	12 ± 26	43	16 ± 13	31
ESP-DR01-D1-M-042	N/A	N/A	27 ± 29	43	17 ± 13	31
Summary for Survey Unit # DR01 (42 detail records)						
Average			23		17	
Minimum			3		8	
Maximum			42		35	
Standard Deviation			9		5	

Note: All results are in units of dpm/100cm².

Building System Survey Results

Building ESP **Survey Unit VE01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ESP-VE01-E1-M-001	N/A	N/A	43 ± 31	43	19 ± 13	31
ESP-VE01-E1-M-002	N/A	N/A	29 ± 29	43	17 ± 13	31
ESP-VE01-E1-M-003	N/A	N/A	31 ± 29	43	18 ± 13	31
ESP-VE01-E1-M-004	N/A	N/A	31 ± 29	43	26 ± 14	31
ESP-VE01-E1-M-005	N/A	N/A	26 ± 28	43	21 ± 14	31
ESP-VE01-E1-M-006	N/A	N/A	25 ± 28	43	16 ± 13	31
ESP-VE01-E1-M-007	N/A	N/A	24 ± 28	43	11 ± 12	31
ESP-VE01-E1-M-008	N/A	N/A	30 ± 29	43	21 ± 14	31
ESP-VE01-E1-M-009	N/A	N/A	23 ± 28	43	14 ± 12	31
ESP-VE01-E1-M-010	N/A	N/A	10 ± 26	43	25 ± 14	31
ESP-VE01-E1-M-011	N/A	N/A	29 ± 29	43	22 ± 14	31
ESP-VE01-E1-M-012	N/A	N/A	35 ± 30	43	20 ± 13	31
ESP-VE01-E1-M-013	N/A	N/A	31 ± 29	43	15 ± 12	31
ESP-VE01-E1-M-014	N/A	N/A	20 ± 27	43	18 ± 13	31
ESP-VE01-E1-M-015	N/A	N/A	45 ± 32	43	31 ± 15	31
ESP-VE01-E1-M-016	N/A	N/A	37 ± 30	43	13 ± 12	31
ESP-VE01-E1-M-017	N/A	N/A	24 ± 28	43	24 ± 14	31
ESP-VE01-E1-M-018	N/A	N/A	29 ± 29	43	11 ± 12	31
ESP-VE01-E1-M-019	N/A	N/A	13 ± 26	43	24 ± 14	31
ESP-VE01-E1-M-020	N/A	N/A	20 ± 27	43	17 ± 13	31
ESP-VE01-E1-M-021	N/A	N/A	48 ± 32	43	11 ± 12	31
ESP-VE01-E1-M-022	N/A	N/A	27 ± 29	43	9 ± 11	31
ESP-VE01-E1-M-023	N/A	N/A	52 ± 33	43	11 ± 12	31
ESP-VE01-E1-M-024	N/A	N/A	51 ± 32	43	13 ± 12	31
ESP-VE01-E1-M-025	N/A	N/A	30 ± 29	43	27 ± 15	31
ESP-VE01-E1-M-026	N/A	N/A	43 ± 31	43	20 ± 13	31
ESP-VE01-E1-M-027	N/A	N/A	29 ± 29	43	22 ± 14	31
ESP-VE01-E1-M-028	N/A	N/A	43 ± 31	43	6 ± 10	31
ESP-VE01-E1-M-029	N/A	N/A	18 ± 27	43	13 ± 12	31
ESP-VE01-E1-M-030	N/A	N/A	23 ± 28	43	25 ± 14	31
ESP-VE01-E1-M-031	N/A	N/A	16 ± 27	43	18 ± 13	31

Note: All results are in units of dpm/100cm².

Building System Survey Results

Building ESP Survey Unit VE01 Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
ESP-VE01-E1-M-032	N/A	N/A	27 ± 29	43	12 ± 12	31
ESP-VE01-E1-M-033	N/A	N/A	24 ± 28	43	12 ± 12	31
ESP-VE01-E1-M-034	N/A	N/A	40 ± 31	43	18 ± 13	31
ESP-VE01-E1-M-035	N/A	N/A	18 ± 27	43	16 ± 13	31
Summary for Survey Unit # VE01 (35 detail records)						
Average			30		18	
Minimum			10		6	
Maximum			52		31	
Standard Deviation			11		6	
Summary for Building # ESP (77 detail records)						
Avg			26		17	
Min			3		6	
Max			52		35	

Note: All results are in units of dpm/100cm².

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ANN ARBOR, MI 48105
UNITED STATES US

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PATRICE PELKE
2443 WARRENVILLE ROAD
SUITE # 210
LISLE, IL 60532

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