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Global Research & Development

February 14, 2006

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

Subject: License Amendment Request to Remove 24 Frank Lloyd Wright Drive (Domino Farms Facility) from NRC License Number 21-01443-06

Dear Ms. Pelke:

This letter is to request an amendment to radioactive materials license number 21-01443-06 authorizing unrestricted release of the Domino Farms Facility for return to the landlord. The facility is located at Building V, Domino Farms, 24 Frank Lloyd Wright Drive, Ann Arbor, MI.

Licensed activities have ceased and the facility has undergone decommissioning. Decommissioning was conducted under the provisions of the Pfizer 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 200 dpm/100cm^2 removable activity. Dose modeling indicates that the TEDE to the maximally exposed individual is < 0.002 mrem/year (0.008% 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 734-622-4467.

Sincerely yours,

Carol Lentz

Carol Lentz
Radiation Safety Officer

Domino Farms Facility
Decommissioning Final Status Report
NRC License Number: 21-01443-06

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

February 13, 2006

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

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Table of Contents

1.0 Introduction....1
2.0 Site Description....1
2.1 Historical Site Assessments....2
2.2 Potential Contaminants....2
2.3 License History....2
2.4 Operational and Closeout Radiological Surveys....3
2.5 Previous Decommissioning Activities....4
3.0 Release Criteria....4
4.0 Derived Concentration Guideline Levels....4
5.0 ALARA Goal....4
6.0 ALARA Analysis....5
7.0 Area Classifications....5
8.0 Survey Units....6
9.0 Survey Instrumentation....6
9.1 Instrument Specifications....6
9.2 Instrument Calibration....7
9.3 Functional Checks....7
9.4 Determination of Counting Times and Minimum Detectable Concentrations....7
9.4.1 Static Counting....7
9.4.2 Beta Ratemeter Scanning....8
9.4.3 Smear Counting....9
9.5 Determination of Uncertainty....10
10.0 Data Quality Objectives....11
11.0 Characterization Surveys....12
12.0 Remediation....12
12.1 Building Structures and Surfaces....12
12.2 Drain System....12
12.3 Ventilation Exhaust System....13
12.4 Vacuum System....13
13.0 Design and Performance of Final Status Surveys....14
13.1 Background Determination....14
13.2 Surface Scans....15
13.3 Total Surface Activity Measurements....15
13.3.1 Determining the Number of Samples Needed....15
13.3.2 Determining Class 1 and Class 2 Sample Locations....18
13.3.3 Determining Class 3 Sample Locations....18
13.4 Removable Contamination Measurements....18
13.5 Building System Surveys....19
13.6 Survey Documentation....19
13.7 Data Validation....20
14.0 Data Quality Assessment and Interpretation of Survey Results....21
14.1 Preliminary Data Review....21
14.2 Determining Compliance for Building Surfaces and Structures....23
14.3 Determining Compliance for Building Systems....24
15.0 Quality Assurance Surveys....24
16.0 References....24
17.0 Certification....24

Appendices

Appendix A – Building Floor Plan
Appendix B – Survey Unit Floor Plan
Appendix C – Instrument Calibration Records
Appendix D – Sample Final Status Survey Package
Appendix E – Surface and Structure Measurement Location Maps
Appendix F – Structural Surfaces Final Status Survey Results
Appendix G – Building Systems Final Status Survey Results

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 the rented Domino Farms Facility located at Building V, Domino Farms, 24 Frank Lloyd Wright Drive, Ann Arbor, MI. Principal activities involving radioactive materials have ceased and licensed activities formerly performed at the facility have been relocated to other licensed Pfizer facilities as part of Pfizer's reorganization and consolidation plan. The facility has 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 removal of the Domino Farms Facility from the main campus NRC license (No. 21-01443-06).

Radioactive materials used at the facility consisted of a variety of radionuclides for research. Primarily these included H-3, C-14, P-32, P-33, S-35, Ca-45 and I-125. 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.

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 Domino Farms site were performed from January 30 to February 3, 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 results of the surface and structure final status surveys, the TEDE to a maximally exposed individual based on the Building Occupancy Scenario of the NRC DandD Version 2.1 is < 0.002 mrem/year (0.008% of the NRC release criterion of 25 mrem/yr).** All survey unit means were less than their applicable minimum detectable concentrations. The previously stated exposure rate is based on the survey unit with the highest average activity.

2.0 Site Description

The Domino Farms facility is a rented portion of a large commercial building containing other businesses. The facility is approximately 28,000 ft^2 and is on the first floor of a large three-story steel frame building with a basement. The facility has a brick exterior, sheetrock interior walls and poured concrete floors. Laboratory, storage room and hallway floors are covered with vinyl tile or vinyl sheet. Offices and conference rooms have carpeted floors. The Domino Farms site was initially licensed in 1991 and the operational history is well known. Due to the nature of the radiological operations conducted, only the interior portions of the facility and system exhausts were considered for decommissioning. A building floor plan is 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
Ca-45	165 d	2.8E6	DandD
I-125	60.2 d	6.6E5	DandD

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

Licensed activities were first authorized at the Domino Farms facility by Amendment 42 to NRC License #21-01443-06 on May 29, 1991. Subsequent amendments did not affect operations at the Domino Farms facility. The amendment request indicated that activities would involve in vitro biochemical research using radio-labeled materials and would not involve animal studies. Table 2-2 presents the radionuclides and quantities requested.

Table 2-2 - Domino Farms Radionuclide Usage

Isotope	Form	Maximum (mCi)	Typical Laboratory Operations (mCi per operation)
H-3/C-14	Bound	100	.001-.05
P-32	Aqueous	30	0.001-0.05, occasionally 1-2
S-35	Bound	10	0.001-0.05
Ca-45	Bound	15	0.001-0.05
I-125	Bound NaI	5 25	0.001-0.01, 1-3 in Room 158 iodination hood
Others Listed	Various	10	<1, in vitro laboratory tests

A majority of the radiological operations involved P-32 and I-125. Iodinations were never performed at the facility. The largest quantities were used in Room 158 with smaller quantities used in other laboratories. Room 158 is the designated hot laboratory and has a dedicated ventilation exhaust system with HEPA and charcoal filtration. More recently (in the past few years), lesser quantities of short-lived radionuclides were used and H-3 and C-14 were used more frequently. No more than 25 mCi of H-3 or C-14 were possessed at the facility at any given time. Sewer disposal of licensed material was performed via laboratory sinks per license authorization and within regulatory limits. Waste awaiting shipment was stored in a chain-link cage located in the basement. The cage is fully enclosed and was locked with access only by authorized Pfizer personnel. All waste stored in the cage was properly packaged for DOT shipment when received and was not opened during storage.

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. The Domino Farms site had experienced several spills involving approximately 1 mCi of P-32 that were remediated, the most recent was several years ago. Considering the quantity and half-life of P-32, these spills are not significant in regards to decommissioning.

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.
- Exterior of 100% of vacuum port nozzles.
- Four locations in 100% of fume hoods: sash, air foil, horizontal working surface and baffle.

This protocol resulted in a total of 672 removable contamination measurements. All measurements were below the license action limit of 200 dpm. The maximum result was 168

dpm H-3 in a sink located in Room 126. This location was also identified during decommissioning surveys and was remediated. 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 site.

3.0 Release Criteria

The radiological release criteria of NRC 10CFR20 Subpart E for unrestricted use were used for decommissioning this facility. Specifically, the facility was 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 is 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 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. Additionally, each removable contamination measurements will be less than the license operational limit of 200 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 using a mild cleaning solution 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	Classification	GSF
DF01	104, 105, 106	2	4,198
DF02	116, 117, 118, 119, 121, 178, 179, 181, 182, 183, 184, 185, 187, 188, 189, 190	2	3,081
DF03	124, 125, 126, 152, 153	2	3,905
DF04	127, 128, 155, 157, 158, 161, 166	2	5,295
DF05	All not listed above.	3	11,526
		Total	28,005

Table 8-2 - Building Systems Survey Units

Survey Unit	Description
DR01	Drain System - including laboratory sink drains and fume hood cup sink drains.
VA01	Vacuum System - including benchtop and fume hood nozzles, valves, piping, pumps, accumulators, oil separators and exhaust.
VE01	Ventilation Exhaust System - including general ventilation exhaust ducts, fume hood exhaust ducts, fans and discharge ducts.

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.	Count Time (min.) Sample	Bkg. (cpm)	MDC (dpm/100cm^2)
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	20 in./sec.	N/A	N/A	1000	2300 (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:

$$MDC_{SCAN} = \frac{1.38\sqrt{4.33}\left(\frac{60}{0.26}\right)}{\left(\sqrt{0.5}\right)(0.07)\left(\frac{582}{100}\right)} = 2300\,\text{dpm/100cm}^2$$

$$i = 13.3\,\text{cm} \cdot \frac{\text{inch}}{2.54\,\text{cm}} \cdot \frac{\text{sec}}{20\,\text{inch}} \cdot = 0.26\,\text{sec}$$

$$b_i = 0.26\,\text{sec} \cdot \frac{1000\,\text{counts}}{\text{minute}} \cdot \frac{\text{minute}}{60\,\text{sec}} = 4.33\,\text{counts}$$

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

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

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

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

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 ^3H 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:

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

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

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	> 200 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, vacuum 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.

The waste storage cage in the basement was surveyed during characterization in order to verify its classification as non-impacted for final status surveys. Waste properly packaged for DOT shipment was stored in the cage near the loading dock until regularly scheduled waste shipments were conducted. Packages were not opened in the cage area and only Pfizer waste management personnel possessed keys. The 8' x 10' cage is isolated from the rest of the facility and, due to its size, does not support a MARSSIM-based survey protocol. As an alternative, the cage was surveyed by performing a 100% scan survey and static measurements and smears at a frequency of one per square meter. The survey results supported the conclusion that the cage did not contain residual radioactivity from licensed operations and could be classified as non-impacted for final status surveys.

12.0 Remediation

12.1 Building Structures and Surfaces

There were two locations where elevated activity was identified. Chase used simple decontamination techniques (hand wiping with disposable towels and a mild decontamination solution) and removal of contaminated material to reduce the contamination levels to less than the ALARA goal. Table 12-1 summarizes all building structural surfaces that were remediated.

12.2 Drain System

Low levels of tritium contamination were found in two drain strainers adjacent to the contaminated benchtop in Room 126. The drain strainers and piping were removed to the trap and disposed of as radioactive waste. The traps were then surveyed and met the ALARA goal. Table 12-2 summarizes all building systems that were remediated.

12.3 Ventilation Exhaust System

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

12.4 Vacuum System

Eighteen vacuum nozzles were above the ALARA goal of 200 dpm/100cm^2. The nozzles were removed and the manifold bodies surveyed. Where contamination remained above the 200 dpm/100cm^2, the vacuum piping was extracted until the remaining portions met the ALARA goal. Some nozzles converged to a common line. Table 12-2 summarizes all building systems that were remediated.

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
DF03	Room 126 Benchtop (300 cm^2)	<MDC	349 – ^{3}H 15 – ^{14}C	Hand wiping	<MDC	43 – ^{3}H 10 – ^{14}C
DF04	Room 157 Cooler Floor (500cm^2)	7,910	17 – ^{3}H 79 – ^{14}C	Removal of contaminated material	<MDC	20 – ^{3}H 21 – ^{14}C

Table 12-2 – Remediated Systems

<table>
<tr><th>Survey Unit</th><th>Location</th><th>Removable Activity (dpm/100cm^2)</th><th>Remediation Method</th><th>Post-Remediation Removable Activity[1] (dpm/100cm^2)</th></tr>
<tr><td>DR01</td><td>Room 126</td><td>288 – ^{3}H
5 – ^{14}C</td><td>Removal of piping to trap.</td><td>54 – ^{3}H
11 – ^{14}C</td></tr>
<tr><td>DR01</td><td>Room 126</td><td>932 – ^{3}H
0 – ^{14}C</td><td>Removal of piping to trap.</td><td>41 – ^{3}H
14 – ^{14}C</td></tr>
<tr><td>VA01</td><td>Room 104</td><td>44 – ^{3}H
778 – ^{14}C</td><td rowspan="2">Removed 5’ of piping.</td><td rowspan="2">22 – ^{3}H
113 – ^{14}C</td></tr>
<tr><td>VA01</td><td>Room 104</td><td>226 – ^{3}H
0 – ^{14}C</td></tr>
<tr><td>VA01</td><td>Room 105</td><td>7,946 – ^{3}H
0 – ^{14}C</td><td>Removed 12’ of piping to chase.</td><td>35 – ^{3}H
11 – ^{14}C</td></tr>
<tr><td>VA01</td><td>Room 105</td><td>360 – ^{3}H
14 – ^{14}C</td><td rowspan="3">Removed 12’ of piping to chase.</td><td rowspan="3">62 – ^{3}H
25 – ^{14}C</td></tr>
<tr><td>VA01</td><td>Room 105</td><td>271 – ^{3}H
7 – ^{14}C</td></tr>
<tr><td>VA01</td><td>Room 105</td><td>239 – ^{3}H
60 – ^{14}C</td></tr>
</table>

Survey Unit	Location	Removable Activity (dpm/100cm^2)	Remediation Method	Post-Remediation Removable Activity[1] (dpm/100cm^2)
VA01	Room 105	1506 – ^3H 19 – ^{14}C	Removed 12' of piping to chase.	57 – ^3H 19 – ^{14}C
VA01	Room 106	731 – ^3H 24 – ^{14}C	Removed nozzle.	116 – ^3H 112 – ^{14}C
VA01	Room 106	222 – ^3H 0 – ^{14}C	Removed 2' of piping.	116 – ^3H 7 – ^{14}C
VA01	Room 124	319 – ^3H 6 – ^{14}C	Removed 2' of piping.	43 – ^3H 27 – ^{14}C
VA01	Room 126	460 – ^3H 286 – ^{14}C	Removed 8' of piping.	62 – ^3H 16 – ^{14}C
VA01	Room 126	1,324 – ^3H 0 – ^{14}C		
VA01	Room 126	2,044 – ^3H 0 – ^{14}C	Removed 2' of piping.	99 – ^3H 164 – ^{14}C
VA01	Room 126	365 – ^3H 86 – ^{14}C	Removed 2' of piping.	71 – ^3H 83 – ^{14}C
VA01	Room 127	369 – ^3H 1,730 – ^{14}C	Removed nozzle.	120 – ^3H 122 – ^{14}C
VA01	Room 127	1,019 – ^3H 11 – ^{14}C	Removed nozzle.	69 – ^3H 14 – ^{14}C
VA01	Room 128	97 – ^3H 513 – ^{14}C	Removed 2' of piping.	58 – ^3H 79 – ^{14}C
VA01	Room 128	37 – ^3H 244 – ^{14}C	Removed 2' of piping.	37 – ^3H 39 – ^{14}C

[1] Measurement performed inside the opening of the remaining portion of piping.

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

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

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:

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

$Z_{1-\alpha}$ 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 ^3H 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

Activity measurements, including removable activity, scan surveys, and, where possible static measurements were completed on ventilation exhausts, house vacuum, and building drains in accordance with the Decommissioning Plan. 100% of the vacuum nozzles, drains and ventilation exhausts were surveyed for internal removable activity. Due to geometry, static measurements and scans were only possible inside the Room 158 HEPA and charcoal filter housing. The vacuum system pumps, accumulator, oil separator and exhaust system was surveyed for removable contamination as well as the ventilation exhaust fan inlet and outlet ducting.

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

<table>
<tr><td colspan="3">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:</td></tr>
<tr><td>BBB</td><td>=</td><td>Building Code. This field represents the facility. (3 characters)
DFF = Domino Farms Facility</td></tr>
<tr><td>RRRR</td><td>=</td><td>Survey Unit Number. This is the assigned survey unit number. (4 characters)</td></tr>
<tr><td>SS</td><td>=</td><td>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</td></tr>
<tr><td>M</td><td>=</td><td>Structural Material Code. This field represents the type of structural material on which a particular measurement is taken. (1 Character)
A = Carpet
T = Vinyl Tile
V = Vinyl Sheeting
M = Miscellaneous</td></tr>
<tr><td>LLL</td><td>=</td><td>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)</td></tr>
</table>

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)						
DF01	16	250	50	210	-297	331	500	No
DF02	15	205	179	186	-175	630	500	Yes[1]
DF03	14	249	37	237	-278	589	500	Yes[1]
DF04	14	214	-13	248	-300	509	500	Yes[1]
DF05	14	226	-28	84	-170	102	500	No

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 ^3H Summary

Survey Unit	# of Sample Locations	Mean	Standard Deviation	Minimum	Maximum	Investigation Level	Any Result Exceeding Applicable Investigation Level?
		(dpm/100 cm^2)					
DF01	16	22	6	13	34	200	No
DF02	15	17	7	5	28	200	No
DF03	14	23	9	13	43	200	No
DF04	14	17	6	2	28	200	No
DF05	14	21	9	5	33	200	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)					
DF01	16	14	4	8	24	200	No
DF02	15	14	5	8	24	200	No
DF03	14	14	5	7	23	200	No
DF04	14	15	5	6	24	200	No
DF05	14	15	3	10	20	200	No

Table 14-4 – Building Systems 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)						
VE01	3	352	-49	96	-158	24	500	No

Table 14-5 – 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)					
DR01	74	59	14	8	83	200	No
VE01	70	24	9	6	48	200	No
VA01	223	30	23	4	182	200	No

Table 14-6 – 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)					
DR01	74	15	9	5	81	200	No
VE01	70	16	5	4	26	200	No
VA01	223	20	18	4	164	200	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. Three measurements exceeded the Investigation Level. All three were taken on vinyl sheet flooring: DF02 (Room 188), DF03 (Room 153) and DF04 (Room 158) indicating elevated activity due to naturally-occurring radioactivity in the concrete beneath the sheeting. There were a total of four measurements conducted on this material (630, 589, 340 and 509 dpm/100cm^2). An analysis of the distribution of these measurements was performed with the following results:

Mean:	517
Median:	549
Standard Deviation:	128
Mean - 2 sigma:	260
Minimum:	340
Maximum:	630
Mean + 2 sigma:	774

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

- The median is within 20% of the mean.
- No measurement is more than two standard deviations from the mean. In a normal distribution, 5% of the measurements would be expected to be more than two standard deviations from the mean. For a population of four, it is reasonable that all measurements would be within two standard deviations from the mean (5% is 0.2).
- 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 total surface activity measurements were compared directly to the DCGL and investigation levels to determine if an area required further examination. The geometry of building systems frequently precluded scanning and total activity measurements. All total activity measurements and removable activity measurements were less than the applicable investigation level. Therefore, all systems survey units meet the release criteria and are suitable for release. Total activity and 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.

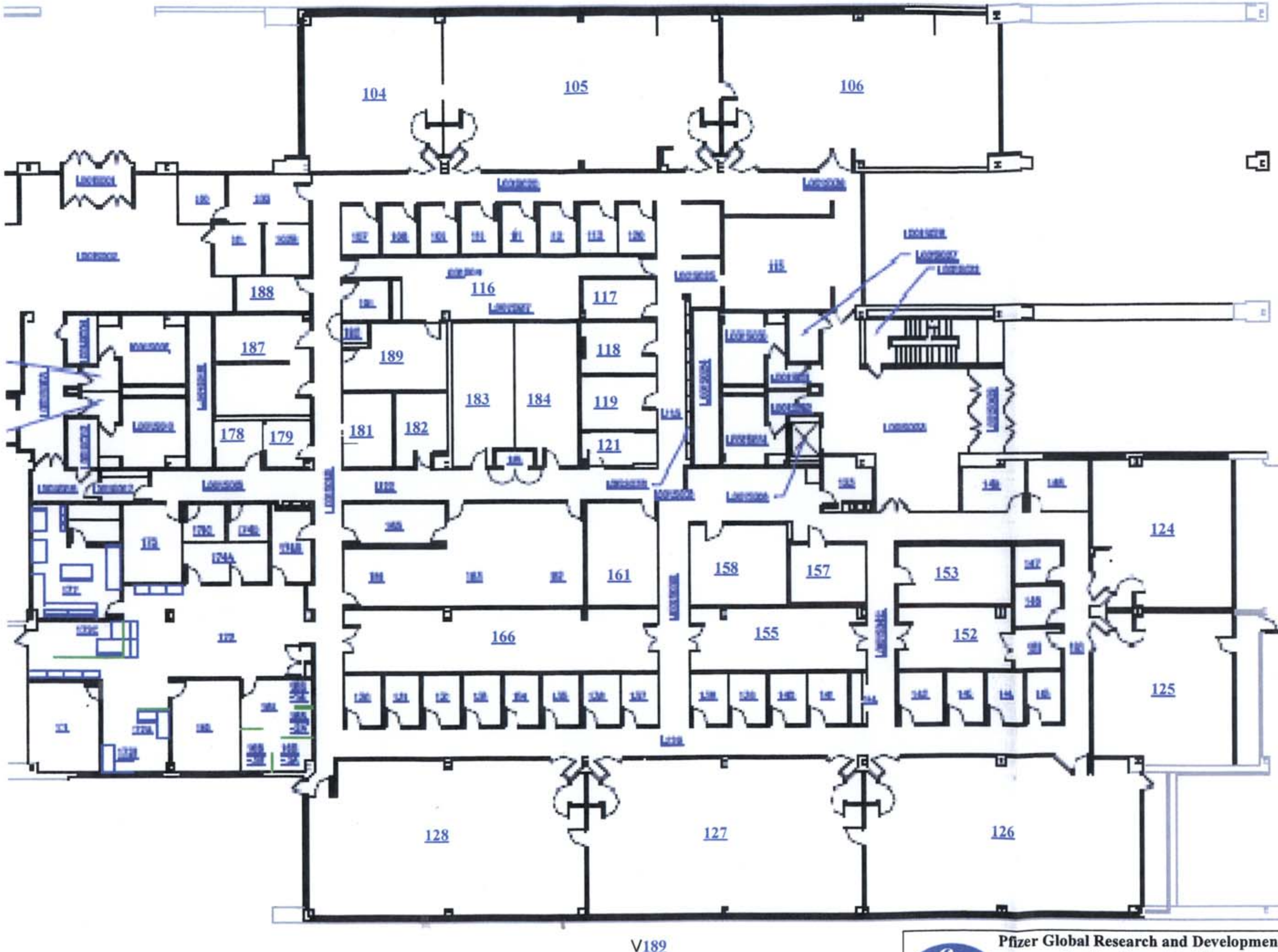
16.0 References

- "Ann Arbor Satellite Facilities Decommissioning Plan," 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

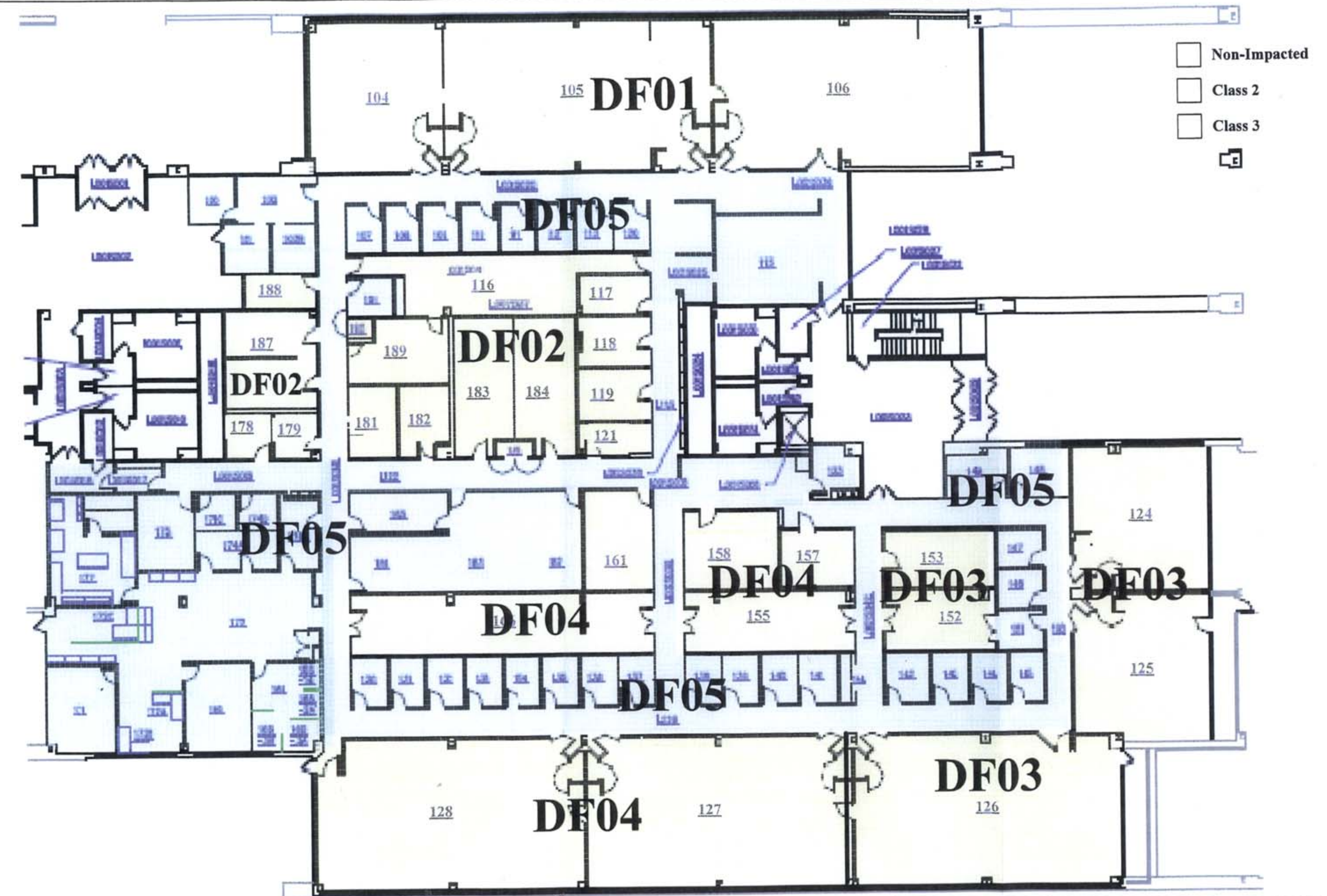
Prepared: [signature] Project Manager Date: 2/13/06

Approved: [signature] Certified Health Physicist Date: 2/13/06



Pfizer Global Research and Development
Domino Farms Facility
Final Status Report

Appendix A, Facility Floor Plan



Pfizer Global Research and Development
Domino Farms Facility
Final Status Report

Appendix B, Survey Unit Floor Plan

Page: B.1 of B.1

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2221 SERIAL# 184007

Owner: GI

DATE:	01/18/06	LOCATION:	Griffin Inst
TECH:	J. Glenn	DATE LAST CAL EXPIRES:	10/07/04

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

BATTERIES: ○ Yes ● No *BATTERY CHECK:* 6.1

HV	AS FOUND HV	AS LEFT HV
600 V:	592	595
1200 V:	1228	1200
1800 V:	1823	1790

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	0	100.0%	100	0.0%				
	250	0	100.0%	250	0.0%	250	0.0%	250	0.0%
	400	0	100.0%	400	0.0%				
x1 or x10	1000	0	100.0%	1000	0.0%				
	2500	0	100.0%	2500	0.0%				
	4000	0	100.0%	4000	0.0%				
x10 or x100	10K	0 K	100.0%	10K	0.0%				
	25K	0 K	100.0%	25K	0.0%				
	40K	0 K	100.0%	40K	0.0%				
x100 or x1000	100K	0 K	100.0%	100K	0.0%				
	250K	0 K	100.0%	250K	0.0%				
	400K	0 K	100.0%	400K	0.0%				

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

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
Log	200	0	100.0%	200	0.0%
	2000	0	100.0%	2000	0.0%
	20K	0 K	100.0%	20K	0.0%
	200K	0 K	100.0%	200K	0.0%

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

GRIFFIN INSTRUMENTS

SERIAL # 184007
01/18/06

Audio Divide:	◉ Sat	○ Unsat	Push Buttons:	◉ Sat	○ Unsat
Lamp:	◉ Sat	○ Unsat	Scaler/Digital:	◉ Sat	○ Unsat

Remarks: Replaced bad meter movement.

Does Instrument Meet Final Acceptance Criteria?:	◉ Yes	○ No
Calibration Sticker Attached?:	◉ Yes	○ No
Date Instrument is Due For Next Calibration:	01/18/07	

Performed/Reviewed by: Joanne Glenn Date: 1/18/2006 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

CALIBRATION CERTIFICATE FOR 2221 SERIAL# 126533

Owner: GI

DATE: 01/08/06 LOCATION: Griffin Inst

TECH: J. Glenn DATE LAST CAL EXPIRES: 02/23/03

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: Worn AF MECHANICAL ZERO: 0 AL MECHANICAL ZERO: 0

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

HV	AS FOUND HV	AS LEFT HV
600 V:	0	590
1200 V:	0	1200
1800 V:	0	1774

AF INPUT SENSITIVITY (mV): 0 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	0	100.0%	100	0.0%				
	250	0	100.0%	250	0.0%			250	0.0%
	400	0	100.0%	400	0.0%				
x1 or x10	1000	0	100.0%	1000	0.0%				
	2500	0	100.0%	2500	0.0%				
	4000	0	100.0%	4000	0.0%				
x10 or x100	10K	0 K	100.0%	10K	0.0%				
	25K	0 K	100.0%	25K	0.0%				
	40K	0 K	100.0%	40K	0.0%				
x100 or x1000	100K	0 K	100.0%	100K	0.0%				
	250K	0 K	100.0%	250K	0.0%				
	400K	0 K	100.0%	400K	0.0%				

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 # 126533
01/08/06

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

Remarks: Replaced bad meter movement.

Does Instrument Meet Final Acceptance Criteria?:	(•) Yes	( ) No
Calibration Sticker Attached?:	(•) Yes	( ) No
Date Instrument is Due For Next Calibration:	01/08/07	

Performed/Reviewed by: Joanne Glenn Date: 1/8/2006 Entered by ___ Initials

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-68 PROBE # PR101550

Owner: GI

DATE:	01/24/06	LOCATION:	Griffin Inst
TECH:	J. Glenn	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:** JG **Initials**

Calibrations performed to ANSI N323A-1997 standards.

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

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

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:** ____ **Initials**

GRIFFIN INSTRUMENTS
977 Hamilton Lane
Kingston, TN 37763
865-376-1313
e-mail - griffininst@mindspring.com

CALIBRATION DATA SHEET

MODEL	SERIAL #	CALIBRATION DATE	CALIBRATION DUE
43-68	PR149839	1/7/06	1/7/07
PERFORMED BY	**LOCATION**	**PHYSICAL COND.**	**AUDIO RESPONSE**
Joanne Glenn	Griffin Instruments	SAT	SAT
ISOTOPE	**SERIAL #**	**ASSAY DATE**	**DPM**
Tc99	99TC470-1814	8/3/99	37,300
ISOTOPE	**SERIAL #**	**ASSAY DATE**	**DPM**
Sr90	2697-00	3/1/00	12,200
ISOTOPE	**SERIAL #**	**ASSAY DATE**	**DPM**
C14	DX 295	5/3/94	67,800

PLATEAU DATA		
HV	**BKG.**	**CPM**
1600	119	7403
1650	224	8581
1700	278	8798
1750	309	8812
1800	318	8722
Geometry for Plateau: probe modified w/cardboard.		

HV Set Point: 1750 V Threshold: 4 mV i.s. (40)

ISOTOPE	NET CPM	% EFFICIENCY
Tc99	8690	22.47%
Sr90	4595	35.15%
C14	6842	9.64%

Remarks: Geometry: Flat surface

Calibrated/Reviewed By: ________ Date: 1/7/07

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2224 SERIAL# 146721

Owner: CHASE ENV

DATE:	01/07/06	LOCATION:	Griffin Inst
TECH:	J. Glenn	DATE LAST CAL EXPIRES:	07/31/04

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: Sat

HV	AS FOUND HV	AS LEFT HV	WINDOW SETTINGS:	A.F.	A.L.
500 V:	500	A.F.	BT (3.5 mV +/- 1 mV):	3.8	3.5
1000 V:	1000	A.F.	BW (30 mV +/-3 mV):	38	30
1500 V:	1500	A.F.	AT (120 mV +/-10 mV):	110	120

[redacted]

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

Overload Light: ( ) Adjusted (•) Not Adj. Low Battery (2.2 V): (•) Sat ( ) Unsat

Remarks: Calibrated w/43-37 #PR148503.

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: JG Initials

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-37 PROBE # PR148503

Owner: CHASE ENV

DATE:	01/07/06	LOCATION:	Griffin Inst
TECH:	J. Glenn	DATE LAST CAL EXPIRES:	07/31/04

REASON FOR CALIBRATION:

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

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL:	2224	SERIAL #:	146721	CAL. DUE:	01/07/07
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: Tc Ni: Th: Sr:

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 / 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 #: PR148503
Date: 01/07/06

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	7	3104	15.9%	2089	432	11.4%	3	182	10.7%	<1%
1650	2	4339	22.1%	2496	557	13.6%	2	277	10.1%	<1%
1700	8	5105	25.0%	2539	693	13.9%	3	503	7.0%	<1%
1750	4	5050	23.1%	3189	947	17.4%	3	803	4.3%	<1%
1800	39	3955	16.6%	3634	1133	19.8%	8	893	6.2%	<1%

Alpha / Beta Bkg (cpm) 4 481

HV / Vernier		Pu-239	Tc-99 NI	Tc-99 SS	Th-230	Sr-90
1700	CPM:	2945	5237	6403	5831	2864
	AL Efficiencies:	**16.07%**	**25.85%**	**15.88%**	**13.40%**	**19.53%**

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: No previous cal data. Cal'ed w/2224 #146721. C14 eff - 8716 cpm -481 bkg = 8235/67800 dpm =12.15%. Source used DX295, 67,800 dpm, assay 5/3/94.

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:**_______**Initials**

Calibrations performed to ANSI N323A-1997 standards.

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 2360 SERIAL# 185784

Owner: CHASE ENV

DATE:	01/07/06	LOCATION:	Griffin Inst
TECH:	J. Glenn	DATE LAST CAL EXPIRES:	02/04/06

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: Sat

HV	AS FOUND HV	AS LEFT HV	WINDOW SETTINGS:	A.F.	A.L.
500 V:	500	A.F.	BT (3.5 mV +/- 1 mV):	3.5	A.F.
1000 V:	1000	A.F.	BW (30 mV +/-3 mV):	30	A.F.
1500 V:	1500	A.F.	AT (120 mV +/-10 mV):	120	A.F.

[redacted]

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.		[redacted]			
	250	250	0.0%	A.F.		250	0.0%	A.F.	
	400	400	0.0%	A.F.		[redacted]			
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

Overload Light: ○ Adjusted ● Not Adj. **Low Battery (2.2 V):** ● *Sat* ○ *Unsat*

Remarks: Calibrated w/43-37 #PR178300.

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: *Joanno Glenn* Date: 1/7/2006 Entered by ______ Initials

GRIFFIN INSTRUMENTS

CALIBRATION CERTIFICATE FOR 43-37 PROBE # PR178300

Owner: CHASE ENV

DATE:	01/07/06	LOCATION:	Griffin Inst
TECH:	J. Glenn	DATE LAST CAL EXPIRES:	02/04/06

REASON FOR CALIBRATION:

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

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL:	2360	SERIAL #:	185784	CAL. DUE:	01/07/07
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: 14.52% Tc Ni: 27.71% Th: 12.08% Sr: 21.33%

	HV	Vernier		
Setpoints from last cal.:	1700	N/A		
Source	**Alpha Response CPM**	**Beta Response CPM**		
Background:	2	767		
Pu-239:	3339	832	A-B XTLK:	1.9%
Tc-99 Ni:	3	5664	B-A XTLK:	<1%
As Found Efficiencies Pu, Tc:	18.23%	26.61%		
Th-230 / Sr-90	6018 /	3969	13.83% /	26.25%
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 #: PR178300
Date: 01/07/06

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	5	4154	21.3%	2643	463	14.4%	5	236	7.9%	<1%
1650	6	5124	25.4%	2820	616	15.4%	3	444	5.7%	<1%
1700	5	4963	22.9%	3116	829	17.0%	7	752	2.4%	<1%
1750	21	4010	17.2%	3402	1058	18.6%	7	841	6.0%	<1%
1800							30	782		<1%
										<1%

Alpha / Beta Bkg (cpm) 4 639

HV / Vernier		**Pu-239**	**Tc-99 Ni**	**Tc-99 SS**	**Th-230**	**Sr-90**
1700	**CPM:**	3330	5067	7724	5522	3638
	AL Efficiencies:	**18.17%**	**24.07%**	**18.99%**	**12.69%**	**24.58%**

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: Replateaued due to higher beta efficiency. Calibrated w/2360 #185784. C-14 7752 cpm - 639 bkg = 7113/67800 dpm = 10.49%. Source used DX295, 67,800 dpm, assay 5/3/94

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:**______**Initials**

Calibrations performed to ANSI N323A-1997 standards.

Technical(.lternatives, Inc.

4220 Varsity Dr.
Suite A
Ann Arbor, MI. 48108

Servicing The Midwest

Remit To: PO Box 3575 Redmond, WA. 98073
734-971-1372 • 800-447-7169 * Fax 734-971-1560

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Service Report

FSR # 06A27-1-04

CALL #

Institution: Pfizer - Ann Arbor	Instrument: A1900	Manufacturer: Packard	Serial Number: 100345	Date Call Received:	Hour:
Street: 2800 Plymouth Rd	Service Engineer: GEORGE LADD			Date Instrument Up: 01/27/06	Hour:
City: Ann Arbor State: MI Zip: 48105	Accessories:				
Phone: 734-633-4467 Extension:	Drive #:	Current Counter:			PMC #:
User: Carol Lentz	Notes To Office:				
Department/Instrument Location: Dominos Rm 005-125	No Charge - Covered By Service Agreement ☐				

Customer Complaint & Repair Description	Part Description	Part Number	Labor Hours	Travel Hours	Part Qty.	Hourly Rate Unit Price	Amount
Installed and Preventative Maintenance		27-Jan	3			$140.00	$ 420.00
Checked all voltages		30-Jan	2	1		$140.00	$ 280.00
Cleaned Sample changer and detector area							
SNC'ed	Gas Shocks	1648976			2	$ 80.00	$ 160.00
Installed new 3H, 14C, 3H/C14 Dual lable quench curues							$ -
							$ -
Ran complete system checks							$ -
							$ -
							$ -
							$ -

Customer Approval	PO or Card #	V Code	Exp. Date	Total	$ 860.00
				Due net 30	

Building: DFF	Survey Unit: DF02	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: DFF	Survey Unit: DF02	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	N/A	20 inches/sec.	^{14}C	N/A
☐ 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: DFF	Survey Unit: DF02	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
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 S1 = 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: DFF	Survey Unit: DF02	Class: 2	Page ___ of ___

Survey Unit Area (ft^2):	3081	Maximum X-axis Dimension:	122
Required Number of Samples:	14	Maximum Y-axis Dimension:	54

Class 1 and Class 2 Calculations			
X Axis Random Number:[1]	0.582030018	X-Axis Start Location[2]:	**71**
Y Axis Random Number[1]	0.587659469	Y-Axis Start Location[2]:	**32**
		Sampling Spacing (ft):	**15**

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: DFF	Survey Unit: DF02			Page ____ of ____
Survey Unit Description	Rooms 116, 117, 118, 119, 121, 178, 179, 181, 182, 183, 184, 185, 187, 188, 189, 190			
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: DFF	Survey Unit: DF02			Page ____ of ____
Survey Unit Description	Rooms 116, 117, 118, 119, 121, 178, 179, 181, 182, 183, 184, 185, 187, 188, 189, 190			
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 Net Activity (dpm/100cm^2)		
	Gross Counts (cpm/probe)	Net Counts (cpm/probe)	Net Activity (dpm/100cm^2)	CH 1	CH 2	CH 3
- - - -						
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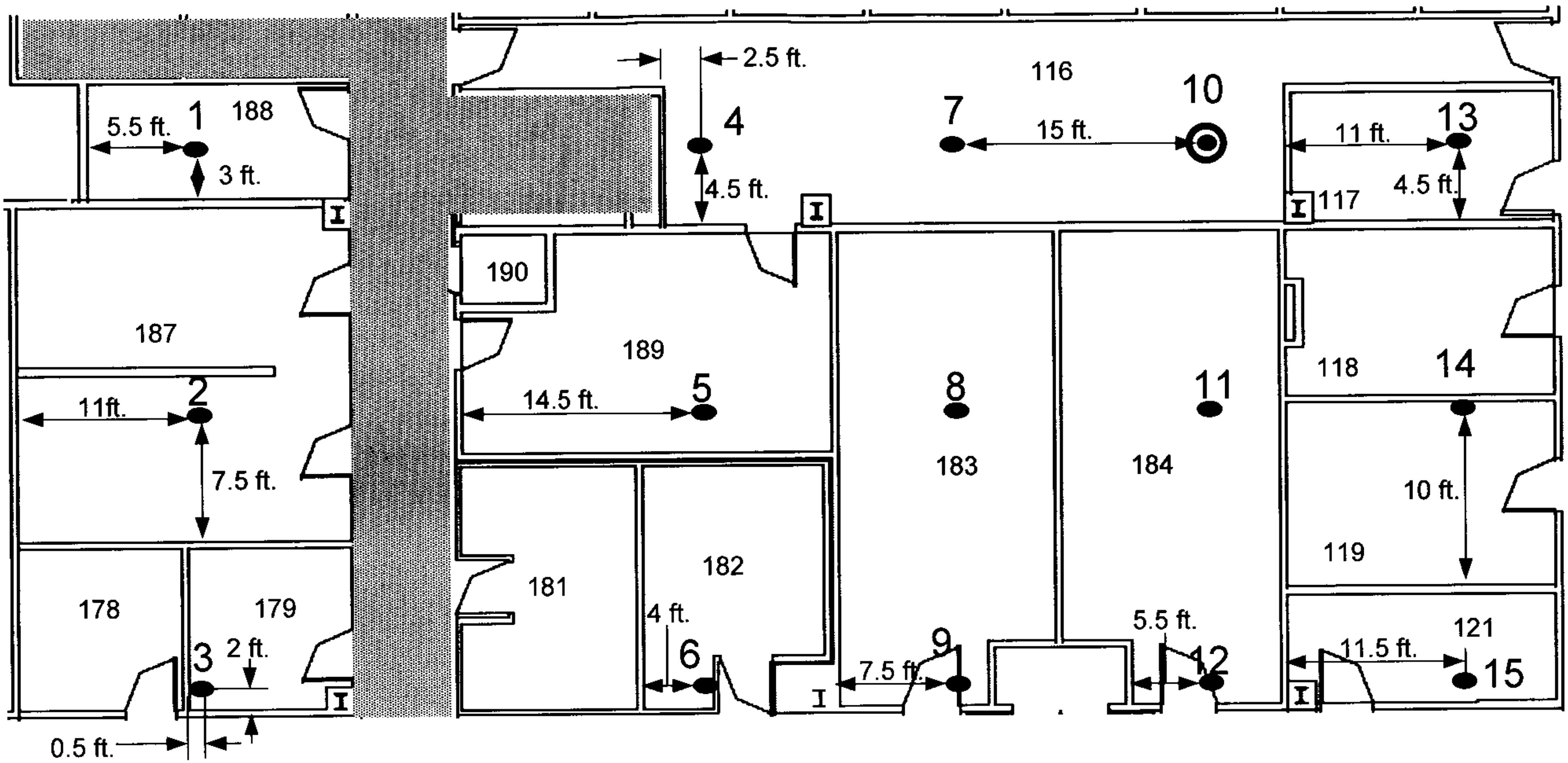
Reviewed By: ______________________ Date: ______________



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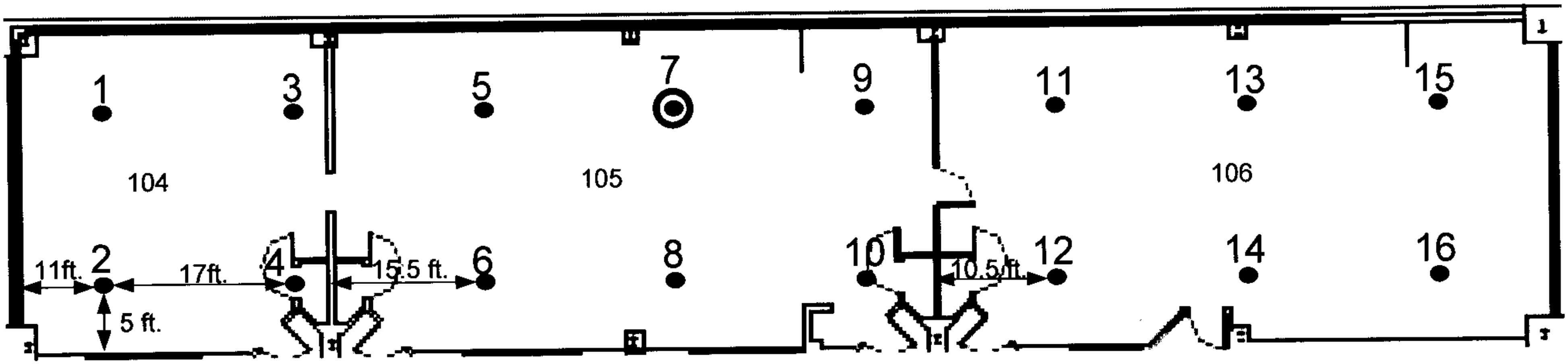
Ann Arbor Satellite Facilities
Final Status Survey Package

Building: DFF	Survey Unit: DF02	Page: ___ of ___



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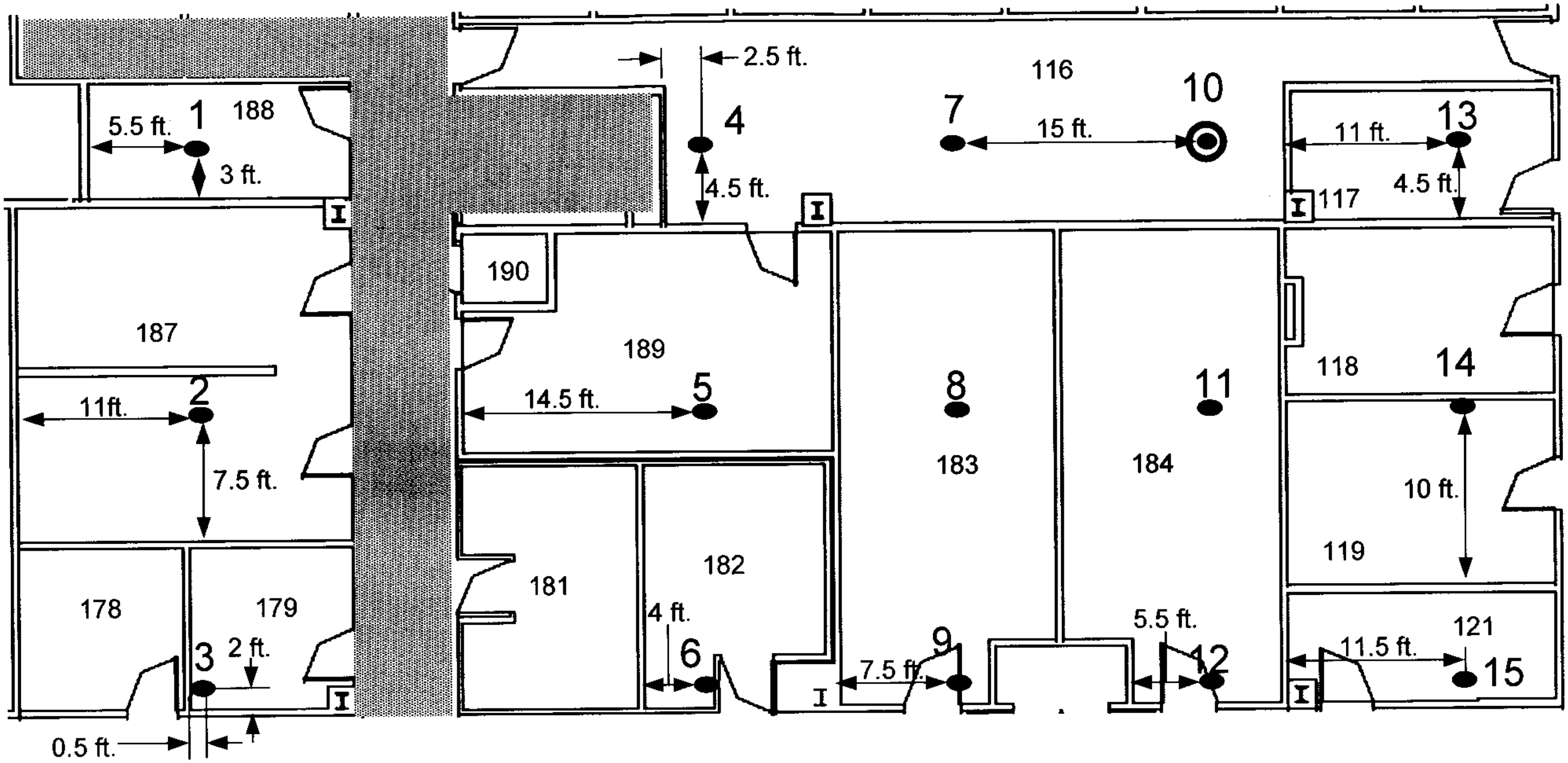
10.5 ft.
5 ft.



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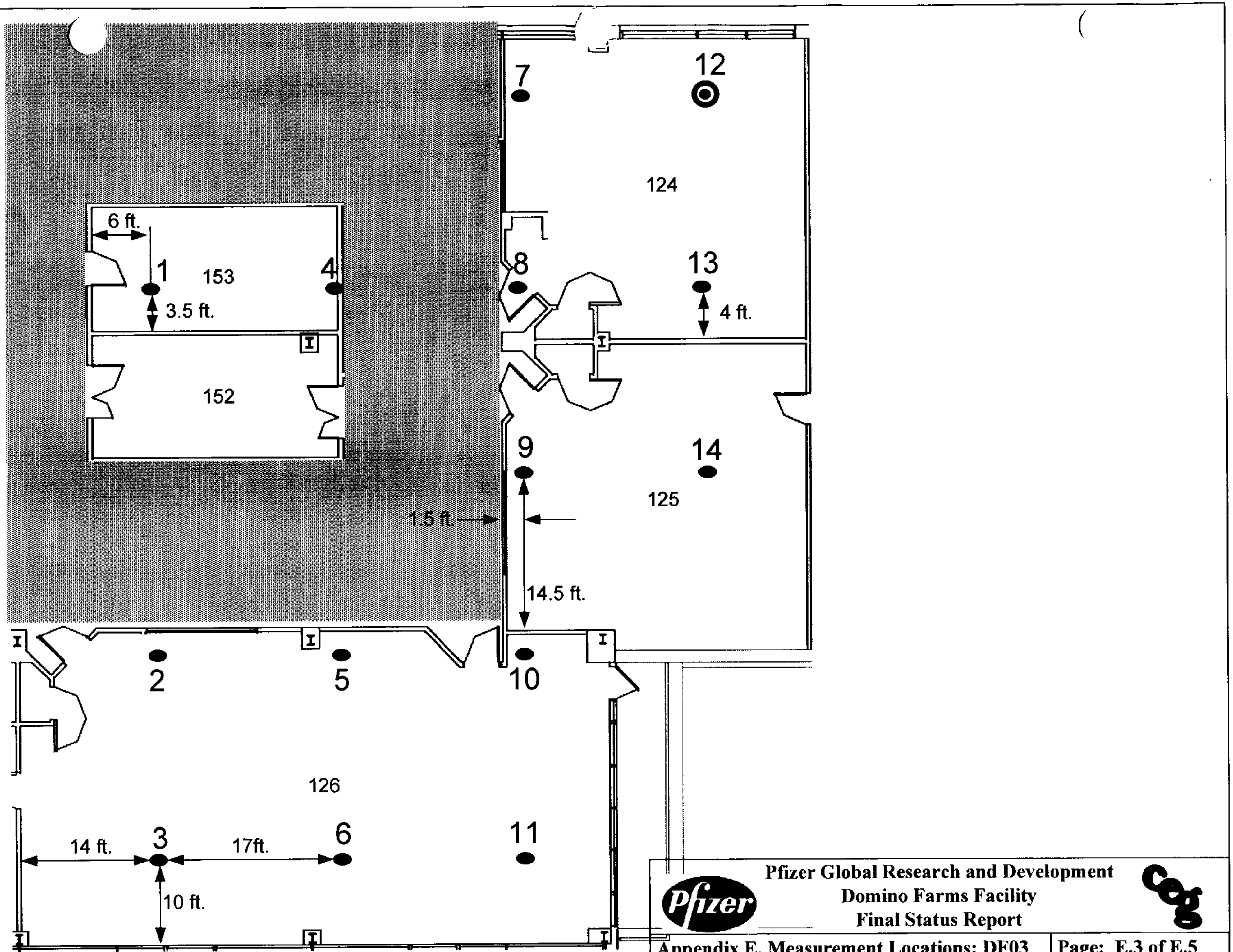
Domino Farms Facility
Final Status Report

Appendix E, Measurement Locations: DF02	Page: E.2 of E.5



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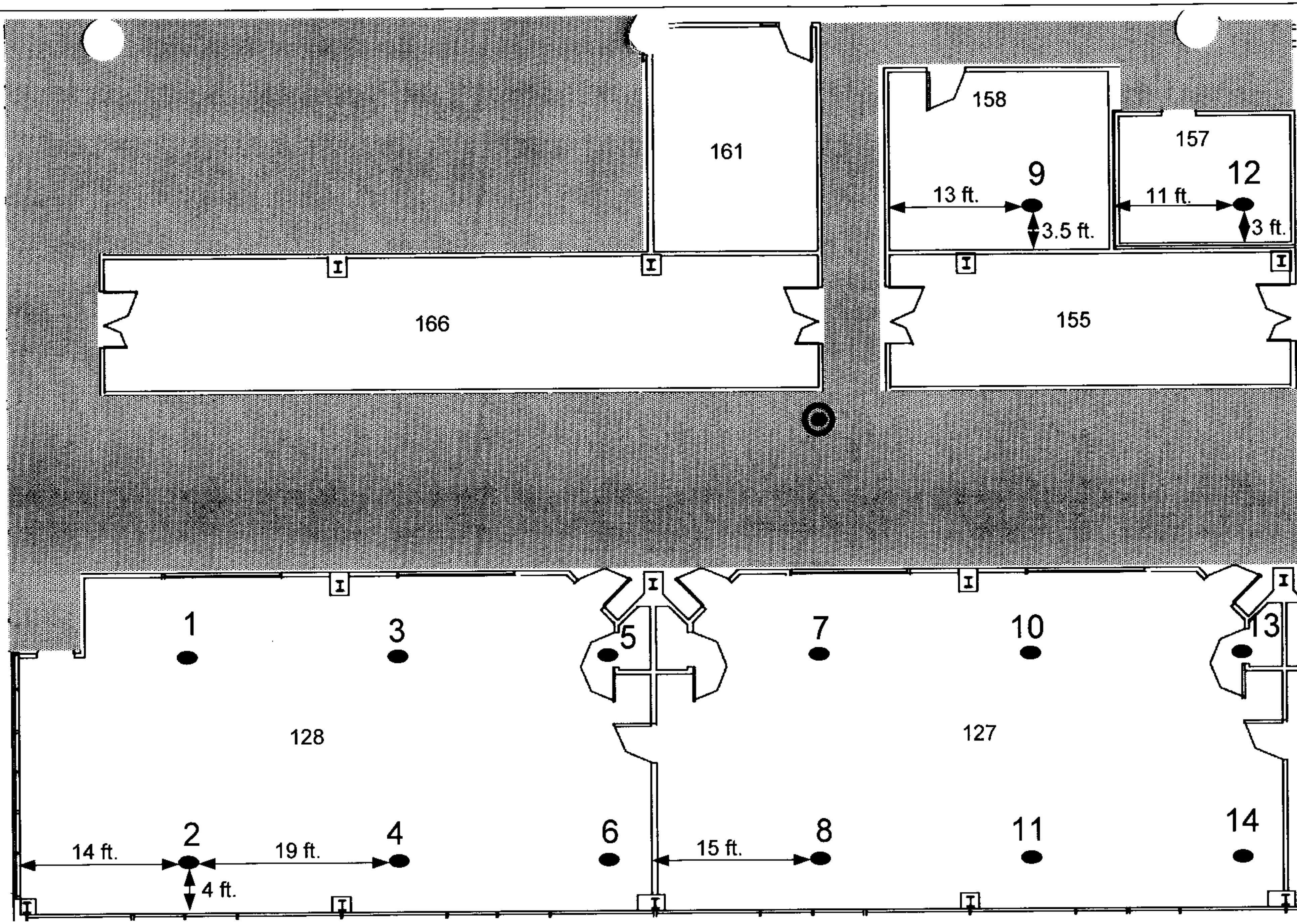
Domino Farms Facility
Final Status Report

Appendix E, Measurement Locations: DF03



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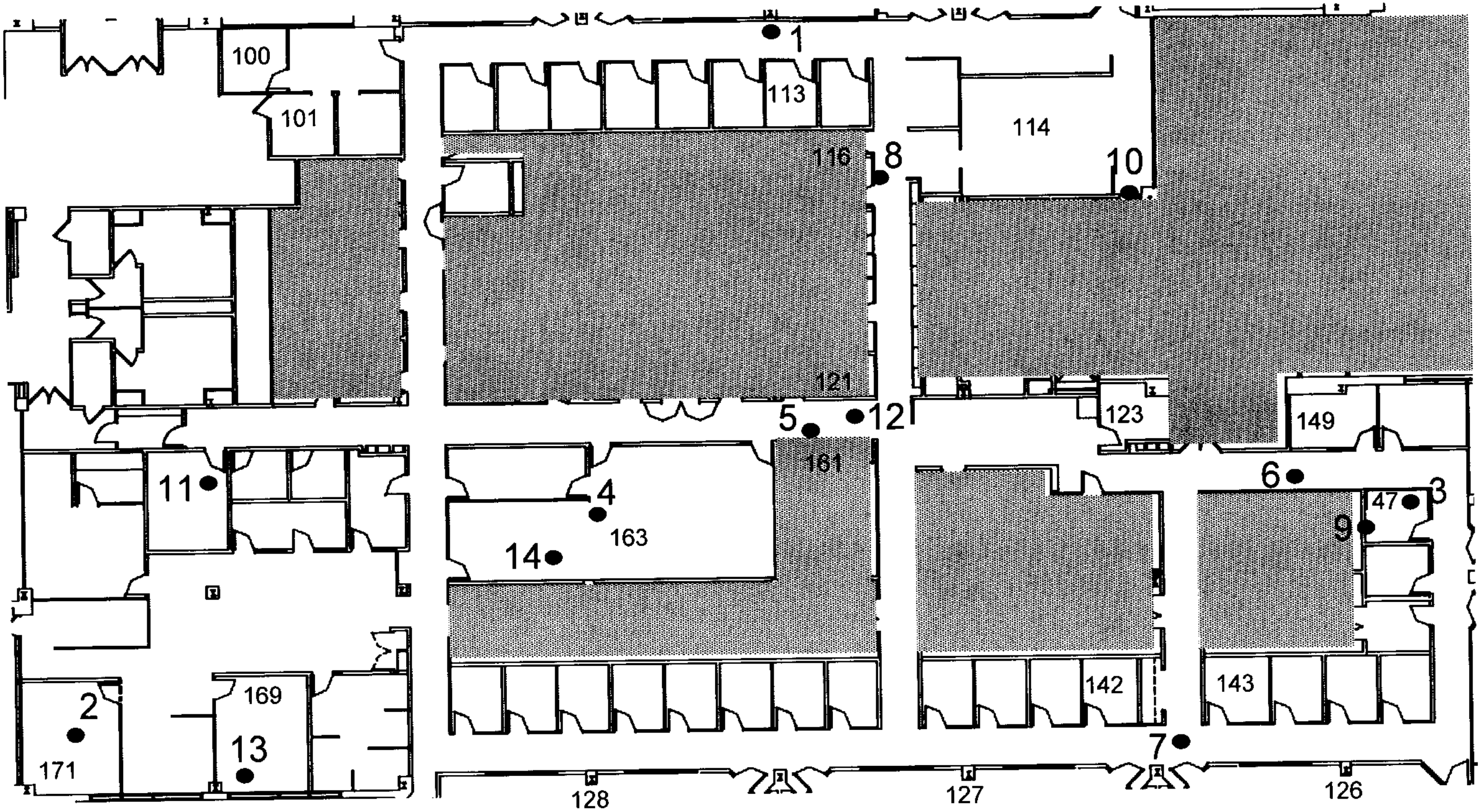
Domino Farms Facility
Final Status Report

Appendix E, Measurement Locations: DF04



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Domino Farms Facility
Final Status Report

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Appendix E, Measurement Locations: DF05

Page: E.5 of E.5

Surface and Structure Final Status Survey Results

Building DFF Survey Unit DF01 Class 2

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-DF01-F1-T-001	229 ± 853	250	14 ± 26	43	18 ± 13	31
DFF-DF01-F1-T-002	243 ± 856	250	15 ± 26	43	16 ± 13	31
DFF-DF01-H1-M-003	-164 ± 764	250	21 ± 28	43	17 ± 13	31
DFF-DF01-F1-T-004	226 ± 852	250	18 ± 27	43	14 ± 12	31
DFF-DF01-F1-T-005	331 ± 875	250	24 ± 28	43	12 ± 12	31
DFF-DF01-F1-T-006	184 ± 843	250	16 ± 27	43	16 ± 13	31
DFF-DF01-B1-M-007	-257 ± 741	250	27 ± 29	43	16 ± 13	31
DFF-DF01-B1-M-008	-297 ± 731	250	19 ± 27	43	11 ± 12	31
DFF-DF01-F1-T-009	172 ± 841	250	22 ± 28	43	8 ± 11	31
DFF-DF01-F1-T-010	88 ± 822	250	21 ± 28	43	13 ± 12	31
DFF-DF01-B1-M-011	-155 ± 766	250	29 ± 29	43	24 ± 14	31
DFF-DF01-B1-M-012	-232 ± 747	250	13 ± 26	43	15 ± 12	31
DFF-DF01-F1-T-013	218 ± 851	250	31 ± 29	43	13 ± 12	31
DFF-DF01-F1-T-014	150 ± 836	250	23 ± 28	43	13 ± 12	31
DFF-DF01-B1-M-015	-85 ± 782	250	34 ± 30	43	8 ± 11	31
DFF-DF01-B1-M-016	147 ± 835	250	19 ± 27	43	15 ± 12	31

Summary for Survey Unit # DF01 (16 detail records)

	Total Beta Activity	Tritium Activity	Carbon-14 Activity
Average	50	22	14
Minimum	-297	13	8
Maximum	331	34	24
Standard Deviation	210	6	4

Surface and Structure Final Status Survey Results

Building DFF   Survey Unit DF02   Class 2

Location Code	Total Beta Activity Measurements: Activty	Total Beta Activity Measurements: MDC	Removable Activity Measurements — Tritium: Activity	Tritium: MDC	Carbon-14: Activity	Carbon-14: MDC
DFF-DF02-F1-V-001	630 ± 812	205	28 ± 29	43	22 ± 14	31
DFF-DF02-F1-T-002	138 ± 691	205	5 ± 25	43	14 ± 12	31
DFF-DF02-F1-T-003	283 ± 729	205	25 ± 28	43	10 ± 11	31
DFF-DF02-F1-T-004	345 ± 744	205	23 ± 28	43	18 ± 13	31
DFF-DF02-F1-T-005	220 ± 713	205	14 ± 26	43	13 ± 12	31
DFF-DF02-B1-M-006	-11 ± 650	205	17 ± 27	43	10 ± 11	31
DFF-DF02-F1-T-007	328 ± 740	205	24 ± 28	43	8 ± 11	31
DFF-DF02-F1-T-008	147 ± 694	205	19 ± 27	43	10 ± 11	31
DFF-DF02-F1-T-009	158 ± 697	205	7 ± 25	43	14 ± 12	31
DFF-DF02-F1-T-010	252 ± 721	205	11 ± 26	43	13 ± 12	31
DFF-DF02-F1-T-011	3 ± 654	205	14 ± 26	43	9 ± 11	31
DFF-DF02-F1-T-012	48 ± 667	205	23 ± 28	43	16 ± 13	31
DFF-DF02-F1-T-013	164 ± 698	205	23 ± 28	43	24 ± 14	31
DFF-DF02-B1-M-014	-175 ± 602	205	20 ± 27	43	14 ± 12	31
DFF-DF02-F1-T-015	150 ± 694	205	9 ± 25	43	21 ± 14	31

Summary for Survey Unit # DF02 (15 detail records)

	Total Beta Activity	Tritium Activity	Carbon-14 Activity
Average	179	17	14
Minimum	-175	5	8
Maximum	630	28	24
Standard Deviation	186	7	5

Surface and Structure Final Status Survey Results

Building DFF **Survey Unit DF03** **Class 2**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-DF03-F1-V-001	589 ± 940	249	21 ± 28	43	7 ± 11	31
DFF-DF03-F1-T-002	43 ± 807	249	24 ± 28	43	21 ± 14	31
DFF-DF03-B1-M-003	-209 ± 738	249	15 ± 26	43	9 ± 11	31
DFF-DF03-F1-V-004	340 ± 882	249	36 ± 30	43	8 ± 11	31
DFF-DF03-F1-T-005	101 ± 823	249	18 ± 27	43	10 ± 11	31
DFF-DF03-B1-M-006	-278 ± 718	249	43 ± 31	43	10 ± 11	31
DFF-DF03-S1-M-007	-216 ± 736	249	32 ± 29	43	15 ± 12	31
DFF-DF03-F1-T-008	62 ± 812	249	13 ± 26	43	15 ± 12	31
DFF-DF03-S1-M-009	-101 ± 768	249	13 ± 26	43	16 ± 13	31
DFF-DF03-F1-T-010	101 ± 823	249	22 ± 28	43	23 ± 14	31
DFF-DF03-F1-T-011	196 ± 847	249	19 ± 27	43	17 ± 13	31
DFF-DF03-B1-M-012	-196 ± 742	249	21 ± 28	43	15 ± 12	31
DFF-DF03-F1-T-013	52 ± 810	249	21 ± 28	43	18 ± 13	31
DFF-DF03-F1-T-014	29 ± 804	249	17 ± 27	43	14 ± 12	31

Summary for Survey Unit # DF03 (14 detail records)

	Total Beta	Tritium	Carbon-14
Average	37	23	14
Minimum	-278	13	7
Maximum	589	43	23
Standard Deviation	237	9	5

Surface and Structure Final Status Survey Results

Building DFF | **Survey Unit DF04** | **Class 2**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-DF04-B1-M-001	-136 ± 645	214	20 ± 27	43	16 ± 13	31
DFF-DF04-B1-M-002	-229 ± 618	214	11 ± 26	43	15 ± 12	31
DFF-DF04-B1-M-003	-300 ± 597	214	22 ± 28	43	16 ± 13	31
DFF-DF04-B1-M-004	-246 ± 613	214	15 ± 26	43	6 ± 10	31
DFF-DF04-F1-T-005	155 ± 723	214	21 ± 28	43	7 ± 11	31
DFF-DF04-F1-T-006	164 ± 725	214	21 ± 28	43	10 ± 11	31
DFF-DF04-F1-T-007	254 ± 748	214	17 ± 27	43	20 ± 13	31
DFF-DF04-F1-T-008	206 ± 736	214	17 ± 27	43	17 ± 13	31
DFF-DF04-F1-V-009	509 ± 808	214	9 ± 25	43	19 ± 13	31
DFF-DF04-B1-M-010	-235 ± 616	214	20 ± 27	43	18 ± 13	31
DFF-DF04-B1-M-011	-141 ± 643	214	28 ± 29	43	13 ± 12	31
DFF-DF04-F1-M-012	-195 ± 628	214	20 ± 27	43	21 ± 14	31
DFF-DF04-F1-T-013	164 ± 725	214	2 ± 24	43	24 ± 14	31
DFF-DF04-B1-M-014	-158 ± 639	214	17 ± 27	43	12 ± 12	31
Summary for Survey Unit # DF04 (14 detail records)						
Average	-13		17		15	
Minimum	-300		2		6	
Maximum	509		28		24	
Standard Deviation	248		6		5	

Surface and Structure Final Status Survey Results

Building DFF **Survey Unit DF05** **Class 3**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-DF05-F1-T-001	-17 ± 718	226	7 ± 25	43	12 ± 12	31
DFF-DF05-F1-A-002	102 ± 748	226	25 ± 28	43	12 ± 12	31
DFF-DF05-F1-A-003	-25 ± 716	226	19 ± 27	43	15 ± 12	31
DFF-DF05-F1-A-004	-99 ± 697	226	5 ± 25	43	18 ± 13	31
DFF-DF05-F1-T-005	-144 ± 685	226	30 ± 29	43	16 ± 13	31
DFF-DF05-F1-T-006	-110 ± 694	226	19 ± 27	43	17 ± 13	31
DFF-DF05-F1-T-007	57 ± 737	226	25 ± 28	43	12 ± 12	31
DFF-DF05-F1-T-008	-110 ± 694	226	12 ± 26	43	20 ± 13	31
DFF-DF05-F1-A-009	25 ± 729	226	32 ± 29	43	17 ± 13	31
DFF-DF05-F1-T-010	34 ± 731	226	14 ± 26	43	11 ± 12	31
DFF-DF05-F1-T-011	42 ± 733	226	26 ± 28	43	17 ± 13	31
DFF-DF05-F1-T-012	-170 ± 678	226	26 ± 28	43	10 ± 11	31
DFF-DF05-F1-A-013	0 ± 722	226	33 ± 30	43	18 ± 13	31
DFF-DF05-F1-A-014	28 ± 729	226	21 ± 28	43	18 ± 13	31

Summary for Survey Unit # DF05 (14 detail records)

	Total Beta Activity	Tritium Activity	Carbon-14 Activity
Average	-28	21	15
Minimum	-170	5	10
Maximum	102	33	20
Standard Deviation	84	9	3

Summary for Building # DFF (73 detail records)

	Total Beta Activity	Tritium Activity	Carbon-14 Activity
Avg	47	20	15
Min	-300	2	6
Max	630	43	24

Building System Survey Results

Building DFF **Survey Unit DR01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-DR01-S1-M-001	N/A	N/A	17 ± 27	43	15 ± 12	31
DFF-DR01-S1-M-002	N/A	N/A	15 ± 26	43	16 ± 13	31
DFF-DR01-S1-M-003	N/A	N/A	80 ± 37	43	81 ± 22	31
DFF-DR01-S1-M-004	N/A	N/A	35 ± 30	43	13 ± 12	31
DFF-DR01-S1-M-005	N/A	N/A	30 ± 29	43	9 ± 11	31
DFF-DR01-S1-M-006	N/A	N/A	51 ± 32	43	13 ± 12	31
DFF-DR01-S1-M-007	N/A	N/A	32 ± 29	43	15 ± 12	31
DFF-DR01-S1-M-008	N/A	N/A	20 ± 27	43	20 ± 13	31
DFF-DR01-S1-M-009	N/A	N/A	23 ± 28	43	11 ± 12	31
DFF-DR01-S1-M-010	N/A	N/A	24 ± 28	43	21 ± 14	31
DFF-DR01-S1-M-011	N/A	N/A	35 ± 30	43	20 ± 13	31
DFF-DR01-S1-M-012	N/A	N/A	22 ± 28	43	13 ± 12	31
DFF-DR01-S1-M-013	N/A	N/A	37 ± 30	43	12 ± 12	31
DFF-DR01-S1-M-014	N/A	N/A	37 ± 30	43	5 ± 10	31
DFF-DR01-S1-M-015	N/A	N/A	22 ± 28	43	12 ± 12	31
DFF-DR01-S1-M-016	N/A	N/A	34 ± 30	43	15 ± 12	31
DFF-DR01-S1-M-017	N/A	N/A	23 ± 28	43	21 ± 14	31
DFF-DR01-S1-M-018	N/A	N/A	83 ± 37	43	9 ± 11	31
DFF-DR01-S1-M-019	N/A	N/A	48 ± 32	43	12 ± 12	31
DFF-DR01-S1-M-020	N/A	N/A	31 ± 29	43	15 ± 12	31
DFF-DR01-S1-M-021	N/A	N/A	20 ± 27	43	6 ± 10	31
DFF-DR01-S1-M-022	N/A	N/A	13 ± 26	43	10 ± 11	31
DFF-DR01-S1-M-023	N/A	N/A	15 ± 26	43	10 ± 11	31
DFF-DR01-S1-M-024	N/A	N/A	14 ± 26	43	12 ± 12	31
DFF-DR01-S1-M-025	N/A	N/A	19 ± 27	43	10 ± 11	31
DFF-DR01-S1-M-026	N/A	N/A	8 ± 25	43	8 ± 11	31
DFF-DR01-S1-M-027	N/A	N/A	10 ± 26	43	8 ± 11	31
DFF-DR01-S1-M-028	N/A	N/A	32 ± 29	43	13 ± 12	31
DFF-DR01-S1-M-029	N/A	N/A	34 ± 30	43	7 ± 11	31
DFF-DR01-S1-M-030	N/A	N/A	46 ± 32	43	11 ± 12	31
DFF-DR01-S1-M-031	N/A	N/A	27 ± 29	43	12 ± 12	31
DFF-DR01-S1-M-032	N/A	N/A	26 ± 28	43	13 ± 12	31

Building System Survey Results

Building DFF Survey Unit DR01 Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
	Activty	MDC	Tritium Activity	Tritium MDC	Carbon-14 Activity	Carbon-14 MDC
DFF-DR01-S1-M-033	N/A	N/A	21 ± 28	43	16 ± 13	31
DFF-DR01-S1-M-034	N/A	N/A	26 ± 28	43	14 ± 12	31
DFF-DR01-S1-M-035	N/A	N/A	34 ± 30	43	18 ± 13	31
DFF-DR01-S1-M-036	N/A	N/A	42 ± 31	43	16 ± 13	31
DFF-DR01-S1-M-037	N/A	N/A	17 ± 27	43	10 ± 11	31
DFF-DR01-S1-M-038	N/A	N/A	38 ± 30	43	16 ± 13	31
DFF-DR01-S1-M-039	N/A	N/A	22 ± 28	43	15 ± 12	31
DFF-DR01-S1-M-040	N/A	N/A	18 ± 27	43	13 ± 12	31
DFF-DR01-S1-M-041	N/A	N/A	28 ± 29	43	18 ± 13	31
DFF-DR01-S1-M-042	N/A	N/A	30 ± 29	43	6 ± 10	31
DFF-DR01-S1-M-043	N/A	N/A	34 ± 30	43	10 ± 11	31
DFF-DR01-S1-M-044	N/A	N/A	24 ± 28	43	17 ± 13	31
DFF-DR01-S1-M-045	N/A	N/A	28 ± 29	43	19 ± 13	31
DFF-DR01-S1-M-046	N/A	N/A	34 ± 30	43	14 ± 12	31
DFF-DR01-S1-M-047	N/A	N/A	23 ± 28	43	6 ± 10	31
DFF-DR01-S1-M-048	N/A	N/A	17 ± 27	43	15 ± 12	31
DFF-DR01-S1-M-049	N/A	N/A	18 ± 27	43	14 ± 12	31
DFF-DR01-S1-M-050	N/A	N/A	13 ± 26	43	14 ± 12	31
DFF-DR01-S1-M-051	N/A	N/A	13 ± 26	43	14 ± 12	31
DFF-DR01-S1-M-052	N/A	N/A	20 ± 27	43	15 ± 12	31
DFF-DR01-S1-M-053	N/A	N/A	33 ± 30	43	12 ± 12	31
DFF-DR01-S1-M-054	N/A	N/A	20 ± 27	43	12 ± 12	31
DFF-DR01-S1-M-055	N/A	N/A	30 ± 29	43	12 ± 12	31
DFF-DR01-S1-M-058	N/A	N/A	12 ± 26	43	15 ± 12	31
DFF-DR01-S1-M-059	N/A	N/A	51 ± 32	43	16 ± 13	31
DFF-DR01-S1-M-060	N/A	N/A	17 ± 27	43	16 ± 13	31
DFF-DR01-S1-M-061	N/A	N/A	29 ± 29	43	15 ± 12	31
DFF-DR01-S1-M-062	N/A	N/A	41 ± 31	43	31 ± 15	31
DFF-DR01-S1-M-063	N/A	N/A	20 ± 27	43	12 ± 12	31
DFF-DR01-S1-M-064	N/A	N/A	13 ± 26	43	18 ± 13	31
DFF-DR01-S1-M-065	N/A	N/A	31 ± 29	43	16 ± 13	31
DFF-DR01-S1-M-066	N/A	N/A	48 ± 32	43	16 ± 13	31

Building System Survey Results

Building DFF **Survey Unit DR01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-DR01-S1-M-067	N/A	N/A	28 ± 29	43	19 ± 13	31
DFF-DR01-S1-M-068	N/A	N/A	37 ± 30	43	7 ± 11	31
DFF-DR01-S1-M-069	N/A	N/A	18 ± 27	43	21 ± 14	31
DFF-DR01-S1-M-070	N/A	N/A	12 ± 26	43	23 ± 14	31
DFF-DR01-S1-M-071	N/A	N/A	20 ± 27	43	17 ± 13	31
DFF-DR01-S1-M-072	N/A	N/A	42 ± 31	43	16 ± 13	31
DFF-DR01-S1-M-073	N/A	N/A	20 ± 27	43	8 ± 11	31
DFF-DR01-S1-M-074	N/A	N/A	34 ± 30	43	15 ± 12	31
DFF-DR01-S1-M-075	N/A	N/A	54 ± 33	43	11 ± 12	31
DFF-DR01-S1-M-076	N/A	N/A	41 ± 31	43	14 ± 12	31

Summary for Survey Unit # DR01 (74 detail records)

	Tritium	Carbon-14
Average	29	15
Minimum	8	5
Maximum	83	81
Standard Deviation	14	9

Building System Survey Results

Building DFF **Survey Unit VA01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VA01-S1-M-001	N/A	N/A	27 ± 29	43	13 ± 12	31
DFF-VA01-S1-M-004	N/A	N/A	30 ± 29	43	13 ± 12	31
DFF-VA01-S1-M-005	N/A	N/A	18 ± 27	43	11 ± 12	31
DFF-VA01-S1-M-006	N/A	N/A	11 ± 26	43	24 ± 14	31
DFF-VA01-S1-M-008	N/A	N/A	43 ± 31	43	11 ± 12	31
DFF-VA01-S1-M-009	N/A	N/A	28 ± 29	43	23 ± 14	31
DFF-VA01-S1-M-010	N/A	N/A	20 ± 27	43	22 ± 14	31
DFF-VA01-S1-M-011	N/A	N/A	33 ± 30	43	12 ± 12	31
DFF-VA01-S1-M-012	N/A	N/A	30 ± 29	43	17 ± 13	31
DFF-VA01-S1-M-013	N/A	N/A	22 ± 28	43	15 ± 12	31
DFF-VA01-S1-M-014	N/A	N/A	20 ± 27	43	12 ± 12	31
DFF-VA01-S1-M-015	N/A	N/A	28 ± 29	43	22 ± 14	31
DFF-VA01-S1-M-016	N/A	N/A	17 ± 27	43	25 ± 14	31
DFF-VA01-S1-M-017	N/A	N/A	15 ± 26	43	17 ± 13	31
DFF-VA01-S1-M-018	N/A	N/A	14 ± 26	43	19 ± 13	31
DFF-VA01-S1-M-020	N/A	N/A	9 ± 25	43	17 ± 13	31
DFF-VA01-S1-M-022	N/A	N/A	11 ± 26	43	22 ± 14	31
DFF-VA01-S1-M-023	N/A	N/A	22 ± 28	43	13 ± 12	31
DFF-VA01-S1-M-024	N/A	N/A	22 ± 28	43	6 ± 10	31
DFF-VA01-S1-M-025	N/A	N/A	15 ± 26	43	16 ± 13	31
DFF-VA01-S1-M-026	N/A	N/A	21 ± 28	43	17 ± 13	31
DFF-VA01-S1-M-027	N/A	N/A	32 ± 29	43	24 ± 14	31
DFF-VA01-S1-M-028	N/A	N/A	24 ± 28	43	15 ± 12	31
DFF-VA01-S1-M-029	N/A	N/A	22 ± 28	43	13 ± 12	31
DFF-VA01-S1-M-030	N/A	N/A	29 ± 29	43	11 ± 12	31
DFF-VA01-S1-M-031	N/A	N/A	16 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-032	N/A	N/A	12 ± 26	43	20 ± 13	31
DFF-VA01-S1-M-033	N/A	N/A	79 ± 36	43	57 ± 19	31
DFF-VA01-S1-M-036	N/A	N/A	28 ± 29	43	7 ± 11	31
DFF-VA01-S1-M-040	N/A	N/A	21 ± 28	43	14 ± 12	31
DFF-VA01-S1-M-041	N/A	N/A	20 ± 27	43	10 ± 11	31
DFF-VA01-S1-M-042	N/A	N/A	13 ± 26	43	16 ± 13	31

Building System Survey Results

Building DFF **Survey Unit VA01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VA01-S1-M-043	N/A	N/A	68 ± 35	43	13 ± 12	31
DFF-VA01-S1-M-044	N/A	N/A	23 ± 28	43	20 ± 13	31
DFF-VA01-S1-M-045	N/A	N/A	21 ± 28	43	13 ± 12	31
DFF-VA01-S1-M-046	N/A	N/A	22 ± 28	43	19 ± 13	31
DFF-VA01-S1-M-047	N/A	N/A	34 ± 30	43	23 ± 14	31
DFF-VA01-S1-M-048	N/A	N/A	19 ± 27	43	9 ± 11	31
DFF-VA01-S1-M-049	N/A	N/A	39 ± 31	43	14 ± 12	31
DFF-VA01-S1-M-050	N/A	N/A	22 ± 28	43	21 ± 14	31
DFF-VA01-S1-M-051	N/A	N/A	19 ± 27	43	15 ± 12	31
DFF-VA01-S1-M-052	N/A	N/A	24 ± 28	43	12 ± 12	31
DFF-VA01-S1-M-053	N/A	N/A	28 ± 29	43	19 ± 13	31
DFF-VA01-S1-M-054	N/A	N/A	18 ± 27	43	11 ± 12	31
DFF-VA01-S1-M-055	N/A	N/A	18 ± 27	43	22 ± 14	31
DFF-VA01-S1-M-064	N/A	N/A	16 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-065	N/A	N/A	24 ± 28	43	7 ± 11	31
DFF-VA01-S1-M-068	N/A	N/A	18 ± 27	43	14 ± 12	31
DFF-VA01-S1-M-069	N/A	N/A	17 ± 27	43	21 ± 14	31
DFF-VA01-S1-M-072	N/A	N/A	4 ± 24	43	25 ± 14	31
DFF-VA01-S1-M-073	N/A	N/A	30 ± 29	43	11 ± 12	31
DFF-VA01-S1-M-074	N/A	N/A	15 ± 26	43	15 ± 12	31
DFF-VA01-S1-M-075	N/A	N/A	20 ± 27	43	14 ± 12	31
DFF-VA01-S1-M-076	N/A	N/A	30 ± 29	43	15 ± 12	31
DFF-VA01-S1-M-077	N/A	N/A	25 ± 28	43	26 ± 14	31
DFF-VA01-S1-M-078	N/A	N/A	16 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-079	N/A	N/A	26 ± 28	43	22 ± 14	31
DFF-VA01-S1-M-080	N/A	N/A	39 ± 31	43	13 ± 12	31
DFF-VA01-S1-M-081	N/A	N/A	16 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-082	N/A	N/A	11 ± 26	43	14 ± 12	31
DFF-VA01-S1-M-083	N/A	N/A	12 ± 26	43	15 ± 12	31
DFF-VA01-S1-M-084	N/A	N/A	25 ± 28	43	4 ± 10	31
DFF-VA01-S1-M-085	N/A	N/A	16 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-086	N/A	N/A	12 ± 26	43	20 ± 13	31

Building System Survey Results

Building DFF   Survey Unit VA01   Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VA01-S1-M-087	N/A	N/A	20 ± 27	43	6 ± 10	31
DFF-VA01-S1-M-088	N/A	N/A	15 ± 26	43	15 ± 12	31
DFF-VA01-S1-M-089	N/A	N/A	21 ± 28	43	15 ± 12	31
DFF-VA01-S1-M-090	N/A	N/A	24 ± 28	43	12 ± 12	31
DFF-VA01-S1-M-091	N/A	N/A	14 ± 26	43	14 ± 12	31
DFF-VA01-S1-M-092	N/A	N/A	13 ± 26	43	19 ± 13	31
DFF-VA01-S1-M-094	N/A	N/A	87 ± 37	43	14 ± 12	31
DFF-VA01-S1-M-095	N/A	N/A	13 ± 26	43	15 ± 12	31
DFF-VA01-S1-M-096	N/A	N/A	13 ± 26	43	9 ± 11	31
DFF-VA01-S1-M-097	N/A	N/A	24 ± 28	43	8 ± 11	31
DFF-VA01-S1-M-098	N/A	N/A	17 ± 27	43	16 ± 13	31
DFF-VA01-S1-M-099	N/A	N/A	12 ± 26	43	21 ± 14	31
DFF-VA01-S1-M-100	N/A	N/A	27 ± 29	43	17 ± 13	31
DFF-VA01-S1-M-101	N/A	N/A	35 ± 30	43	5 ± 10	31
DFF-VA01-S1-M-102	N/A	N/A	26 ± 28	43	25 ± 14	31
DFF-VA01-S1-M-103	N/A	N/A	23 ± 28	43	15 ± 12	31
DFF-VA01-S1-M-104	N/A	N/A	24 ± 28	43	26 ± 14	31
DFF-VA01-S1-M-105	N/A	N/A	35 ± 30	43	13 ± 12	31
DFF-VA01-S1-M-106	N/A	N/A	33 ± 30	43	11 ± 12	31
DFF-VA01-S1-M-107	N/A	N/A	17 ± 27	43	10 ± 11	31
DFF-VA01-S1-M-108	N/A	N/A	23 ± 28	43	12 ± 12	31
DFF-VA01-S1-M-109	N/A	N/A	31 ± 29	43	27 ± 15	31
DFF-VA01-S1-M-110	N/A	N/A	18 ± 27	43	15 ± 12	31
DFF-VA01-S1-M-111	N/A	N/A	24 ± 28	43	29 ± 15	31
DFF-VA01-S1-M-112	N/A	N/A	13 ± 26	43	16 ± 13	31
DFF-VA01-S1-M-113	N/A	N/A	28 ± 29	43	22 ± 14	31
DFF-VA01-S1-M-114	N/A	N/A	26 ± 28	43	12 ± 12	31
DFF-VA01-S1-M-115	N/A	N/A	14 ± 26	43	13 ± 12	31
DFF-VA01-S1-M-116	N/A	N/A	25 ± 28	43	10 ± 11	31
DFF-VA01-S1-M-117	N/A	N/A	10 ± 26	43	19 ± 13	31
DFF-VA01-S1-M-118	N/A	N/A	29 ± 29	43	11 ± 12	31
DFF-VA01-S1-M-119	N/A	N/A	16 ± 27	43	15 ± 12	31

Building System Survey Results

Building DFF **Survey Unit VA01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VA01-S1-M-122	N/A	N/A	17 ± 27	43	19 ± 13	31
DFF-VA01-S1-M-123	N/A	N/A	27 ± 29	43	14 ± 12	31
DFF-VA01-S1-M-124	N/A	N/A	39 ± 31	43	14 ± 12	31
DFF-VA01-S1-M-125	N/A	N/A	11 ± 26	43	19 ± 13	31
DFF-VA01-S1-M-126	N/A	N/A	18 ± 27	43	24 ± 14	31
DFF-VA01-S1-M-127	N/A	N/A	17 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-128	N/A	N/A	19 ± 27	43	9 ± 11	31
DFF-VA01-S1-M-129	N/A	N/A	27 ± 29	43	17 ± 13	31
DFF-VA01-S1-M-130	N/A	N/A	14 ± 26	43	12 ± 12	31
DFF-VA01-S1-M-131	N/A	N/A	20 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-132	N/A	N/A	20 ± 27	43	14 ± 12	31
DFF-VA01-S1-M-133	N/A	N/A	27 ± 29	43	13 ± 12	31
DFF-VA01-S1-M-134	N/A	N/A	15 ± 26	43	19 ± 13	31
DFF-VA01-S1-M-135	N/A	N/A	20 ± 27	43	13 ± 12	31
DFF-VA01-S1-M-136	N/A	N/A	28 ± 29	43	7 ± 11	31
DFF-VA01-S1-M-137	N/A	N/A	23 ± 28	43	82 ± 22	31
DFF-VA01-S1-M-138	N/A	N/A	48 ± 32	43	13 ± 12	31
DFF-VA01-S1-M-139	N/A	N/A	23 ± 28	43	19 ± 13	31
DFF-VA01-S1-M-140	N/A	N/A	23 ± 28	43	18 ± 13	31
DFF-VA01-S1-M-141	N/A	N/A	17 ± 27	43	16 ± 13	31
DFF-VA01-S1-M-142	N/A	N/A	12 ± 26	43	19 ± 13	31
DFF-VA01-S1-M-143	N/A	N/A	15 ± 26	43	14 ± 12	31
DFF-VA01-S1-M-144	N/A	N/A	17 ± 27	43	9 ± 11	31
DFF-VA01-S1-M-145	N/A	N/A	29 ± 29	43	11 ± 12	31
DFF-VA01-S1-M-146	N/A	N/A	17 ± 27	43	17 ± 13	31
DFF-VA01-S1-M-150	N/A	N/A	34 ± 30	43	31 ± 15	31
DFF-VA01-S1-M-154	N/A	N/A	20 ± 27	43	23 ± 14	31
DFF-VA01-S1-M-155	N/A	N/A	15 ± 26	43	15 ± 12	31
DFF-VA01-S1-M-156	N/A	N/A	30 ± 29	43	14 ± 12	31
DFF-VA01-S1-M-157	N/A	N/A	57 ± 33	43	13 ± 12	31
DFF-VA01-S1-M-158	N/A	N/A	21 ± 28	43	16 ± 13	31
DFF-VA01-S1-M-159	N/A	N/A	47 ± 32	43	35 ± 16	31

Building System Survey Results

Building DFF | **Survey Unit VA01** | **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VA01-S1-M-161	N/A	N/A	76 ± 36	43	17 ± 13	31
DFF-VA01-S1-M-162	N/A	N/A	46 ± 32	43	60 ± 19	31
DFF-VA01-S1-M-163	N/A	N/A	30 ± 29	43	14 ± 12	31
DFF-VA01-S1-M-164	N/A	N/A	26 ± 28	43	20 ± 13	31
DFF-VA01-S1-M-165	N/A	N/A	20 ± 27	43	11 ± 12	31
DFF-VA01-S1-M-166	N/A	N/A	14 ± 26	43	15 ± 12	31
DFF-VA01-S1-M-167	N/A	N/A	24 ± 28	43	72 ± 21	31
DFF-VA01-S1-M-168	N/A	N/A	11 ± 26	43	21 ± 14	31
DFF-VA01-S1-M-169	N/A	N/A	21 ± 28	43	16 ± 13	31
DFF-VA01-S1-M-170	N/A	N/A	37 ± 30	43	18 ± 13	31
DFF-VA01-S1-M-172	N/A	N/A	18 ± 27	43	14 ± 12	31
DFF-VA01-S1-M-173	N/A	N/A	68 ± 35	43	22 ± 14	31
DFF-VA01-S1-M-174	N/A	N/A	49 ± 32	43	16 ± 13	31
DFF-VA01-S1-M-175	N/A	N/A	26 ± 28	43	12 ± 12	31
DFF-VA01-S1-M-176	N/A	N/A	20 ± 27	43	9 ± 11	31
DFF-VA01-S1-M-178	N/A	N/A	30 ± 29	43	7 ± 11	31
DFF-VA01-S1-M-180	N/A	N/A	20 ± 27	43	12 ± 12	31
DFF-VA01-S1-M-181	N/A	N/A	24 ± 28	43	12 ± 12	31
DFF-VA01-S1-M-182	N/A	N/A	36 ± 30	43	16 ± 13	31
DFF-VA01-S1-M-183	N/A	N/A	12 ± 26	43	20 ± 13	31
DFF-VA01-S1-M-185	N/A	N/A	25 ± 28	43	19 ± 13	31
DFF-VA01-S1-M-186	N/A	N/A	44 ± 31	43	17 ± 13	31
DFF-VA01-S1-M-187	N/A	N/A	18 ± 27	43	19 ± 13	31
DFF-VA01-S1-M-188	N/A	N/A	58 ± 33	43	10 ± 11	31
DFF-VA01-S1-M-189	N/A	N/A	45 ± 32	43	19 ± 13	31
DFF-VA01-S1-M-190	N/A	N/A	22 ± 28	43	22 ± 14	31
DFF-VA01-S1-M-191	N/A	N/A	25 ± 28	43	12 ± 12	31
DFF-VA01-S1-M-192	N/A	N/A	35 ± 30	43	24 ± 14	31
DFF-VA01-S1-M-193	N/A	N/A	7 ± 25	43	16 ± 13	31
DFF-VA01-S1-M-194	N/A	N/A	27 ± 29	43	20 ± 13	31
DFF-VA01-S1-M-195	N/A	N/A	37 ± 30	43	13 ± 12	31
DFF-VA01-S1-M-196	N/A	N/A	24 ± 28	43	16 ± 13	31

Building System Survey Results

Building DFF **Survey Unit VA01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VA01-S1-M-197	N/A	N/A	24 ± 28	43	16 ± 13	31
DFF-VA01-S1-M-198	N/A	N/A	20 ± 27	43	16 ± 13	31
DFF-VA01-S1-M-199	N/A	N/A	10 ± 26	43	12 ± 12	31
DFF-VA01-S1-M-200	N/A	N/A	27 ± 29	43	11 ± 12	31
DFF-VA01-S1-M-201	N/A	N/A	36 ± 30	43	25 ± 14	31
DFF-VA01-S1-M-202	N/A	N/A	32 ± 29	43	17 ± 13	31
DFF-VA01-S1-M-203	N/A	N/A	31 ± 29	43	14 ± 12	31
DFF-VA01-S1-M-204	N/A	N/A	30 ± 29	43	15 ± 12	31
DFF-VA01-S1-M-205	N/A	N/A	14 ± 26	43	21 ± 14	31
DFF-VA01-S1-M-206	N/A	N/A	16 ± 27	43	11 ± 12	31
DFF-VA01-S1-M-207	N/A	N/A	98 ± 39	43	27 ± 15	31
DFF-VA01-S1-M-208	N/A	N/A	27 ± 29	43	12 ± 12	31
DFF-VA01-S1-M-209	N/A	N/A	43 ± 31	43	94 ± 23	31
DFF-VA01-S1-M-210	N/A	N/A	27 ± 29	43	13 ± 12	31
DFF-VA01-S1-M-211	N/A	N/A	21 ± 28	43	24 ± 14	31
DFF-VA01-S1-M-212	N/A	N/A	40 ± 31	43	11 ± 12	31
DFF-VA01-S1-M-213	N/A	N/A	22 ± 28	43	17 ± 13	31
DFF-VA01-S1-M-214	N/A	N/A	31 ± 29	43	11 ± 12	31
DFF-VA01-S1-M-215	N/A	N/A	51 ± 32	43	49 ± 18	31
DFF-VA01-S1-M-216	N/A	N/A	37 ± 30	43	15 ± 12	31
DFF-VA01-S1-M-217	N/A	N/A	19 ± 27	43	11 ± 12	31
DFF-VA01-S1-M-218	N/A	N/A	30 ± 29	43	37 ± 16	31
DFF-VA01-S1-M-219	N/A	N/A	37 ± 30	43	28 ± 15	31
DFF-VA01-S1-M-220	N/A	N/A	14 ± 26	43	37 ± 16	31
DFF-VA01-S1-M-221	N/A	N/A	19 ± 27	43	25 ± 14	31
DFF-VA01-S1-M-223	N/A	N/A	16 ± 27	43	11 ± 12	31
DFF-VA01-S1-M-224	N/A	N/A	37 ± 30	43	12 ± 12	31
DFF-VA01-S1-M-225	N/A	N/A	34 ± 30	43	26 ± 14	31
DFF-VA01-S1-M-228	N/A	N/A	33 ± 30	43	20 ± 13	31
DFF-VA01-S1-M-229	N/A	N/A	24 ± 28	43	24 ± 14	31
DFF-VA01-S1-M-230	N/A	N/A	24 ± 28	43	21 ± 14	31
DFF-VA01-S1-M-231	N/A	N/A	19 ± 27	43	15 ± 12	31

Building System Survey Results

Building DFF **Survey Unit VA01** **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VA01-S1-M-233	N/A	N/A	38 ± 30	43	9 ± 11	31
DFF-VA01-S1-M-234	N/A	N/A	26 ± 28	43	16 ± 13	31
DFF-VA01-S1-M-235	N/A	N/A	22 ± 28	43	29 ± 15	31
DFF-VA01-S1-M-236	N/A	N/A	14 ± 26	43	22 ± 14	31
DFF-VA01-S1-M-237	N/A	N/A	9 ± 25	43	31 ± 15	31
DFF-VA01-S1-M-238	N/A	N/A	14 ± 26	43	17 ± 13	31
DFF-VA01-S1-M-239	N/A	N/A	12 ± 26	43	20 ± 13	31
DFF-VA01-S1-M-240	N/A	N/A	21 ± 28	43	16 ± 13	31
DFF-VA01-S1-M-241	N/A	N/A	18 ± 27	43	16 ± 13	31
DFF-VA01-S1-M-242	N/A	N/A	12 ± 26	43	12 ± 12	31
DFF-VA01-S1-M-243	N/A	N/A	32 ± 29	43	12 ± 12	31
DFF-VA01-S1-M-244	N/A	N/A	71 ± 35	43	16 ± 13	31
DFF-VA01-S1-M-246	N/A	N/A	116 ± 41	43	12 ± 12	31
DFF-VA01-S1-M-250	N/A	N/A	144 ± 44	43	27 ± 15	31
DFF-VA01-S1-M-256	N/A	N/A	58 ± 33	43	25 ± 14	31
DFF-VA01-S1-M-261	N/A	N/A	19 ± 27	43	21 ± 14	31
DFF-VA01-S1-M-263	N/A	N/A	120 ± 42	43	122 ± 26	31
DFF-VA01-S1-M-264	N/A	N/A	30 ± 29	43	22 ± 14	31
DFF-VA01-S1-M-265	N/A	N/A	69 ± 35	43	14 ± 12	31
DFF-VA01-S1-M-271	N/A	N/A	116 ± 41	43	7 ± 11	31
DFF-VA01-S1-M-272	N/A	N/A	22 ± 28	43	113 ± 25	31
DFF-VA01-S1-M-273	N/A	N/A	182 ± 48	43	17 ± 13	31
DFF-VA01-S1-M-274	N/A	N/A	43 ± 31	43	27 ± 15	31
DFF-VA01-S1-M-276	N/A	N/A	99 ± 39	43	164 ± 30	31
DFF-VA01-S1-M-277	N/A	N/A	71 ± 35	43	83 ± 22	31
DFF-VA01-S1-M-278	N/A	N/A	58 ± 33	43	79 ± 22	31
DFF-VA01-S1-M-279	N/A	N/A	37 ± 30	43	39 ± 16	31
DFF-VA01-S1-M-280	N/A	N/A	35 ± 30	43	11 ± 12	31
DFF-VA01-S1-M-281	N/A	N/A	57 ± 33	43	19 ± 13	31
DFF-VA01-S1-M-282	N/A	N/A	62 ± 34	43	25 ± 14	31
DFF-VA01-S1-M-283	N/A	N/A	62 ± 34	43	16 ± 13	31

Building System Survey Results

Building DFF   Survey Unit VA01   Class N/A

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
Summary for Survey Unit # VA01 (223 detail records)						
Average			30		20	
Minimum			4		4	
Maximum			182		164	
Standard Deviation			23		18	

Building System Survey Results

Building DFF | **Survey Unit VE01** | **Class N/A**

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VE01-S1-M-001	N/A	N/A	27 ± 29	43	9 ± 11	31
DFF-VE01-S1-M-002	N/A	N/A	20 ± 27	43	19 ± 13	31
DFF-VE01-S1-M-003	N/A	N/A	25 ± 28	43	21 ± 14	31
DFF-VE01-S1-M-004	N/A	N/A	25 ± 28	43	18 ± 13	31
DFF-VE01-S1-M-005	N/A	N/A	13 ± 26	43	16 ± 13	31
DFF-VE01-S1-M-006	N/A	N/A	33 ± 30	43	15 ± 12	31
DFF-VE01-S1-M-007	N/A	N/A	9 ± 25	43	17 ± 13	31
DFF-VE01-S1-M-008	N/A	N/A	18 ± 27	43	15 ± 12	31
DFF-VE01-S1-M-009	N/A	N/A	25 ± 28	43	10 ± 11	31
DFF-VE01-S1-M-010	N/A	N/A	28 ± 29	43	8 ± 11	31
DFF-VE01-S1-M-011	N/A	N/A	20 ± 27	43	14 ± 12	31
DFF-VE01-S1-M-012	N/A	N/A	10 ± 26	43	19 ± 13	31
DFF-VE01-S1-M-013	N/A	N/A	26 ± 28	43	21 ± 14	31
DFF-VE01-S1-M-014	N/A	N/A	20 ± 27	43	14 ± 12	31
DFF-VE01-S1-M-015	N/A	N/A	18 ± 27	43	21 ± 14	31
DFF-VE01-S1-M-016	N/A	N/A	18 ± 27	43	19 ± 13	31
DFF-VE01-S1-M-017	N/A	N/A	20 ± 27	43	11 ± 12	31
DFF-VE01-S1-M-018	N/A	N/A	15 ± 26	43	13 ± 12	31
DFF-VE01-S1-M-019	N/A	N/A	12 ± 26	43	25 ± 14	31
DFF-VE01-S1-M-020	N/A	N/A	17 ± 27	43	10 ± 11	31
DFF-VE01-S1-M-021	N/A	N/A	22 ± 28	43	11 ± 12	31
DFF-VE01-S1-M-022	N/A	N/A	20 ± 27	43	17 ± 13	31
DFF-VE01-S1-M-023	N/A	N/A	24 ± 28	43	19 ± 13	31
DFF-VE01-S1-M-024	N/A	N/A	17 ± 27	43	9 ± 11	31
DFF-VE01-S1-M-025	N/A	N/A	26 ± 28	43	15 ± 12	31
DFF-VE01-S1-M-026	N/A	N/A	19 ± 27	43	18 ± 13	31
DFF-VE01-S1-M-027	N/A	N/A	23 ± 28	43	17 ± 13	31
DFF-VE01-S1-M-028	N/A	N/A	22 ± 28	43	20 ± 13	31
DFF-VE01-S1-M-029	N/A	N/A	15 ± 26	43	17 ± 13	31
DFF-VE01-S1-M-030	N/A	N/A	13 ± 26	43	15 ± 12	31
DFF-VE01-S1-M-031	N/A	N/A	23 ± 28	43	18 ± 13	31
DFF-VE01-S1-M-032	N/A	N/A	14 ± 26	43	20 ± 13	31

Building System Survey Results

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

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VE01-S1-M-033	N/A	N/A	16 ± 27	43	19 ± 13	31
DFF-VE01-S1-M-034	N/A	N/A	20 ± 27	43	15 ± 12	31
DFF-VE01-S1-M-035	N/A	N/A	22 ± 28	43	7 ± 11	31
DFF-VE01-S1-M-036	N/A	N/A	35 ± 30	43	26 ± 14	31
DFF-VE01-S1-M-037	N/A	N/A	6 ± 25	43	19 ± 13	31
DFF-VE01-S1-M-038	N/A	N/A	31 ± 29	43	19 ± 13	31
DFF-VE01-S1-M-039	N/A	N/A	25 ± 28	43	16 ± 13	31
DFF-VE01-S1-M-040	N/A	N/A	16 ± 27	43	13 ± 12	31
DFF-VE01-S1-M-041	N/A	N/A	30 ± 29	43	13 ± 12	31
DFF-VE01-S1-M-042	N/A	N/A	21 ± 28	43	18 ± 13	31
DFF-VE01-S1-M-043	N/A	N/A	16 ± 27	43	14 ± 12	31
DFF-VE01-S1-M-044	N/A	N/A	32 ± 29	43	14 ± 12	31
DFF-VE01-S1-M-045	N/A	N/A	15 ± 26	43	19 ± 13	31
DFF-VE01-S1-M-046	N/A	N/A	13 ± 26	43	21 ± 14	31
DFF-VE01-S1-M-047	-158 ± 104	352	37 ± 30	43	18 ± 13	31
DFF-VE01-S1-M-048	24 ± 106	352	32 ± 29	43	16 ± 13	31
DFF-VE01-S1-M-049	-12 ± 106	352	32 ± 29	43	20 ± 13	31
DFF-VE01-S1-M-050	N/A	N/A	28 ± 29	43	24 ± 14	31
DFF-VE01-S1-M-051	N/A	N/A	45 ± 32	43	15 ± 12	31
DFF-VE01-S1-M-052	N/A	N/A	22 ± 28	43	15 ± 12	31
DFF-VE01-S1-M-053	N/A	N/A	16 ± 27	43	24 ± 14	31
DFF-VE01-S1-M-054	N/A	N/A	23 ± 28	43	16 ± 13	31
DFF-VE01-S1-M-055	N/A	N/A	35 ± 30	43	15 ± 12	31
DFF-VE01-S1-M-056	N/A	N/A	25 ± 28	43	13 ± 12	31
DFF-VE01-S1-M-057	N/A	N/A	23 ± 28	43	16 ± 13	31
DFF-VE01-S1-M-058	N/A	N/A	18 ± 27	43	22 ± 14	31
DFF-VE01-S1-M-059	N/A	N/A	34 ± 30	43	8 ± 11	31
DFF-VE01-S1-M-060	N/A	N/A	35 ± 30	43	8 ± 11	31
DFF-VE01-S1-M-061	N/A	N/A	38 ± 30	43	8 ± 11	31
DFF-VE01-S1-M-062	N/A	N/A	36 ± 30	43	8 ± 11	31
DFF-VE01-S1-M-063	N/A	N/A	11 ± 26	43	14 ± 12	31
DFF-VE01-S1-M-064	N/A	N/A	25 ± 28	43	18 ± 13	31

Building System Survey Results

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

Location Code	Total Beta Activity Measurements		Removable Activity Measurements			
			Tritium		Carbon-14	
	Activty	MDC	Activity	MDC	Activity	MDC
DFF-VE01-S1-M-065	N/A	N/A	33 ± 30	43	8 ± 11	31
DFF-VE01-S1-M-066	N/A	N/A	28 ± 29	43	17 ± 13	31
DFF-VE01-S1-M-067	N/A	N/A	21 ± 28	43	16 ± 13	31
DFF-VE01-S1-M-068	N/A	N/A	35 ± 30	43	4 ± 10	31
DFF-VE01-S1-M-069	N/A	N/A	48 ± 32	43	9 ± 11	31
DFF-VE01-S1-M-070	N/A	N/A	30 ± 29	43	14 ± 12	31
Summary for Survey Unit # VE01 (70 detail records)						
Average	-49		24		16	
Minimum	-158		6		4	
Maximum	24		48		26	
Standard Deviation	96		9		5	
Summary for Building # DFF (367 detail records)						
Avg	-49		28		18	
Min	-158		4		4	
Max	24		182		164	

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