Duratek

# Bristol-Myers Squibb Former Radiopharmaceutical Production Facility Final Status Survey Packages and Results by Survey Area

**APPENDIX A**
**BOOK 2 of 4**
**September 2003**

# APPENDIX A
# BRISTOL-MYERS SQUIBB
# FORMER RADIOPHARMACEUTICAL PRODUCTION FACILITY
# FINAL STATUS SURVEY PACKAGES
# AND RESULTS BY SURVEY AREA

for the

Bristol-Myers Squibb
Former Radiopharmaceutical Production Facility
Characterization Report

**REVISION 0**
SEPTEMBER 2003

**Prepared By:**
**Duratek, Inc.**
**Commercial Services**
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Each completed survey package will contain the following information:

- Survey Package Worksheet
- Map(s) of survey locations
- Survey location calculation sheets
- COMPASS generated building surface or surface soil survey plan
- Characterization data input to COMPASS for this survey package
- Beta survey download report
- Alpha survey download report
- Gamma survey download report
- Smear survey results form
- Soil sample analysis results summary
- Tritium smear survey results summary

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| Survey Package | Building | Room/Area Description | Surface | Tab No. |
|---|---|---|---|---|
| COMPASS | N/A | Site Report | N/A | CHR01 |
| | | ***Class 1 Survey Units Consist of the Following*** | | |
| A0100 | 124 | 146 & 147 | Floor | A0100 |
| A0200 | 124 | 148 & 149 | Floor | A0200 |
| A0300 | 124 | 150 & 152 | Soil | A0300 |
| A0310 | 124 | Corridors 146C & 150C | Floor | A0310 |
| A0400 | 124 | 151 & 153 | Floor | A0400 |
| A0500 | 124 | Former Tank Area | Floor | A0500 |
| A0600 | 124 | Stack Base | Base | A0600 |
| A0700 | 124 | 180 & 181 | Floor | A0700 |
| A0800 | 124 | Minitec Cave | Cave | A0800 |
| A0810 | 124 | MINITEC Pits | Pit | A0810 |
| A0900 | 124 | 172, 174, 175, 176, 177 | Floor | A0900 |
| A1000 | 124 | 171 & 178 | Floor | A1000 |
| A1100 | 124 | Iodine Caves | Cave | A1100 |
| A1200 | 124 | 142 | Floor | A1200 |
| A1300 | 124 | 143 | Floor | A1300 |
| A1400 | 124 | Valve Pit | All | A1400 |
| A1500 | 124 | 190 | Floor | A1500 |
| A1600 | 122 | Hot Barn Floor | Floor | A1600 |
| A1610 | 122 | Room 221 Floor | Floor | A1610 |
| A1620 | 122 | Room 222 Floor | Floor | A1620 |
| A1700 | 83 | Tank Vault (1.86) | All | A1700 |
| A1910 | 124 | 2nd Floor in Old Section-HEPA Housing | Interior | A1910 |

| Survey Package | Building | Room/Area Description | Surface | Tab No. |
|---|---|---|---|---|
| | | ***Class 2 Survey Units Consist of the Following*** | | |
| B0100 | 124 | Tank Vault | All | B0100 |
| B0200 | 124 | 144 &145 | All | B0200 |
| B0300 | 124 | 146-153 | Walls & Ceiling | B0300 |
| B0310 | 124 | Corridors 146C and 150C | Walls & Ceiling | B0310 |
| B0400 | 124 | 142 & 143 | Walls & Ceiling | B0400 |
| B0500 | 124 | 143A | All | B0500 |
| B0600 | 124 | 154 | All | B0600 |
| B0700 | 124 | 155-168, Elecrical Room, Phone Room | All | B0700 |
| B0800 | 124 | 170 | All | B0800 |
| B0900 | 124 | 171-178, + 173 Floors | Walls & Ceiling | B0900 |
| B0910 | 124 | 180 & 181 | Walls & Ceiling | B0910 |
| B1000 | 124 | 179 & 212 | All | B1000 |
| B1100 | 124 | 182-184 | All | B1100 |
| B1200 | 124 | 190 | Walls & Ceiling | B1200 |
| B1300 | 124 | 191-199 | All | B1300 |
| B1400 | 124 | 200 | All | B1400 |
| B1500 | 124 | 201-204, 204A | All | B1500 |
| B1600 | 124 | 205-207 | All | B1600 |
| B1700 | 124 | 208-210 | All | B1700 |
| B1800 | 124 | 211, 212A, 213 | All | B1800 |
| B1900 | 124 | 2nd Floor in Old Section-South | All | B1900 |
| B2000 | 124 | 2nd Floor in Old Section-North | All | B2000 |
| B2100 | 124 | 2nd Floor in New Section-South | All | B2100 |
| B2200 | 124 | 2nd Floor in New Section-Center | All | B2200 |
| B2300 | 124 | 2nd Floor in New Section-North | All | B2300 |
| B2400 | 122 | 219 & 220 | All | B2400 |
| B2500 | 122 | Hot Barn, 221 & 222 | Walls & Ceiling | B2500 |
| B2600 | 124 | Building 124 Pipe Trenches Old Section | Soil | B2600 |
| B2700 | 124 | Building 124 Pipe Trenches New Section | Soil | B2700 |
| D0100 | 124 | Building 124 Vault Area Soils | Soil | D0100 |
| | | ***Class 3 Survey Units Consist of the Following*** | | |
| C0100 | 124 | Above 1st Floor False Ceilings - Old Section | All | C0100 |
| C0200 | 124 | Above 1st Floor False Ceilings - New Section | All | C0200 |
| C0300 | 124 | 1st Floor Offices, Canteen, etc. | All | C0300 |
| C0310 | 124 | 2nd Floor Offices | All | C0310 |
| C0400 | 124 | 185-189 & 214-216 | All | C0400 |
| C0500 | 124 | Building 122 & 124 Exteriors | All | C0500 |
| C0600 | 124 | Paved Exteriors | Paved | C0600 |
| C0700 | 124 | Storm Water Vault | Walls & Ceiling | C0700 |
| E0100 | 124 | All Other Building 124 Soils | Soil | E0100 |
| E0200 | 83 | Building 83 Tank Area Soils | Soil | E0200 |

# Site Report

## Site Summary

Site Name: E.R. Squibb & Sons Decommissioning

Planner(s): Paul Ely & Bill Hoey

## Contaminant Summary

NOTE: Surface soil DCGLw units are pCi/g.
Building surface DCGLw units are dpm/100 cm².

| Contaminant | Type | DCGLw | Screening Value Used? | Area (m²) | Area Factor |
|---|---|---|---|---|---|
| C-14 | Building Surface | 3,700,000 | Yes | N/A | N/A |
| C-14 | Surface Soil | 12.00 | Yes | 1 | 609 |
| | | | | 3 | 207 |
| | | | | 10 | 65.7 |
| | | | | 30 | 23.6 |
| | | | | 100 | 8.4 |
| | | | | 300 | 4.84 |
| | | | | 1,000 | 3.06 |
| | | | | 3,000 | 2.09 |
| | | | | 10,000 | 1 |
| Co-57 | Surface Soil | 90.00 | No | 1 | 8.69 |
| | | | | 3 | 4.06 |
| | | | | 10 | 1.99 |
| | | | | 30 | 1.46 |
| | | | | 100 | 1.19 |
| | | | | 300 | 1.11 |
| | | | | 1,000 | 1.05 |
| | | | | 3,000 | 1.03 |
| | | | | 10,000 | 1 |
| Co-57 | Building Surface | 210,000 | No | N/A | N/A |
| Co-60 | Surface Soil | 3.80 | Yes | 1 | 9.81 |
| | | | | 3 | 4.39 |
| | | | | 10 | 2.12 |
| | | | | 30 | 1.52 |
| | | | | 100 | 1.23 |
| | | | | 300 | 1.13 |
| | | | | 1,000 | 1.06 |
| | | | | 3,000 | 1.04 |
| | | | | 10,000 | 1 |
| Co-60 | Building Surface | 7,100 | Yes | 1 | 22.7 |
| | | | | 4 | 5.5 |
| | | | | 9 | 2.5 |
| | | | | 16 | 1.6 |
| | | | | 25 | 1.2 |
| | | | | 36 | 1 |
| Cs-137 | Building Surface | 28,000 | Yes | 1 | 23.5 |

# Site Report

## Contaminant Summary

NOTE: Surface soil DCGLw units are pCi/g.
Building surface DCGLw units are dpm/100 cm².

| Contaminant | Type | DCGLw | Screening Value Used? | Area (m²) | Area Factor |
|---|---|---|---|---|---|
| Cs-137 | Building Surface | 28,000 | Yes | 4 | 5.7 |
| | | | | 9 | 2.6 |
| | | | | 16 | 1.7 |
| | | | | 25 | 1.2 |
| | | | | 36 | 1 |
| Cs-137 | Surface Soil | 11.00 | Yes | 1 | 11 |
| | | | | 3 | 4.98 |
| | | | | 10 | 2.41 |
| | | | | 30 | 1.75 |
| | | | | 100 | 1.41 |
| | | | | 300 | 1.28 |
| | | | | 1,000 | 1.14 |
| | | | | 3,000 | 1.1 |
| | | | | 10,000 | 1 |
| H-3 | Building Surface | 120,000,000 | Yes | 1 | 36 |
| | | | | 4 | 9 |
| | | | | 9 | 4 |
| | | | | 16 | 2.3 |
| | | | | 25 | 1.4 |
| | | | | 36 | 1 |
| H-3 | Surface Soil | 110.00 | Yes | 1 | 150 |
| | | | | 3 | 51.3 |
| | | | | 10 | 16.4 |
| | | | | 30 | 5.97 |
| | | | | 100 | 2.18 |
| | | | | 300 | 1.38 |
| | | | | 1,000 | 1.08 |
| | | | | 3,000 | 1.06 |
| | | | | 10,000 | 1 |
| Mn-54 | Surface Soil | 9.00 | No | 1 | 9.52 |
| | | | | 3 | 4.3 |
| | | | | 10 | 2.08 |
| | | | | 30 | 1.5 |
| | | | | 100 | 1.22 |
| | | | | 300 | 1.12 |
| | | | | 1,000 | 1.05 |
| | | | | 3,000 | 1.03 |
| | | | | 10,000 | 1 |
| Mn-54 | Building Surface | 32,000 | Yes | N/A | N/A |
| Na-22 | Surface Soil | 4.30 | Yes | 1 | 9.44 |
| | | | | 3 | 4.28 |
| | | | | 10 | 2.07 |
| | | | | 30 | 1.51 |
| | | | | 100 | 1.22 |
| | | | | 300 | 1.13 |
| | | | | 1,000 | 1.08 |

# Site Report

## Contaminant Summary

NOTE: Surface soil DCGLw units are pCi/g.
Building surface DCGLw units are dpm/100 cm².

| Contaminant | Type | DCGLw | Screening Value Used? | Area (m²) | Area Factor |
|---|---|---|---|---|---|
| Na-22 | Surface Soil | 4.30 | Yes | 3,000 | 1.05 |
| | | | | 10,000 | 1 |
| Na-22 | Building Surface | 9,500 | Yes | N/A | N/A |
| Sr-85 | Surface Soil | 16.00 | No | N/A | N/A |
| Sr-85 | Building Surface | 140,000 | No | N/A | N/A |
| Tc-99 | Building Surface | 1,300,000 | Yes | N/A | N/A |
| Tc-99 | Surface Soil | 19.00 | Yes | 1 | 185 |
| | | | | 3 | 62.8 |
| | | | | 10 | 20 |
| | | | | 30 | 7.16 |
| | | | | 100 | 2.55 |
| | | | | 300 | 1.54 |
| | | | | 1,000 | 1.07 |
| | | | | 3,000 | 1.02 |
| | | | | 10,000 | 1 |

Duratek, Inc.
Survey Package Worksheet for Package A0100
Bristol-Myers Squibb Building 124, Rooms 146 & 147 Floors

| | |
|---|---|
| Package Identification No.: A0100 | Prepared by: William R. Hoey |
| Location: Building 124, Rooms 146 & 147 Floors | Date prepared: 11/6/02 |
| Area Classification: Class 1 | |

## Area Description

This survey unit is Building 124, room 146 & 147 floors.

## Historical Information

- Room 146 was used for Rubratope (Co-57) manufacturing, other capsule manufacturing and filling, and R&D. Isotopes used were Co-57, Ir-192, P-32 and I-125.
- Room 147 was used for Rubratope (Co-60) manufacturing and QC testing (Co-60, I-131, Sr-82 & 85). At one time, it was a sample prep room.
- No contamination levels >5,000 dpm/100 $cm^2$ were identified during the characterization survey except on equipment that was removed during the D&D phase.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

## Survey Package: A0100 continued

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears in survey unit at five unspecified survey locations. |

**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross (5) | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| **Bristol Myers Squibb Building 124, Rooms 146 & 147 Floors** | | | | | | | | | | | | |
| A0100 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors-100% | RD / 4-29-03 | DEK / 4-29-03 | NA | NA | DEK / 4-29-03 | NA | NA |
| | | | | | | | | | | | | |

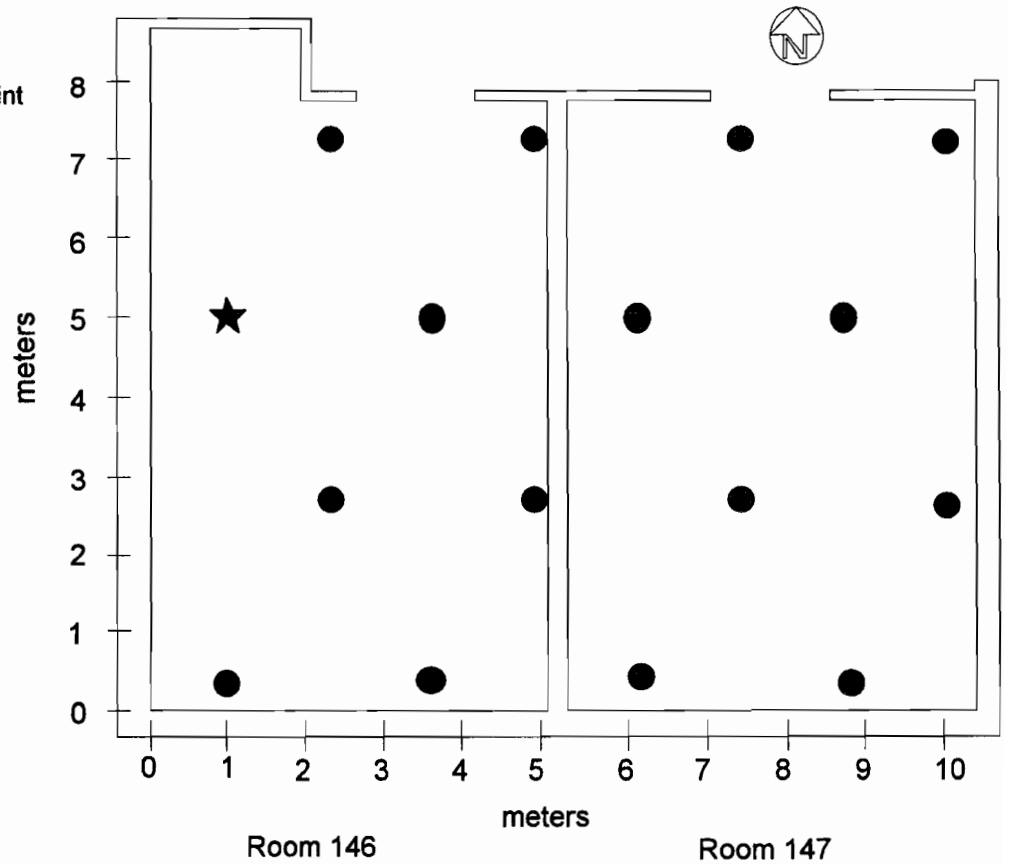
| Package Review |
|---|
| Date Package Completed: 4/30/03 |
| Package Reviewed by and Date: Paul C Ely 4/30/03 |

| Survey Comments |
|---|
| |
| |
| |
| |
| |

**SURVEY PACKAGE A0100**

★ Starting Point

| Survey Point | Survey X | Location Y |
|---|---|---|
| 1 | 1 | 5 |
| 2 | 3.6 | 5 |
| 3 | 6.2 | 5 |
| 4 | 8.8 | 5 |
| 5 | 7.5 | 7.3 |
| 6 | 4.9 | 7.3 |
| 7 | 2.3 | 7.3 |
| 8 | 2.3 | 2.7 |
| 9 | 4.9 | 2.7 |
| 10 | 7.5 | 2.7 |
| 11 | 1.0 | 0.4 |
| 12 | 3.6 | 0.4 |
| 13 | 6.2 | 0.4 |
| 14 | 8.8 | 0.4 |
| 15 | 10.1 | 7.3 |
| 16 | 10.1 | 2.7 |



**Survey Package A0100**
**B-124 Rooms 146 & 147 Floors**

Survey Grid Worksheet

One set of coordinates randomly generated by Excel for starting point. Values were truncated. X coordinate will be generated between 0 and 11. Y coordinate generated between 0 and 8.

| X | Y |
|---|---|
| 1 | 5 |

For the triangular method, the distance between measurement points is given by:

$$L = [A/0.866N]^{1/2}$$

where:

L = distance between measurement points in meters
A = area of survey unit in $m^2$
N = number of survey points

For 146 & 147:

$$L = [90/[0.866*15]]^{1/2}$$
$$= (6.93)^{1/2} \text{ m}$$
$$= 2.6 \text{ m}$$

The distance between measurement rows is given by:

$$D = 0.866 * L$$
$$= 2.3 \text{ m}$$

The measurement points for successive rows shall be offset from the previous row by L/2 or 1.3 m.

**Survey Package A0100**
**B-124 Rms. 146 & 147 Floors**

One set of coordinates randomly generated for starting point. Values will be truncated.
X coordinate will be generated between 0 and 11. Y coordinate generated between 0 and 8

| X | Y |
|---|---|
| 1.265848 | 5.100013 |

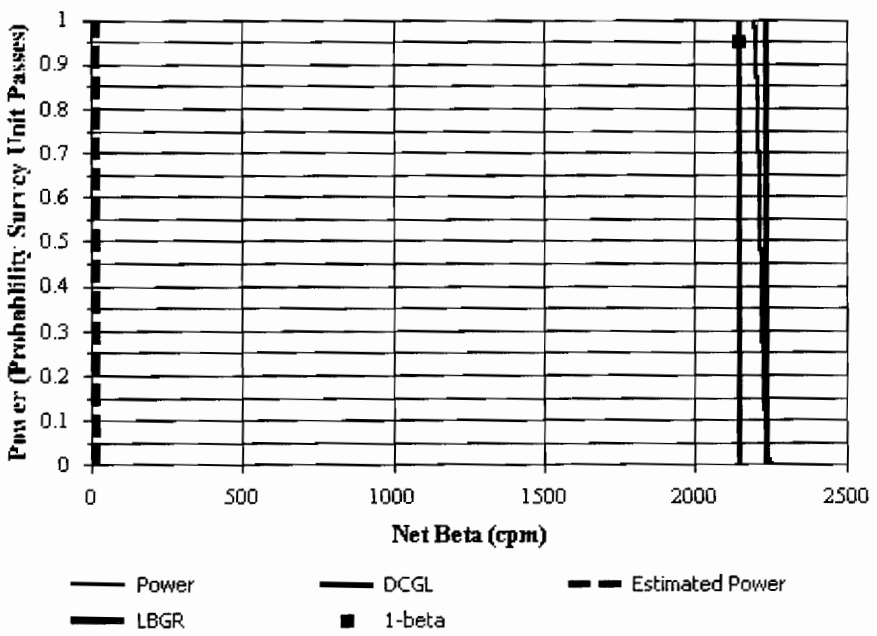
This is the Excel spread sheet used to generate the coordinates.

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0100 | | |
| Comments: | Building 124 Rooms 146 & 147 Floors | | |
| Area (m²): | 83 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 31.5 |
| DCGL (cpm): | 2,237 | Sample Size (N): | 14 |
| LBGR (cpm): | 2,147 | Estimated Conc. (cpm): | 21.5 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.25 |
| Gross Beta DCGLw (cpm): | 2,237 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.50 | 0.50 | 0.2500 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 256 ± 22 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Linoleum | 22 | 234 | 22.7 | 235 |

Characterization
Survey Package A0100
B-124, Rooms 146+147 Floors

# Duratek Download Survey Report

| | | | | | |
|---|---|---|---|---|---|
| ***Technician Name:*** | Betty S. Kjos | ***Download File Name:*** | 00000003 | ***User ID*** | ***Det Type (L4)*** |
| ***M2350 SN*** | 98651 | ***Detector Area:*** | 126 | BSK0490 | 02200 |
| ***Detector SN*** | 092524 | ***Efficiency*** | 0.139 | ***File #*** | 3 |
| ***Survey Start Date:*** | 1/3/02 | ***MeasurementType:*** | Beta | ***Det Setup*** | 4 |

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd* | *Net DPM/100cm2* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,509.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | 99608 | 1 | 4,998.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 251 | 27,104.0 |
| ZZZZZ | 99608 | 2 | 5,263.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 251 | 28,917.1 |
| ZZZZZ | 99608 | 3 | 4,912.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 251 | 26,613.0 |
| ZZZZZ | 10002 | 11 | 2,481.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | 10002 | 12 | 32,848.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 248 | 186,136.9 |
| ZZZZZ | 10002 | 13 | 39,474.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 248 | 223,989.4 |
| ZZZZZ | 10002 | 14 | 36,899.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 248 | 209,268.9 |
| A0500 | 01F01 | 15 | 221.0 | 60 | FLDBK | B9999 | 00149 | 1 | 221 | 0.0 |
| A0500 | 01F01 | 16 | 194.0 | 60 | FLDBK | B9999 | 00149 | 2 | 194 | 0.0 |
| A0500 | 01F01 | 17 | 224.0 | 60 | FLDBK | B9999 | 00149 | 3 | 224 | 0.0 |
| A0500 | 01F01 | 18 | 244.0 | 60 | FLDBK | B9999 | 00147 | 4 | 244 | 0.0 |
| A0500 | 01F01 | 19 | 243.0 | 60 | FLDBK | B9999 | 00147 | 5 | 243 | 0.0 |
| A0500 | 01F01 | 20 | 205.0 | 60 | FLDBK | B9999 | 00147 | 6 | 205 | 0.0 |
| A0500 | 01F01 | 21 | 276.0 | 60 | FLDBK | B9999 | 00146 | 7 | 276 | 0.0 |
| A0500 | 01F01 | 22 | 262.0 | 60 | FLDBK | B9999 | 00146 | 8 | 262 | 0.0 |
| A0500 | 01F01 | 23 | 237.0 | 60 | FLDBK | B9999 | 00146 | 9 | 237 | 0.0 |
| A0500 | 01F01 | 24 | 250.0 | 60 | FLDBK | B9999 | 00148 | 10 | 250 | 0.0 |
| A0500 | 01F01 | 25 | 230.0 | 60 | FLDBK | B9999 | 00148 | 11 | 230 | 0.0 |
| A0500 | 01F01 | 26 | 237.0 | 60 | FLDBK | B9999 | 00148 | 12 | 237 | 0.0 |
| A0500 | 01F01 | 27 | 239.0 | 60 | FLDBK | B9999 | 00153 | 13 | 239 | 0.0 |
| A0500 | 01F01 | 28 | 197.0 | 60 | FLDBK | B9999 | 00153 | 14 | 197 | 0.0 |
| A0500 | 01F01 | 29 | 224.0 | 60 | FLDBK | B9999 | 00153 | 15 | 224 | 0.0 |
| A0500 | 01F01 | 30 | 224.0 | 60 | FLDBK | B9999 | 00151 | 16 | 224 | 0.0 |
| A0500 | 01F01 | 31 | 226.0 | 60 | FLDBK | B9999 | 00151 | 17 | 226 | 0.0 |
| A0500 | 01F01 | 32 | 244.0 | 60 | FLDBK | B9999 | 00151 | 18 | 244 | 0.0 |
| A0500 | 01F01 | 33 | 236.0 | 60 | FLDBK | B9999 | 00150 | 19 | 236 | 0.0 |
| A0500 | 01F01 | 34 | 249.0 | 60 | FLDBK | B9999 | 00150 | 20 | 249 | 0.0 |
| A0500 | 01F01 | 35 | 190.0 | 60 | FLDBK | B9999 | 00150 | 21 | 190 | 0.0 |
| A0500 | 01F01 | 36 | 254.0 | 60 | FLDBK | B9999 | 00152 | 22 | 254 | 0.0 |
| A0500 | 01F01 | 37 | 252.0 | 60 | FLDBK | B9999 | 00152 | 23 | 252 | 0.0 |
| A0500 | 01F01 | 38 | 241.0 | 60 | FLDBK | B9999 | 00152 | 24 | 241 | 0.0 |
| A0500 | 01F01 | 39 | 228.0 | 60 | FLDBK | B9999 | HALL | 25 | 228 | 0.0 |
| A0500 | 01F01 | 40 | 261.0 | 60 | FLDBK | B9999 | HALL | 26 | 261 | 0.0 |

***Beta Flag*** - _____

***Beta Max Flag*** 5000

Entered as linoleum floor background values into Compass

*Tuesday, March 19, 2002*

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd | Net DPM/100cm2 |
|---|---|---|---|---|---|---|---|---|---|---|
| A0500 | 01F01 | 41 | 256.0 | 60 | FLDCT | B9999 | 00149 | 1 | 221 | 199.8 |
| A0500 | 01F01 | 42 | 229.0 | 60 | FLDCT | B9999 | 00149 | 2 | 194 | 199.8 |
| A0500 | 01F01 | 43 | 226.0 | 60 | FLDCT | B9999 | 00149 | 3 | 224 | 11.4 |
| A0500 | 01F01 | 44 | 276.0 | 60 | FLDCT | B9999 | 00147 | 4 | 244 | 182.7 |
| A0500 | 01F01 | 45 | 250.0 | 60 | FLDCT | B9999 | 00147 | 5 | 243 | 40.0 |
| A0500 | 01F01 | 46 | 241.0 | 60 | FLDCT | B9999 | 00147 | 6 | 205 | 205.5 |
| A0500 | 01F01 | 47 | 292.0 | 60 | FLDCT | B9999 | 00146 | 7 | 276 | 91.4 |
| A0500 | 01F01 | 48 | 280.0 | 60 | FLDCT | B9999 | 00146 | 8 | 262 | 102.8 |
| A0500 | 01F01 | 49 | 270.0 | 60 | FLDCT | B9999 | 00146 | 9 | 237 | 188.4 |
| A0500 | 01F01 | 50 | 270.0 | 60 | FLDCT | B9999 | 00148 | 10 | 250 | 114.2 |
| A0500 | 01F01 | 51 | 250.0 | 60 | FLDCT | B9999 | 00148 | 11 | 230 | 114.2 |
| A0500 | 01F01 | 52 | 236.0 | 60 | FLDCT | B9999 | 00148 | 12 | 237 | -5.7 |
| A0500 | 01F01 | 53 | 229.0 | 60 | FLDCT | B9999 | 00153 | 13 | 239 | -57.1 |
| A0500 | 01F01 | 54 | 220.0 | 60 | FLDCT | B9999 | 00153 | 14 | 197 | 131.3 |
| A0500 | 01F01 | 55 | 247.0 | 60 | FLDCT | B9999 | 00153 | 15 | 224 | 131.3 |
| A0500 | 01F01 | 56 | 266.0 | 60 | FLDCT | B9999 | 00151 | 16 | 224 | 239.8 |
| A0500 | 01F01 | 57 | 262.0 | 60 | FLDCT | B9999 | 00151 | 17 | 226 | 205.5 |
| A0500 | 01F01 | 58 | 231.0 | 60 | FLDCT | B9999 | 00151 | 18 | 244 | -74.2 |
| A0500 | 01F01 | 59 | 265.0 | 60 | FLDCT | B9999 | 00150 | 19 | 236 | 165.6 |
| A0500 | 01F01 | 60 | 275.0 | 60 | FLDCT | B9999 | 00150 | 20 | 249 | 148.5 |
| A0500 | 01F01 | 61 | 228.0 | 60 | FLDCT | B9999 | 00150 | 21 | 190 | 217.0 |
| A0500 | 01F01 | 62 | 255.0 | 60 | FLDCT | B9999 | 00152 | 22 | 254 | 5.7 |
| A0500 | 01F01 | 63 | 247.0 | 60 | FLDCT | B9999 | 00152 | 23 | 252 | -28.5 |
| A0500 | 01F01 | 64 | 267.0 | 60 | FLDCT | B9999 | 00152 | 24 | 241 | 148.5 |
| A0500 | 01F01 | 65 | 271.0 | 60 | FLDCT | B9999 | HALL | 25 | 228 | 245.5 |
| A0500 | 01F01 | 66 | 305.0 | 60 | FLDCT | B9999 | HALL | 26 | 261 | 251.2 |
| ZZZZZ | ZZZZZ | 67 | 2,426.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | 99608 | 68 | 5,097.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 243 | 27,715.0 |
| ZZZZZ | 99608 | 69 | 5,529.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 243 | 30,161.6 |
| ZZZZZ | 99608 | 70 | 5,335.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 243 | 29,073.9 |
| ZZZZZ | 10002 | 71 | 33,897.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 243 | 182,154.8 |
| ZZZZZ | 10002 | 72 | 39,786.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 243 | 225,779.4 |
| ZZZZZ | 10002 | 73 | 35,419.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 243 | 200,845.0 |

Survey Package A0100 Gross Survey Unit Mean and σ

$$\bar{X} = \frac{\sum_{i=1}^{i=26} X_i}{26} = 234 \text{ cpm}$$

$$\sigma = \left[\frac{\sum_{i=1}^{26} (X-\bar{X})^2}{N-1}\right]^{1/2} = 21$$

**Beta Flag** - _____

**Beta Max Flag** 5000

*Tuesday, March 19, 2002*

*Page* _____ *of* _____

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyes **Signature:** [signature] **Date:** 4-30-03

Download Station #: 1 Download File #: 102
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kyes **User ID** SRK2986 **Signature:** [signature] **Date:** 4-29-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package AD100, B-124, Rooms 146-147 Floors
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR119337 | 43-68B | .237 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 296 | 2 270 | 3 260 | 4 N/A | 5 N/A | 6 N/A | 275 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .135

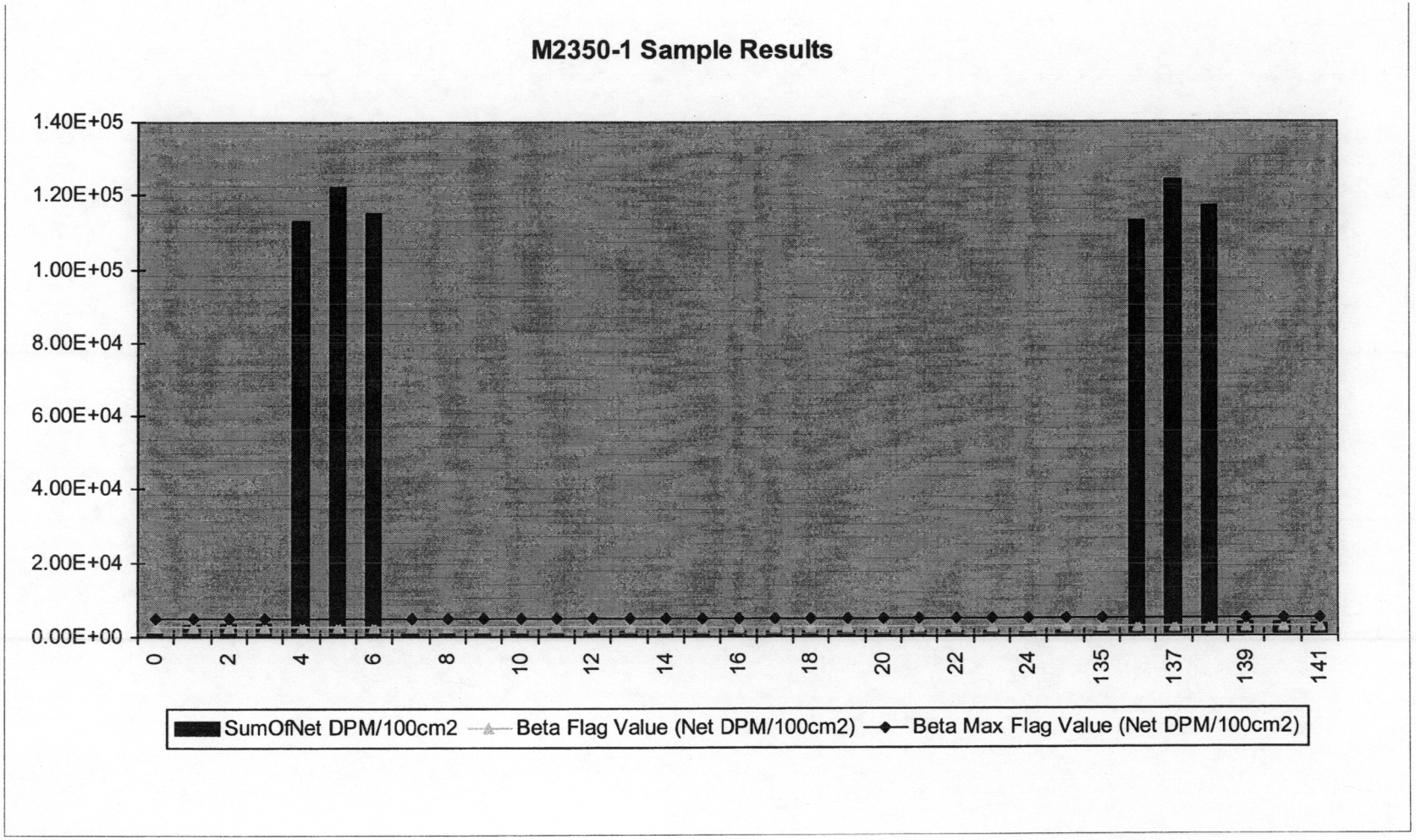
**M2350-1 Download Beta Report**

| | | |
|---|---|---|
| File Name : 00000102 | Survey Description :Package A0100, B-124, Rooms 146-147 (Floors) | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : Beta | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.237 | Survey Date : 4/29/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/25/03 |
| | | |

**Comments:**

*Sign-Off* Paul E Ely (Print Name) Paul C Ely (Signature) 8/25/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
8
10
12
14
16
18
20
22
24
135
137
139
141
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000102

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 3,012.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 1 | 1,005 |
| ZZZZZ | FD184 | 1 | 1,213.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 301 | 3,054 |
| ZZZZZ | FD184 | 2 | 1,394.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 301 | 3,660 |
| ZZZZZ | FD184 | 3 | 1,315.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 301 | 3,396 |
| ZZZZZ | 10002 | 4 | 34,115.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 301 | [redacted] |
| ZZZZZ | 10002 | 5 | 36,847.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 301 | [redacted] |
| ZZZZZ | 10002 | 6 | 34,722.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 301 | [redacted] |
| A0100 | ZZZZZ | 7 | 296.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 991 |
| A0100 | ZZZZZ | 8 | 270.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 904 |
| A0100 | ZZZZZ | 9 | 260.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 871 |
| A0100 | 01F01 | 10 | 358.0 | 60 | FLDCT | B9999 | ZZZZZ | 5 | 0.0001 | 1,199 |
| A0100 | 01F01 | 11 | 294.0 | 60 | FLDCT | B9999 | ZZZZZ | 15 | 0.0001 | 985 |
| A0100 | 01F01 | 12 | 344.0 | 60 | FLDCT | B9999 | ZZZZZ | 4 | 0.0001 | 1,152 |
| A0100 | 01F01 | 13 | 357.0 | 60 | FLDCT | B9999 | ZZZZZ | 3 | 0.0001 | 1,195 |
| A0100 | 01F01 | 14 | 364.0 | 60 | FLDCT | B9999 | ZZZZZ | 10 | 0.0001 | 1,219 |
| A0100 | 01F01 | 15 | 333.0 | 60 | FLDCT | B9999 | ZZZZZ | 16 | 0.0001 | 1,115 |
| A0100 | 01F01 | 16 | 365.0 | 60 | FLDCT | B9999 | ZZZZZ | 14 | 0.0001 | 1,222 |
| A0100 | 01F01 | 17 | 348.0 | 60 | FLDCT | B9999 | ZZZZZ | 13 | 0.0001 | 1,165 |
| A0100 | 01F01 | 18 | 347.0 | 60 | FLDCT | B9999 | ZZZZZ | 6 | 0.0001 | 1,162 |
| A0100 | 01F01 | 19 | 334.0 | 60 | FLDCT | B9999 | ZZZZZ | 7 | 0.0001 | 1,118 |
| A0100 | 01F01 | 20 | 336.0 | 60 | FLDCT | B9999 | ZZZZZ | 1 | 0.0001 | 1,125 |
| A0100 | 01F01 | 21 | 331.0 | 60 | FLDCT | B9999 | ZZZZZ | 2 | 0.0001 | 1,108 |
| A0100 | 01F01 | 22 | 395.0 | 60 | FLDCT | B9999 | ZZZZZ | 9 | 0.0001 | 1,323 |
| A0100 | 01F01 | 23 | 351.0 | 60 | FLDCT | B9999 | ZZZZZ | 12 | 0.0001 | 1,175 |
| A0100 | 01F01 | 24 | 310.0 | 60 | FLDCT | B9999 | ZZZZZ | 11 | 0.0001 | 1,038 |
| A0100 | 01F01 | 25 | 389.0 | 60 | FLDCT | B9999 | ZZZZZ | 8 | 0.0001 | 1,303 |
| ZZZZZ | ZZZZZ | 135 | 2,651.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 1 | 884 |
| ZZZZZ | 10002 | 136 | 34,059.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 265 | [redacted] |
| ZZZZZ | 10002 | 137 | 37,364.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 265 | [redacted] |
| ZZZZZ | 10002 | 138 | 35,231.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 265 | [redacted] |
| ZZZZZ | FD184 | 139 | 1,260.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 265 | 3,332 |
| ZZZZZ | FD184 | 140 | 1,284.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 265 | 3,412 |
| ZZZZZ | FD184 | 141 | 1,234.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 265 | 3,245 |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

Survey #- A0100

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by D. Kjos (Print) Signature D Kjos BSK Date 4-29-03 Time 1000

Counted by Betty S. Kjos (Print) Signature BSKjos Date 4-29-03 Time 1400

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 105 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 1 | 52 | 1 | <MDA |
| 4 | 56 | 5 | |
| 11 | 39 | 0 | |
| 13 | 44 | 0 | |
| 15 | 41 | 0 | <MDA |
| | | N | |
| | | A | |

| Circle: | MDA = 14 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 1 | 0 | 0 | <MDA |
| 4 | 1 | .70 | |
| 11 | 0 | 0 | |
| 13 | 0 | 0 | |
| 15 | 0 | 0 | <MDA |
| | | N | |
| | | A | |

Remarks-

Signature- BSKjos Reviewed by- Paul C Ely 4/30/03

Duratek, Inc.
Survey Package Worksheet for Package A0200
Bristol-Myers Squibb Building 124, Rooms 148 &149

| | |
|---|---|
| Package Identification No.: A0200 | Prepared by: Paul C. Ely |
| Location: Building 124 Room 148 &149 Floors | Date prepared: 4/18/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors in rooms 148 &149.

## Historical Information

Rooms 148 was used for Albumotope I-131 injection manufacturing, Diagnostic Capsule Manufacturing. & Filling, Research in stainless steel boxes and 72 Cap manufacturing (an I-131 therapeutic capsule). Room 149 was the Quality Control Chemists where stability work, special projects, assays and generator milking. I-131 was used in Room 148, all Building 124 radionuclides were used in Room 149.

No contamination levels >5,000 dpm/100 $cm^2$ were identified during the characterization.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A0200 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears on floor in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| Bristol Myers Squibb Building 124 Rooms 148 &149 Floors | | | | | | | | | | | | |
| A0200 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | DB 4-18-03 | BSK 4-25-03 | N/A | N/A | BSK 4-28-03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review | |
|---|---|
| Date Package Completed: | 4/30/03 |
| Package Reviewed by and Date: | Paul C Ely 4/30/03 |

| Survey Comments |
|---|
| |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A0200**
**Rooms 148 & 149 floors**

| | | |
|---|---|---|
| **X (Max):** | 10.5 | meters |
| **Y (Max):** | 8.4 | meters |
| **A (Area):** | 87 | $m^2$ |
| **N (Points):** | 25 | |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 2 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.7 | meters | (distance between rows) |
| **L/2=** | 1.0 | meters | (row offset value) |
| **X (Random):** | 1.7 | | random number generator |
| **Y (Random):** | 1.1 | | random number generator |
| **X (Origin):** | 4.2 | | initially generated random number |
| **Y (Origin):** | 6.8 | | initially generated random number |

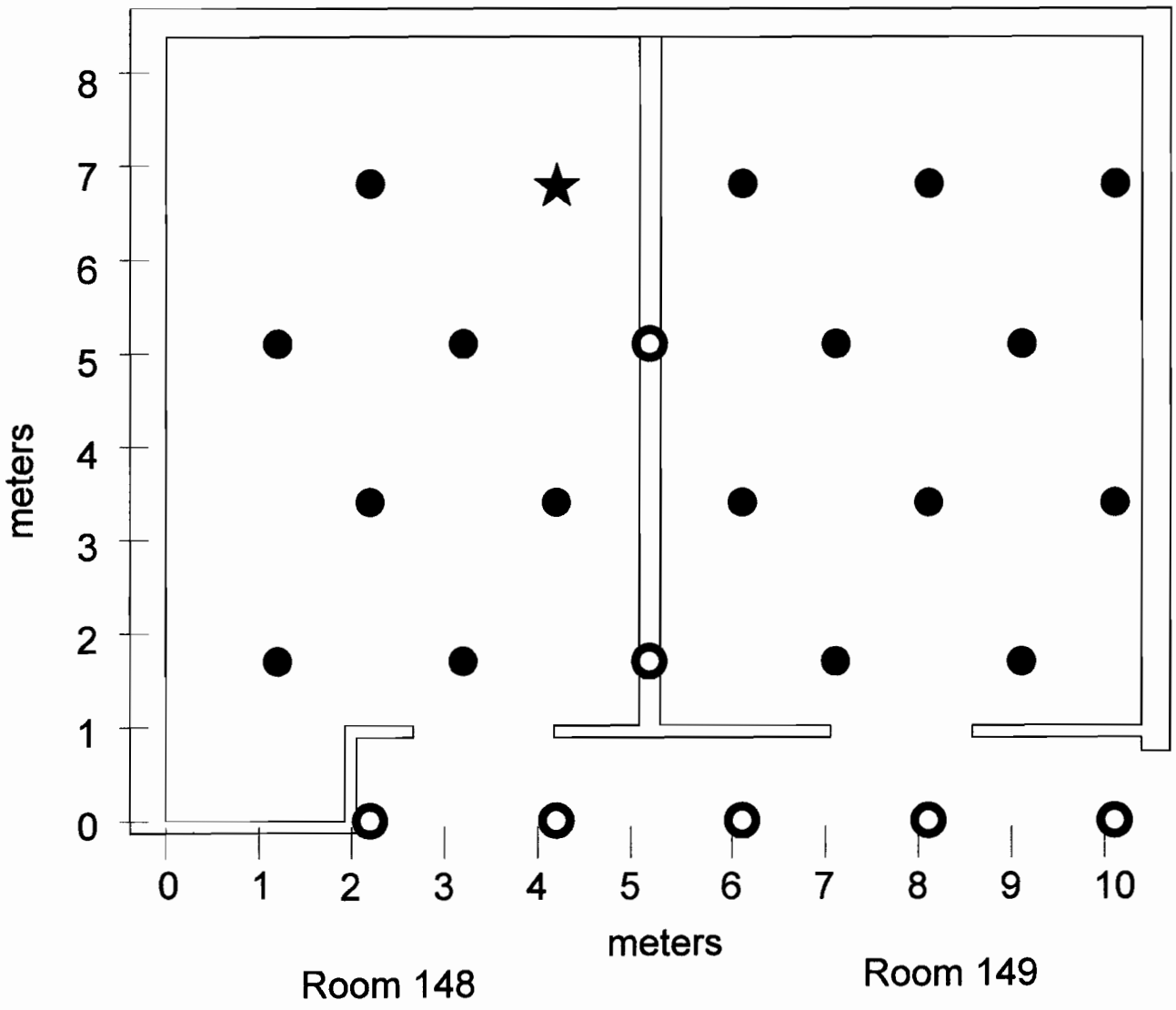
| | |
|---|---|
| **Number of rows:** | 5 |
| **Number of columns:** | 5 |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 4.2 | 6.8 | 5 |
| 2 | 6.2 | 6.8 | |
| 3 | 8.2 | 6.8 | |
| 4 | 10.2 | 6.8 | |
| 5 | 2.2 | 6.8 | |
| 6 | 5.2 | 5.1 | 4 |
| 7 | 7.2 | 5.1 | |
| 8 | 9.2 | 5.1 | |
| 9 | 3.2 | 5.1 | |
| 10 | 1.2 | 5.1 | |
| 11 | 4.2 | 3.4 | 3 |
| 12 | 6.2 | 3.4 | |
| 13 | 8.2 | 3.4 | |
| 14 | 10.2 | 3.4 | |
| 15 | 2.2 | 3.4 | |
| 16 | 5.2 | 1.7 | 2 |
| 17 | 7.2 | 1.7 | |
| 18 | 9.2 | 1.7 | |
| 19 | 3.2 | 1.7 | |
| 20 | 1.2 | 1.7 | |
| 21 | 4.2 | 0 | 1 |
| 22 | 6.2 | 0 | |
| 23 | 8.2 | 0 | |
| 24 | 10.2 | 0 | |
| 25 | 2.2 | 0 | |

★ Starting Point

| Survey Point | Survey Location X | Y |
|---|---|---|
| 1 | 4.2 | 6.8 |
| 2 | 6.2 | 6.8 |
| 3 | 8.2 | 6.8 |
| 4 | 10.2 | 6.8 |
| 5 | 2.2 | 6.8 |
| 6 | 5.2 | 5.1 |
| 7 | 7.2 | 5.1 |
| 8 | 9.2 | 5.1 |
| 9 | 3.2 | 5.1 |
| 10 | 1.2 | 5.1 |
| 11 | 4.2 | 3.4 |
| 12 | 6.2 | 3.4 |
| 13 | 8.2 | 3.4 |
| 14 | 10.2 | 3.4 |
| 15 | 2.2 | 3.4 |
| 16 | 5.2 | 1.7 |
| 17 | 7.2 | 1.7 |
| 18 | 9.2 | 1.7 |
| 19 | 3.2 | 1.7 |
| 20 | 1.2 | 1.7 |
| 21 | 4.2 | 0 |
| 22 | 6.2 | 0 |
| 23 | 8.2 | 0 |
| 24 | 10.2 | 0 |
| 25 | 2.2 | 0 |

**SURVEY PACKAGE A0200**

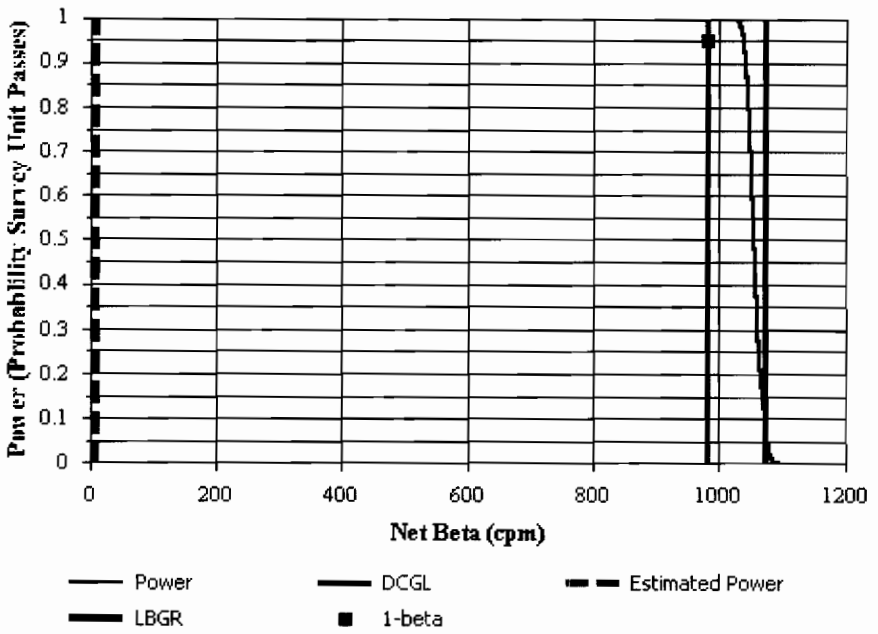


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0200 FSS Package | | |
| Comments: | B-124 Room 148 & 149 Floors | | |
| Area ($m^2$): | 80 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 30.8 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 982 | Estimated Conc. (cpm): | 10.6 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 256 ± 22 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Linoleum | 46 | 244.9 | 21.7 | 501 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0500**
**Building 124 Southwest Lab Areas (Rooms 146-153)**

FSS Packages: A0200, A0200, A0310, A0400, B0300

| | Floor | | Wall | | Ceiling | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| 1 | 221 | 256 | 234 | 276 | 222 | 236 | 243 | 271 |
| 2 | 194 | 229 | 227 | 243 | 209 | 300 | 257 | 266 |
| 3 | 224 | 226 | 278 | 266 | 266 | 257 | 265 | 265 |
| 4 | 244 | 276 | 274 | 264 | 234 | 239 | 265 | 259 |
| 5 | 243 | 250 | 270 | 291 | 215 | 222 | 294 | 253 |
| 6 | 205 | 241 | 296 | 308 | 219 | 237 | 313 | 294 |
| 7 | 276 | 292 | 257 | 288 | 233 | 260 | 234 | 265 |
| 8 | 262 | 280 | 310 | 297 | 248 | 237 | 397 | 452 |
| 9 | 236 | 270 | 304 | 316 | 237 | 233 | 278 | 242 |
| 10 | 250 | 270 | 271 | 294 | 226 | 277 | 217 | 257 |
| 11 | 230 | 250 | 294 | 286 | | | 261 | 258 |
| 12 | 237 | 236 | 272 | 234 | | | 216 | 232 |
| 13 | 239 | 229 | 257 | 316 | | | 290 | 273 |
| 14 | 197 | 220 | 254 | 249 | | | 253 | 291 |
| 15 | 224 | 247 | 249 | 281 | | | 279 | 302 |
| 16 | 224 | 266 | 215 | 251 | | | 265 | 269 |
| 17 | 226 | 262 | 239 | 245 | | | | |
| 18 | 244 | 231 | 276 | 298 | | | | |
| 19 | 236 | 265 | 285 | 258 | | | | |
| 20 | 249 | 275 | 210 | 240 | | | | |
| 21 | 190 | 228 | 267 | 241 | | | | |
| 22 | 254 | 255 | 291 | 310 | | | | |
| 23 | 252 | 247 | 309 | 317 | | | | |
| 24 | 241 | 267 | 227 | 228 | | | | |
| 25 | 228 | 271 | | | | | | |
| 26 | 261 | 305 | | | | | | |
| **Average** | **234.1** | **255.5** | **265.3** | **274.9** | **230.9** | **249.8** | **270.4** | **278.1** |
| **Standard Deviation** | **21.2** | **21.8** | **29.0** | **29.0** | **16.8** | **23.8** | **42.8** | **49.8** |
| **No of Measurements** | **26** | **26** | **24** | **24** | **10** | **10** | **16** | **16** |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | **246.0** | **262.3** | **Average** | **267.5** |
| **Standard Deviation** | **28.5** | **27.0** | **Standard Deviation** | **29.6** |
| **No of Measurements** | **60** | **60** | **No of Measurements** | **34** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kios **Signature:** [signature] **Date:** 4-26-03

Download Station #: 1 Download File #: 80
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Betty S. Kios **User ID** BSK0490 **Signature:** [signature] **Date:** 4-25-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: AD200, Bldg 124, Room 148 + 149, Floors
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ■ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☑ Beta β | 092524 | 43-68B | .224 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 340 | 2 373 | 3 308 | 4 n/a | 5 n/a | 6 n/a | 340 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .139 (7796)
PRBBK-381 AT BBK-278

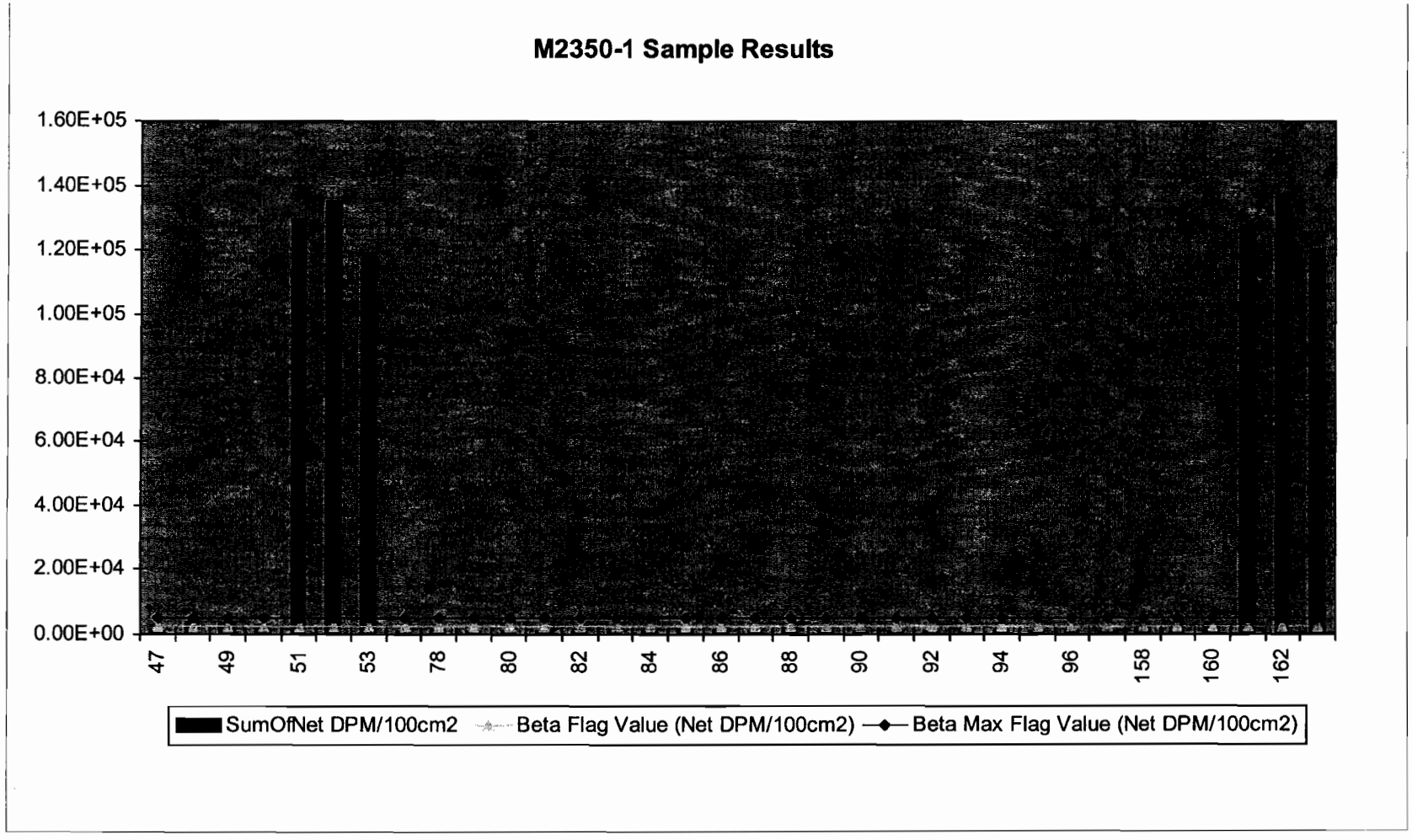
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000080 | Survey Description :Package A0200, B-124, Rooms 148 and 149 | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.224 | Survey Date : 4/25/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSKjos | 8/25/03 |
| | | |

**Comments:**

*Sign-Off* Paul C. Ely (Print Name) Paul C Ely (Signature) 8/25/03 (Date)


M2350-1 Sample Results
1.60E+05
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
47
49
51
53
78
80
82
84
86
88
90
92
94
96
158
160
162
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000080

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 47 | 2,811.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 996 |
| ZZZZZ | 19655 | 48 | 1,210.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,292 |
| ZZZZZ | 19655 | 49 | 1,257.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,458 |
| ZZZZZ | 19655 | 50 | 1,190.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,221 |
| ZZZZZ | 10002 | 51 | 36,864.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |
| ZZZZZ | 10002 | 52 | 38,458.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |
| ZZZZZ | 10002 | 53 | 33,802.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |
| A0200 | ZZZZZ | 77 | 340.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,205 |
| A0200 | ZZZZZ | 78 | 373.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,322 |
| A0200 | ZZZZZ | 79 | 308.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,091 |
| A0200 | 01F01 | 80 | 334.0 | 60 | FLDCT | B0021 | ZZZZZ | 20 | 0.0001 | 1,183 |
| A0200 | 01F01 | 81 | 347.0 | 60 | FLDCT | B0021 | ZZZZZ | 15 | 0.0001 | 1,229 |
| A0200 | 01F01 | 82 | 353.0 | 60 | FLDCT | B0021 | ZZZZZ | 11 | 0.0001 | 1,251 |
| A0200 | 01F01 | 83 | 351.0 | 60 | FLDCT | B0021 | ZZZZZ | 10 | 0.0001 | 1,244 |
| A0200 | 01F01 | 84 | 333.0 | 60 | FLDCT | B0021 | ZZZZZ | 5 | 0.0001 | 1,180 |
| A0200 | 01F01 | 85 | 489.0 | 60 | FLDCT | B0021 | ZZZZZ | 1 | 0.0001 | 1,733 |
| A0200 | 01F01 | 86 | 363.0 | 60 | FLDCT | B0021 | ZZZZZ | 9 | 0.0001 | 1,286 |
| A0200 | 01F01 | 87 | 326.0 | 60 | FLDCT | B0021 | ZZZZZ | 2 | 0.0001 | 1,155 |
| A0200 | 01F01 | 88 | 325.0 | 60 | FLDCT | B0021 | ZZZZZ | 3 | 0.0001 | 1,152 |
| A0200 | 01F01 | 89 | 317.0 | 60 | FLDCT | B0021 | ZZZZZ | 4 | 0.0001 | 1,123 |
| A0200 | 01F01 | 90 | 333.0 | 60 | FLDCT | B0021 | ZZZZZ | 7 | 0.0001 | 1,180 |
| A0200 | 01F01 | 91 | 328.0 | 60 | FLDCT | B0021 | ZZZZZ | 8 | 0.0001 | 1,162 |
| A0200 | 01F01 | 92 | 338.0 | 60 | FLDCT | B0021 | ZZZZZ | 12 | 0.0001 | 1,198 |
| A0200 | 01F01 | 93 | 299.0 | 60 | FLDCT | B0021 | ZZZZZ | 13 | 0.0001 | 1,059 |
| A0200 | 01F01 | 94 | 306.0 | 60 | FLDCT | B0021 | ZZZZZ | 14 | 0.0001 | 1,084 |
| A0200 | 01F01 | 95 | 304.0 | 60 | FLDCT | B0021 | ZZZZZ | 17 | 0.0001 | 1,077 |
| A0200 | 01F01 | 96 | 320.0 | 60 | FLDCT | B0021 | ZZZZZ | 18 | 0.0001 | 1,134 |
| ZZZZZ | ZZZZZ | 157 | 2,780.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 985 |
| ZZZZZ | 19655 | 158 | 1,211.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | 3,306 |
| ZZZZZ | 19655 | 159 | 1,248.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | 3,437 |
| ZZZZZ | 19655 | 160 | 1,238.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | 3,401 |
| ZZZZZ | 10002 | 161 | 36,268.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | [redacted] |
| ZZZZZ | 10002 | 162 | 39,095.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | [redacted] |
| ZZZZZ | 10002 | 163 | 34,387.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 - | _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kjos **Signature:** [signature] **Date:** 4-30-03

Download Station #: 1 Download File #: 110
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kjos **User ID** DRK2986 **Signature:** [signature] **Date:** 4-30-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: PACKAGE A0200, B-124, Point 19
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR119337 | 43-68B | .226 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm !

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 | 2 | 3 | 4 N/A | 5 N/A | 6 N/A | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .130

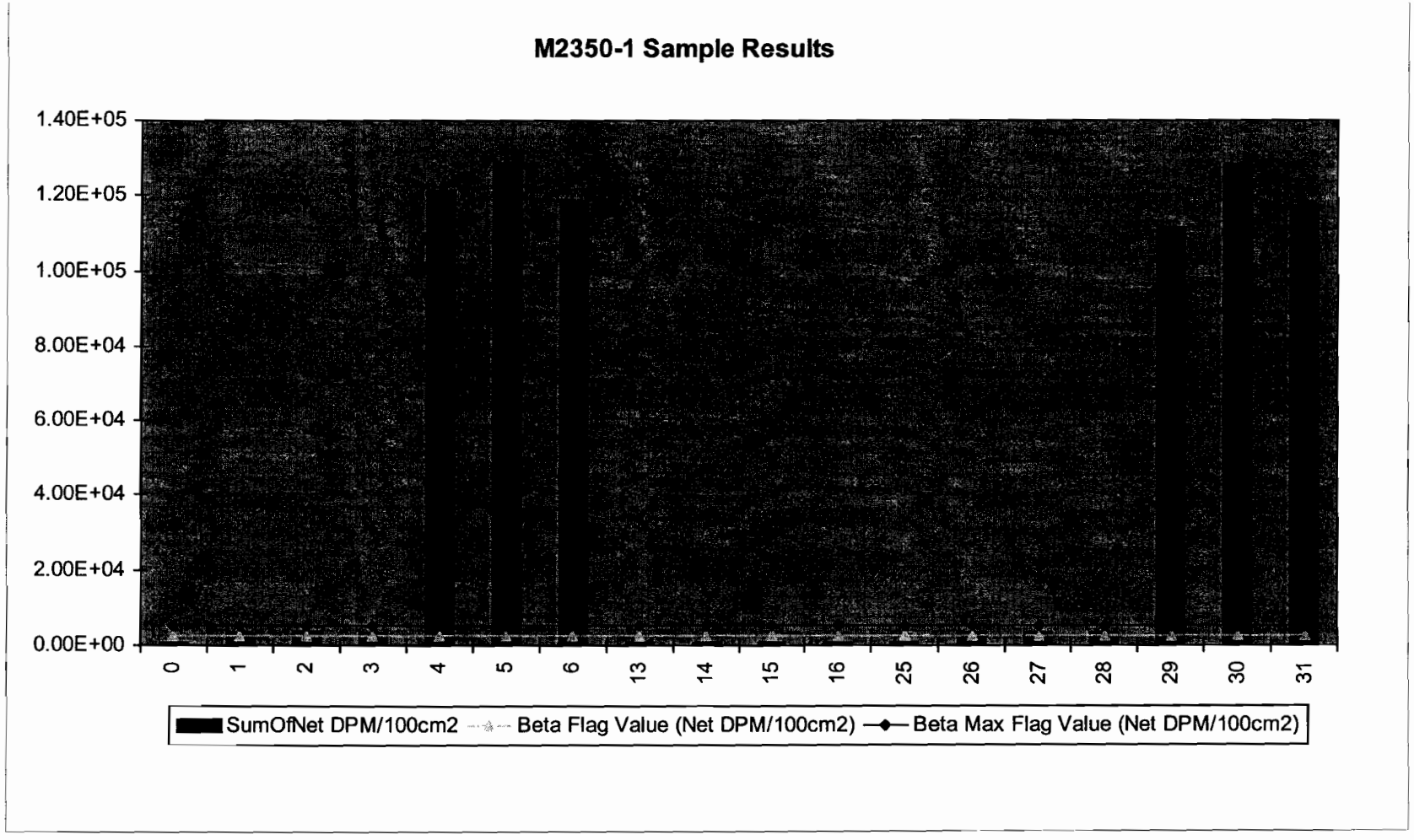
**M2350-1 Download Beta Report**

| | | |
|---|---|---|
| File Name : 00000110 | Survey Description :Package A0200, B-124, Point #19 | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : Beta | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.226 | Survey Date : 4/30/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | Doug RK | 8/25/03 |
| | | |

**Comments:**

Sign-Off Paul E. Ely (Print Name) Paul E Ely (Signature) 8/25/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
1
2
3
4
5
6
13
14
15
16
25
26
27
28
29
30
31
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000110

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,454.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 862 |
| ZZZZZ | FD184 | 1 | 1,252.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,536 |
| ZZZZZ | FD184 | 2 | 1,299.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,701 |
| ZZZZZ | FD184 | 3 | 1,248.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,522 |
| ZZZZZ | 10002 | 4 | 34,775.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| ZZZZZ | 10002 | 5 | 36,935.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| ZZZZZ | 10002 | 6 | 33,946.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| A0200 | ZZZZZ | 13 | 263.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 924 |
| A0200 | ZZZZZ | 14 | 253.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 888 |
| A0200 | ZZZZZ | 15 | 273.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 959 |
| A0200 | 01F01 | 16 | 299.0 | 60 | FLDCT | B9999 | ZZZZZ | 19 | 0.0001 | 1,050 |
| ZZZZZ | ZZZZZ | 25 | 2,586.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 908 |
| ZZZZZ | FD184 | 26 | 1,182.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | 3,241 |
| ZZZZZ | FD184 | 27 | 1,231.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | 3,413 |
| ZZZZZ | FD184 | 28 | 1,202.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | 3,312 |
| ZZZZZ | 10002 | 29 | 32,008.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | [redacted] |
| ZZZZZ | 10002 | 30 | 36,813.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | [redacted] |
| ZZZZZ | 10002 | 31 | 33,314.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

Survey #- A0200

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by Betty S. Kjos (Print) Signature BS Kjos Date 4-28-03 Time 1530

Counted by Betty S. Kjos (Print) Signature BS Kjos Date 4-29-03 Time 0720

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: MDA = 105 dpm/100cm² β-γ | | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 52 | 1 | <MDA |
| 12 | 54 | 3 | |
| 15 | 49 | 0 | |
| 18 | 43 | 0 | |
| 19 | 34 | 0 | <MDA |
| | | N | |
| | | A | |

| Circle: MDA = 14 dpm/100 cm² α | | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | <MDA |
| 12 | 1 | .70 | |
| 15 | 0 | 0 | |
| 18 | 0 | 0 | |
| 19 | 0 | 0 | <MDA |
| | | N | |
| | | A | |

Remarks-

Signature- BS Kjos Reviewed by- Paul C Ely 4/29/03

Duratek Inc.
Final Status Survey Package Worksheet for Package A0300
Bristol-Myers Squibb Building 124, Rooms 150 and 152 Soil

| | |
|---|---|
| Package Identification No.: A0300 | Prepared by: William R. Hoey |
| Location: Building 124, Rooms 150 & 152 soil | Date prepared: March 6, 2003 |
| Area Classification: 1 | |

| Area Description |
|---|
| The survey unit is the soil exposed after removal of the floor and remediation of the soil in the area of the process sewer drain lines. The final status survey will be performed prior to any backfilling of trenches resulting from the remediation. |

| Historical Information |
|---|
| Room 150 was used for Sethotope (Se-75) manufacturing. The bottom of a sink that was located in the northeast corner of the room fell out due to HCL corrosion when manufacturing selenium. Room 150 was also used for manufacturing Phosphotope (P-32). Mercury products (Hg-97, Hg-203) were also manufactured here.<br><br>Room 152 was used for Albumotope (I-131). More recently, I-125 and I-131 products were made in this room. Auretope (Au-198) was also made in this room.<br><br>No contamination in either room was identified during the characterization survey.<br><br>As part of the D&D effort, the process drain lines were removed from both of these rooms. This involved removing the concrete floor from a strip about 1 foot wide directly over the drain lines and removal of 12"-18" of soil to expose the drain line. When the drain lines in 150 and 152 were exposed, a significant portion of the piping was found to be corroded. Soil samples taken in the excavation trench identified significant Co-60 and Cs-137 contamination up to a depth of 30" below the trench. The entire concrete floor was then removed from both rooms and extensive soil sampling was performed. Based on the results of these samples, it was determined that the contamination was confined to an area directly below the failed drain piping. A soil remediation plan was developed that resulted in the removal of ~240 $ft^3$ of soil up to a maximum depth of 4 feet. |

| General Survey Instructions |
|---|
| 1) Immediately notify the Project Manager if any reading greater than the 15 μR/hr.<br>2) Scan 100% of the soil surface keeping the detector within 6 inches of the soil surface.<br>3) Scan down the middle of each trench keeping the detector within 6 inches of the soil surface.<br>4) Perform and log two fixed-point gamma measurements at each surface soil sample location. The first fixed point should be at the soil surface and the second at one meter above the sample point.<br>5) Collect a surface soil sample at each of the 17 points indicated on the enclosed map. |

| Special Instructions |
|---|
| Perform a one minute count of the Cs-137 check source at the beginning and end of the survey.<br>Perform a one minute background count in the hallway outside of 150 and 152 at the beginning and end of the survey.<br><br>Use detector model number 44-2 for surveys. |

**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Gamma Scan | Direct Beta | Direct Alpha | 1 meter Gamma & Contact | Smear Gross | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| **Bristol Myers Squibb Building 124 Rooms 146 & 147 Floors** | | | | | | | | | | | | |
| A0300 | 01F01 | ZZZZZ | ZZZZZ | See Map | N/A | DS 3-10-03 | N/A | N/A | DS 3-10-03 | N/A | N/A | DS 3-10-03 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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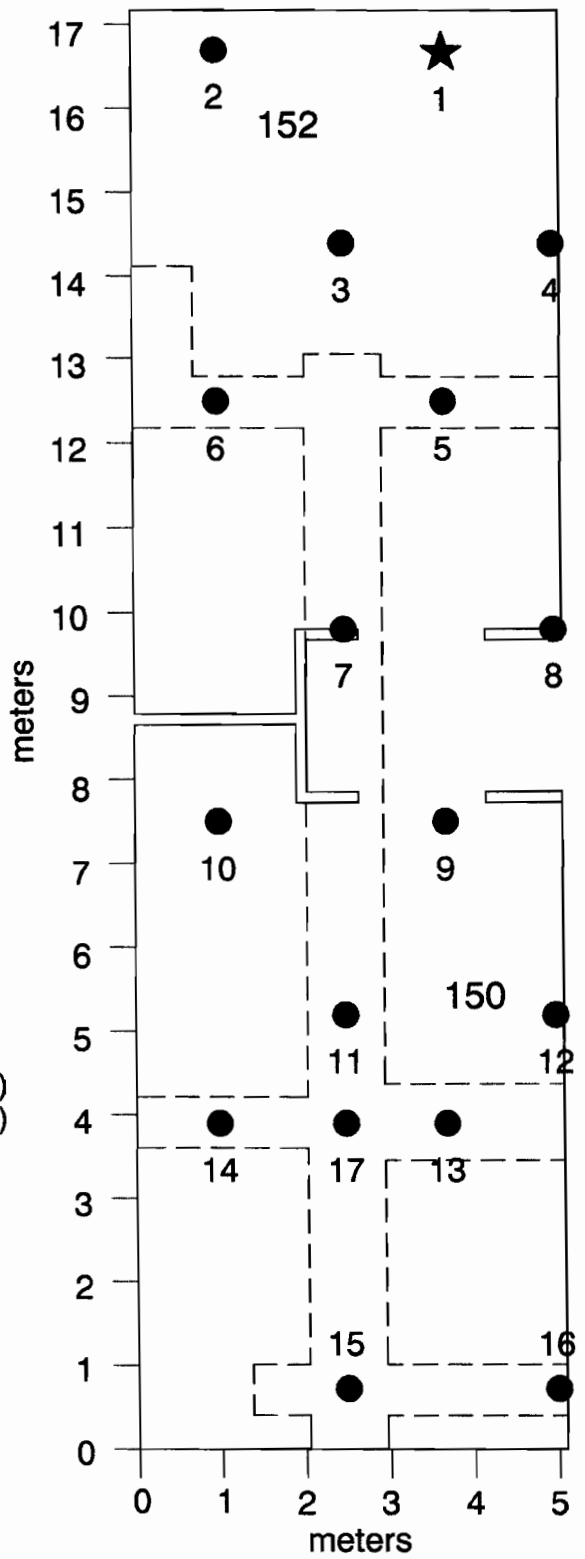
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: |
| Package Reviewed by and Date: |

| Survey Comments |
| --- |
| |
| |
| |
| |
| |
| |
| |
| |

**SURVEY PACKAGE A0300**




★ Starting Point

| Survey Point | Survey X | Location Y |
|---|---|---|
| 1 | 3.7 | 16.7 |
| 2 | 1.0 | 16.7 |
| 3 | 2.3 (2.5) | 14.4 |
| 4 | 5.0 | 14.4 |
| 5 | 3.7 | 12.1 (12.5) |
| 6 | 1.0 | 12.1 (12.5) |
| 7 | 2.3 (2.5) | 9.8 |
| 8 | 5.0 | 9.8 |
| 9 | 3.7 | 7.5 |
| 10 | 1.0 | 7.5 |
| 11 | 2.3 (2.5) | 5.2 |
| 12 | 5.0 | 5.2 |
| 13 | 3.7 | 2.9 (3.9) |
| 14 | 1.0 | 2.9 (3.9) |
| 15 | 2.3 (2.5) | 0.6 (1.0) |
| 16 | 5.0 | 0.6 (1.0) |
| 17 | 2.5 | 4.0 |

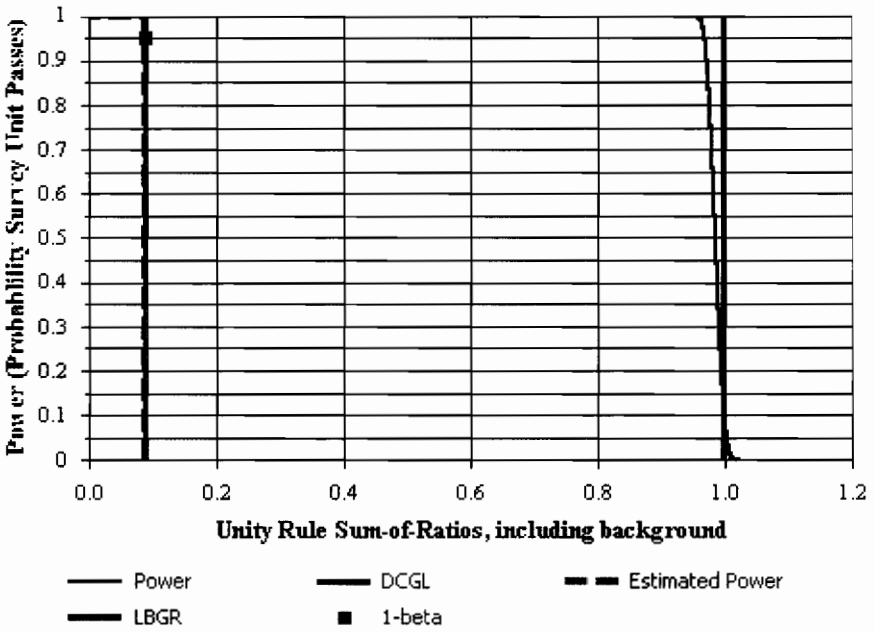
The numbers in parentheses indicate that the random locations were shifted to the locations in parentheses. This was done to bias the survey locations to obtain at least 50% of the samples from the trenches where pipe removal or soil remediation took place.
Point 17 was added because this location required the most remediaiton.

# Surface Soil Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0300 FSS Package | | |
| Comments: | Rooms 150 & 152 Soil | | |
| Area ($m^2$): | 94 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (SOR): | 0.03 |
| DCGL (SOR): | 1 | Sample Size (N): | 13 |
| LBGR (SOR): | 0.09 | Estimated Conc. (SOR): | 0.09 |
| Alpha: | 0.050 | Estimated Power: | 1 |
| Beta: | 0.050 | EMC Sample Size (N): | 13 |
| Scanning Instrumentation: | Ludlum 2350/44-2 NaI | | |

## Prospective Power Curve



# Surface Soil Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (pCi/g) | Inferred Contaminant | Ratio | Modified DCGLw (pCi/g) | Scan MDC (pCi/g) |
|---|---|---|---|---|---|
| Co-60 | 3.80 | N/A | N/A | N/A | 5.8 |
| Cs-137 | 11.00 | N/A | N/A | N/A | 10.4 |

| Contaminant | Survey Unit Estimate (Mean ± 1-Sigma) (pCi/g) | Reference Area Estimate (Mean ± 1-Sigma) (pCi/g) |
|---|---|---|
| Co-60 | 0.25 ± 0.095 | N/A |
| Cs-137 | 0.24 ± 0.158 | N/A |

# FINAL STATUS SURVEY
# PACKAGE No. A0300
# Bldg. 124, Rooms 150 & 152 Soil

Compass Input Information

Survey unit contamination estimate and standard deviation calculated based on results of soil samples collected and analyzed during soil remediation.

LBGR – The estimated standard deviation, $\sigma$, is very small compared to the $DCGL_W$. Therefore, per MARSSIM, section 8.3.3, the LBGR set so the relative shift, $\Delta/\sigma$, is about 3.

Scan MDC – Taken from NUREG 1507.

Survey Grid Worksheet

One set of coordinates randomly generated by Excel for starting point. Values were truncated. X coordinate generated between 0 and 5.0. Y coordinate generated between 0 and 17.0.

| X | Y |
|---|---|
| 3.7 | 16.7 |

For the triangular method, the distance between measurement and soil sample points is given by:

$$L = [A/0.866N]^{1/2}$$

where:

L = distance between measurement points in meters
A = area of survey unit in $m^2$
N = number of survey points (Set at 15 points.)

For rooms 150 & 152:

$$L = [94/[0.866*15]]^{1/2}$$
$$= (7.24)^{1/2} \text{ m}$$
$$= 2.7 \text{ m}$$

The distance between measurement rows is given by:

$$D = 0.866 * L$$
$$= 2.3 \text{ m}$$

The measurement points for successive rows shall be offset from the previous row by L/2 or 1.3 m.

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kips **Signature:** [signature] **Date:** 3-10-03

Download Station #: 1 Download File #: 39
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** D. Schumacher **User ID** DPS 4133 **Signature:** [signature] **Date:** 3-10-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: A0300
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ☑ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☐ Beta β | | 43-68B | | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☑ Gamma γ | 188920 | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 | 2 | 3 | 4 | 5 | 6 | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: On Gamma Survey Report → 2 entries for each survey point. First entry is contact, second entry is one meter reading. [illegible] 3/11/03.

**M2350-1 Download GAMMA Report**

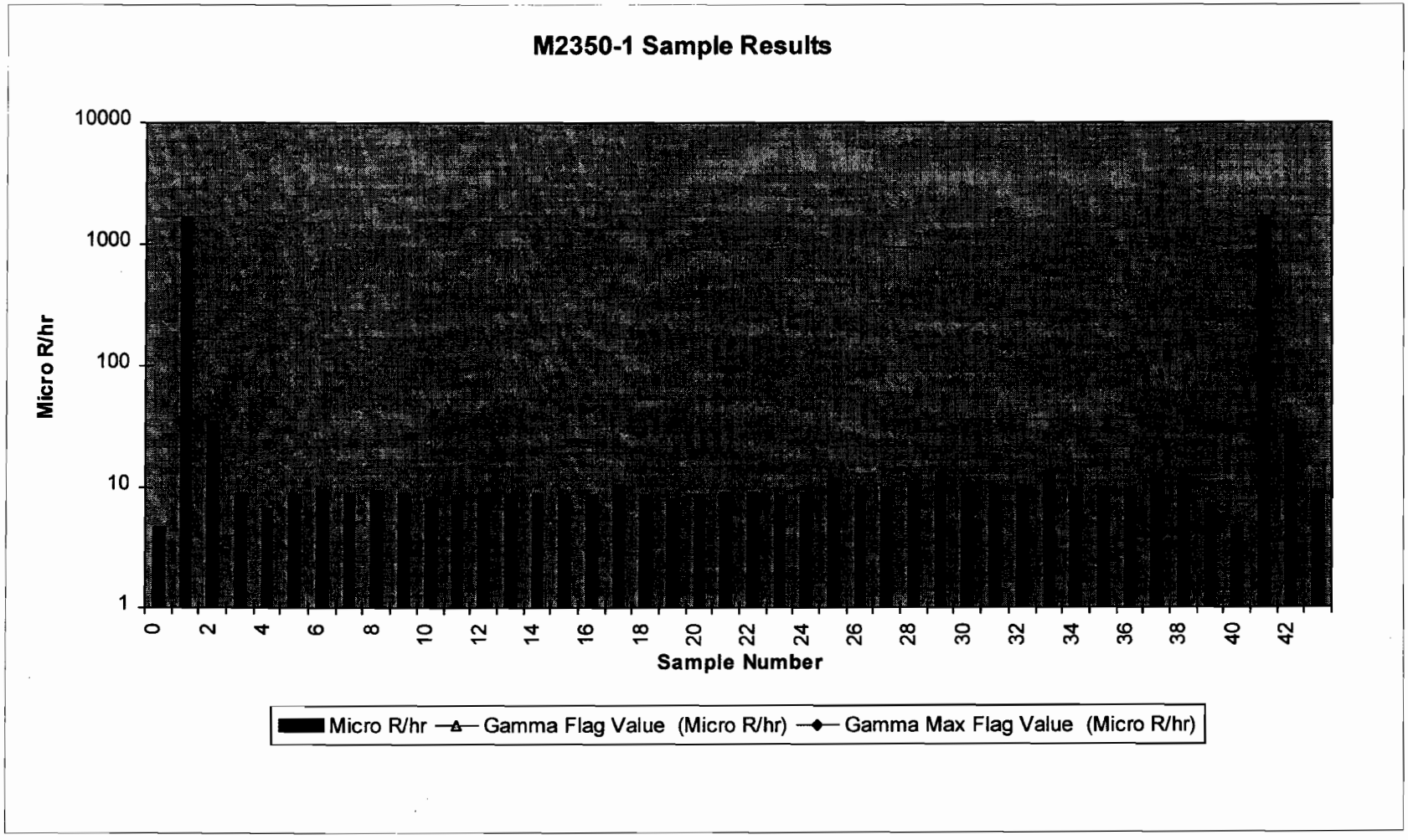
| | | |
|---|---|---|
| File Name : 00000039 | Survey Description :Package A0300 Rooms 150 & 152 | |
| Survey Reason : Termination | | |
| User ID : DPS4133 | Technician Name : Donnie Schumaker | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : LMI 44-2 | Detector S/N : 088920 | Detector Cal. Due : 6/30/03 |
| Measurement Type : GAMMA | Detector Type : 03100 : Measurement of average dose rate at 1 meter | |
| Cal. Constant : 16954100000 | | Survey Date : 3/10/03 |

| Print Name | Signature | Date |
|---|---|---|
| Donnie Schumaker | | 3/10/03 |
| | | |

**Comments:**

Sign-Off

| Print Name | Signature | Date |
|---|---|---|
| Paul C Ely | Paul C Ely | 4/26/03 |


M2350-1 Sample Results
Micro R/hr
10000
1000
100
10
1
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
Sample Number
Micro R/hr
Gamma Flag Value (Micro R/hr)
Gamma Max Flag Value (Micro R/hr)

# Duratek Gamma Survey Report

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | µ R/hr: |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 6,539.0 | 300 | PRGBK | ZZZZZ | ZZZZZ | 0 | | 4.63E+00 |
| ZZZZZ | ZZZZZ | 1 | 479,322.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 1.70E+03 |
| ZZZZZ | ZZZZZ | 2 | 10,044.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 3.55E+01 |
| ZZZZZ | ZZZZZ | 3 | 2,606.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 9.22E+00 |
| A0300 | 01F01 | 4 | 1,897.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | | 6.71E+00 |
| A0300 | 01F01 | 5 | 631.0 | 15 | FLDCT | B0016 | ZZZZZ | 1 | | 8.93E+00 |
| A0300 | 01F01 | 6 | 677.0 | 15 | FLDCT | B0016 | ZZZZZ | 1 | | 9.58E+00 |
| A0300 | 01F01 | 7 | 650.0 | 15 | FLDCT | B0016 | ZZZZZ | 2 | | 9.20E+00 |
| A0300 | 01F01 | 8 | 658.0 | 15 | FLDCT | B0016 | ZZZZZ | 2 | | 9.31E+00 |
| A0300 | 01F01 | 9 | 637.0 | 15 | FLDCT | B0016 | ZZZZZ | 3 | | 9.02E+00 |
| A0300 | 01F01 | 10 | 579.0 | 15 | FLDCT | B0016 | ZZZZZ | 3 | | 8.20E+00 |
| A0300 | 01F01 | 11 | 611.0 | 15 | FLDCT | B0016 | ZZZZZ | 4 | | 8.65E+00 |
| A0300 | 01F01 | 12 | 643.0 | 15 | FLDCT | B0016 | ZZZZZ | 4 | | 9.10E+00 |
| A0300 | 01F01 | 13 | 634.0 | 15 | FLDCT | B0016 | ZZZZZ | 5 | | 8.97E+00 |
| A0300 | 01F01 | 14 | 627.0 | 15 | FLDCT | B0016 | ZZZZZ | 5 | | 8.88E+00 |
| A0300 | 01F01 | 15 | 608.0 | 15 | FLDCT | B0016 | ZZZZZ | 6 | | 8.61E+00 |
| A0300 | 01F01 | 16 | 615.0 | 15 | FLDCT | B0016 | ZZZZZ | 6 | | 8.71E+00 |
| A0300 | 01F01 | 17 | 748.0 | 15 | FLDCT | B0016 | ZZZZZ | 7 | | 1.06E+01 |
| A0300 | 01F01 | 18 | 601.0 | 15 | FLDCT | B0016 | ZZZZZ | 7 | | 8.51E+00 |
| A0300 | 01F01 | 19 | 566.0 | 15 | FLDCT | B0016 | ZZZZZ | 8 | | 8.01E+00 |
| A0300 | 01F01 | 20 | 633.0 | 15 | FLDCT | B0016 | ZZZZZ | 8 | | 8.96E+00 |
| A0300 | 01F01 | 21 | 653.0 | 15 | FLDCT | B0016 | ZZZZZ | 9 | | 9.24E+00 |
| A0300 | 01F01 | 22 | 651.0 | 15 | FLDCT | B0016 | ZZZZZ | 9 | | 9.22E+00 |
| A0300 | 01F01 | 23 | 614.0 | 15 | FLDCT | B0016 | ZZZZZ | 10 | | 8.69E+00 |
| A0300 | 01F01 | 24 | 646.0 | 15 | FLDCT | B0016 | ZZZZZ | 10 | | 9.14E+00 |
| A0300 | 01F01 | 25 | 823.0 | 15 | FLDCT | B0016 | ZZZZZ | 11 | | 1.17E+01 |
| A0300 | 01F01 | 26 | 732.0 | 15 | FLDCT | B0016 | ZZZZZ | 11 | | 1.04E+01 |
| A0300 | 01F01 | 27 | 709.0 | 15 | FLDCT | B0016 | ZZZZZ | 12 | | 1.00E+01 |
| A0300 | 01F01 | 28 | 767.0 | 15 | FLDCT | B0016 | ZZZZZ | 12 | | 1.09E+01 |
| A0300 | 01F01 | 29 | 927.0 | 15 | FLDCT | B0016 | ZZZZZ | 13 | | 1.31E+01 |
| A0300 | 01F01 | 30 | 725.0 | 15 | FLDCT | B0016 | ZZZZZ | 13 | | 1.03E+01 |
| A0300 | 01F01 | 31 | 724.0 | 15 | FLDCT | B0016 | ZZZZZ | 14 | | 1.02E+01 |
| A0300 | 01F01 | 32 | 722.0 | 15 | FLDCT | B0016 | ZZZZZ | 14 | | 1.02E+01 |

| | |
|---|---|
| *Gamma Flag* | - _____ |
| *Gamma Max Flag* | [redacted] |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | µ R/hr: |
|---|---|---|---|---|---|---|---|---|---|---|
| A0300 | 01F01 | 33 | 961.0 | 15 | FLDCT | B0016 | ZZZZZ | 15 | | 1.36E+01 |
| A0300 | 01F01 | 34 | 705.0 | 15 | FLDCT | B0016 | ZZZZZ | 15 | | 9.98E+00 |
| A0300 | 01F01 | 35 | 709.0 | 15 | FLDCT | B0016 | ZZZZZ | 16 | | 1.00E+01 |
| A0300 | 01F01 | 36 | 696.0 | 15 | FLDCT | B0016 | ZZZZZ | 16 | | 9.85E+00 |
| A0300 | 01F01 | 37 | 900.0 | 15 | FLDCT | B0016 | ZZZZZ | 17 | | 1.27E+01 |
| A0300 | 01F01 | 38 | 819.0 | 15 | FLDCT | B0016 | ZZZZZ | 17 | | 1.16E+01 |
| A0300 | 01F01 | 39 | 2,098.0 | 60 | FLDBK | B0016 | ZZZZZ | 0 | | 7.42E+00 |
| ZZZZZ | ZZZZZ | 40 | 6,763.0 | 300 | PTGBK | ZZZZZ | ZZZZZ | 0 | | 4.79E+00 |
| ZZZZZ | 19453 | 41 | 478,361.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 1.69E+03 |
| ZZZZZ | 19453 | 42 | 9,905.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 3.51E+01 |
| ZZZZZ | 19453 | 43 | 2,653.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 9.39E+00 |

*Gamma Flag* - _____

*Gamma Max Flag* [redacted]

ATTACHMENT 6.14
SURVEY DOWNLOAD DATA SHEET

Download Technician: Print Name: Douglas R Kjos Signature: [signature] Date: 1-7-03

Download Station #: 1 Download File #: 8
Serial # Verification: Model 2350: ■ Detector: ☐ Problems: ☐ (See Comments)

Survey Technician(s):
Print Name: Douglas R Kjos User ID NRK2986 Signature: [signature] Date: 1-7-03

Print Name: _____ User ID _____ Signature: _____ Date: _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Remediation Scan of Trenches in Rooms 148, 150, 152 & Hallway
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ☒ Term Survey PCE ~~■ Characterization~~ PCE ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☐ Beta β | | 43-68B | | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ■ Gamma γ | PRD88920 | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements MEAN Value in cpm !

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 | 2 | 3 | 4 | 5 | 6 | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: _____

**M2350-1 Download GAMMA Report**

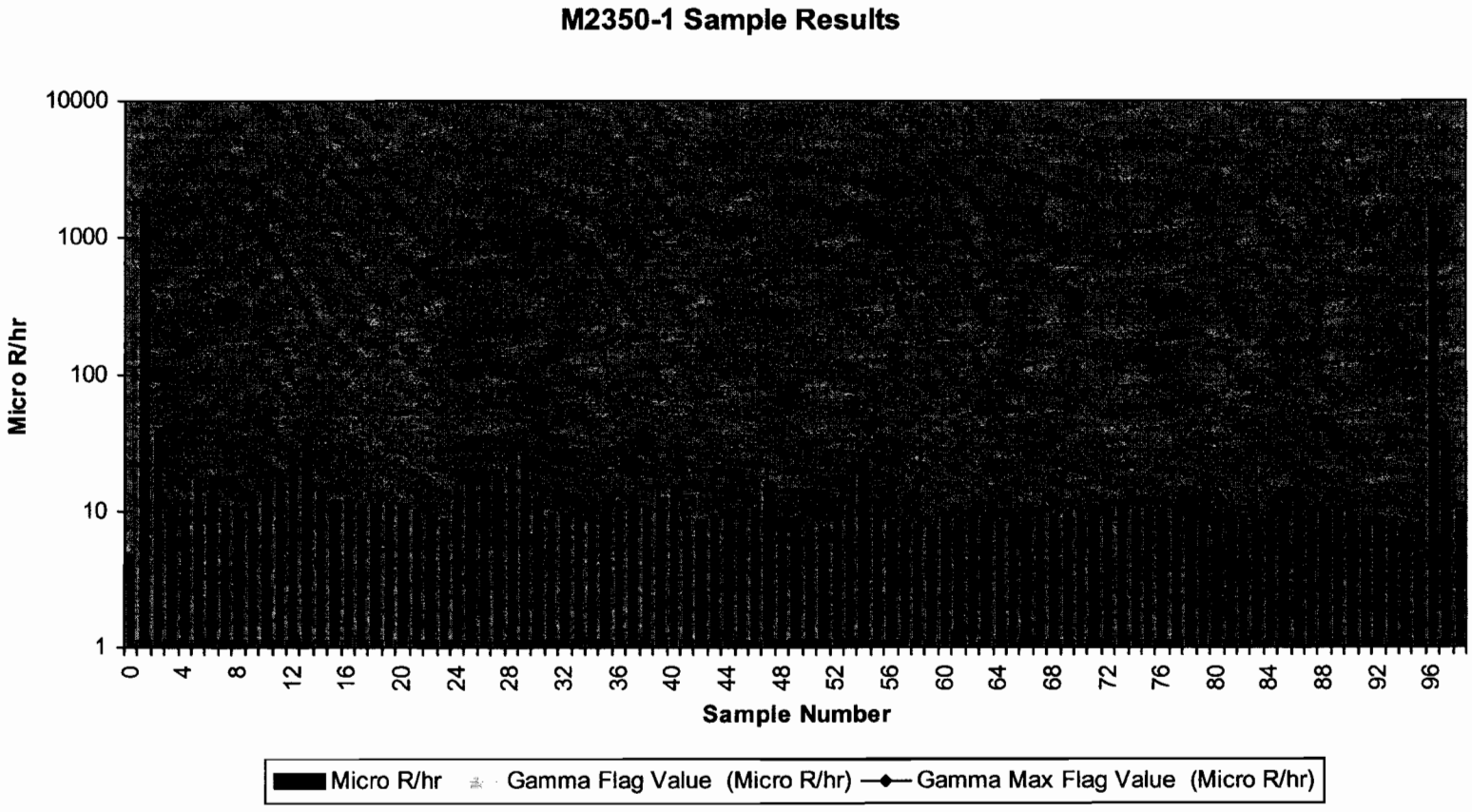
| | | |
|---|---|---|
| File Name : 00000008 | Survey Description :Remediation Scan of trenches in rooms 148,150,152 | |
| Survey Reason : Characterization | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : LMI 44-2 | Detector S/N : 088920 | Detector Cal. Due : 6/30/03 |
| Measurement Type : GAMMA | Detector Type : 03100 : Measurement of average dose rate at 1 meter | |
| Cal. Constant : 16954100000 | | Survey Date : 1/7/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/25/03 |
| | | |

**Comments:**

Sign-Off

| Print Name | Signature | Date |
|---|---|---|
| Paul L. Ely | Paul C Ely | 8/25/03 |


M2350-1 Sample Results
Micro R/hr
10000
1000
100
10
1
0
4
8
12
16
20
24
28
32
36
40
44
48
52
56
60
64
68
72
76
80
84
88
92
96
Sample Number
Micro R/hr
Gamma Flag Value (Micro R/hr)
Gamma Max Flag Value (Micro R/hr)

# Duratek Gamma Survey Report

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | µ R/hr: |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 6,763.0 | 300 | PRGBK | ZZZZZ | ZZZZZ | 0 | | 4.79E+00 |
| ZZZZZ | 19453 | 1 | 478,293.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 1.69E+03 |
| ZZZZZ | 19453 | 2 | 10,764.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 3.81E+01 |
| ZZZZZ | 19453 | 3 | 2,841.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 1.01E+01 |
| ZZZZZ | 01T01 | 4 | 725.0 | 15 | FLDCT | B0016 | RM150 | 1 | | 1.03E+01 |
| ZZZZZ | 01T01 | 5 | 1,225.0 | 15 | FLDCT | B0016 | RM150 | 2 | | 1.73E+01 |
| ZZZZZ | 01T01 | 6 | 963.0 | 15 | FLDCT | B0016 | RM150 | 3 | | 1.36E+01 |
| ZZZZZ | 01T01 | 7 | 781.0 | 15 | FLDCT | B0016 | RM150 | 4 | | 1.11E+01 |
| ZZZZZ | 01T01 | 8 | 749.0 | 15 | FLDCT | B0016 | RM150 | 5 | | 1.06E+01 |
| ZZZZZ | 01T01 | 9 | 850.0 | 15 | FLDCT | B0016 | RM150 | 6 | | 1.20E+01 |
| ZZZZZ | 01T01 | 10 | 929.0 | 15 | FLDCT | B0016 | RM150 | 7 | | 1.32E+01 |
| ZZZZZ | 01T01 | 11 | 1,405.0 | 15 | FLDCT | B0016 | RM150 | 8 | | 1.99E+01 |
| ZZZZZ | 01T01 | 12 | 1,332.0 | 15 | FLDCT | B0016 | RM150 | 9 | | 1.89E+01 |
| ZZZZZ | 01T01 | 13 | 2,283.0 | 15 | FLDCT | B0016 | RM150 | 10 | | 3.23E+01 |
| ZZZZZ | 01T01 | 14 | 985.0 | 15 | FLDCT | B0016 | RM150 | 11 | | 1.39E+01 |
| ZZZZZ | 01T01 | 15 | 847.0 | 15 | FLDCT | B0016 | RM150 | 12 | | 1.20E+01 |
| ZZZZZ | 01T01 | 16 | 901.0 | 15 | FLDCT | B0016 | RM150 | 13 | | 1.28E+01 |
| ZZZZZ | 01T01 | 17 | 780.0 | 15 | FLDCT | B0016 | RM150 | 14 | | 1.10E+01 |
| ZZZZZ | 01T01 | 18 | 771.0 | 15 | FLDCT | B0016 | RM150 | 15 | | 1.09E+01 |
| ZZZZZ | 01T01 | 19 | 832.0 | 15 | FLDCT | B0016 | RM150 | 16 | | 1.18E+01 |
| ZZZZZ | 01T01 | 20 | 806.0 | 15 | FLDCT | B0016 | RM150 | 17 | | 1.14E+01 |
| ZZZZZ | 01T01 | 21 | 731.0 | 15 | FLDCT | B0016 | RM150 | 18 | | 1.03E+01 |
| ZZZZZ | 01T01 | 22 | 676.0 | 15 | FLDCT | B0016 | RM150 | 19 | | 9.57E+00 |
| ZZZZZ | 01T01 | 23 | 626.0 | 15 | FLDCT | B0016 | RM150 | 20 | | 8.86E+00 |
| ZZZZZ | 01T01 | 24 | 817.0 | 15 | FLDCT | B0016 | RM150 | 21 | | 1.16E+01 |
| ZZZZZ | 01T01 | 25 | 1,115.0 | 15 | FLDCT | B0016 | RM150 | 22 | | 1.58E+01 |
| ZZZZZ | 01T01 | 26 | 1,112.0 | 15 | FLDCT | B0016 | RM150 | 23 | | 1.57E+01 |
| ZZZZZ | 01T01 | 27 | 1,259.0 | 15 | FLDCT | B0016 | RM150 | 24 | | 1.78E+01 |
| ZZZZZ | 01T01 | 28 | 1,570.0 | 15 | FLDCT | B0016 | RM150 | 25 | | 2.22E+01 |
| ZZZZZ | 01T01 | 29 | 1,916.0 | 15 | FLDCT | B0016 | RM150 | 26 | | 2.71E+01 |
| ZZZZZ | 01T01 | 30 | 891.0 | 15 | FLDCT | B0016 | RM150 | 27 | | 1.26E+01 |
| ZZZZZ | 01T01 | 31 | 684.0 | 15 | FLDCT | B0016 | RM150 | 28 | | 9.68E+00 |
| ZZZZZ | 01T01 | 32 | 660.0 | 15 | FLDCT | B0016 | RM150 | 29 | | 9.34E+00 |

*Gamma Flag* - _____

*Gamma Max Flag* [redacted]

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | µ R/hr: |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | 01T01 | 33 | 637.0 | 15 | FLDCT | B0016 | RM150 | 30 | | 9.02E+00 |
| ZZZZZ | 01T01 | 34 | 575.0 | 15 | FLDCT | B0016 | RM150 | 31 | | 8.14E+00 |
| ZZZZZ | 01T01 | 35 | 658.0 | 15 | FLDCT | B0016 | RM150 | 32 | | 9.31E+00 |
| ZZZZZ | 01T01 | 36 | 727.0 | 15 | FLDCT | B0016 | RM150 | 33 | | 1.03E+01 |
| ZZZZZ | 01T01 | 37 | 712.0 | 15 | FLDCT | B0016 | RM150 | 34 | | 1.01E+01 |
| ZZZZZ | 01T01 | 38 | 750.0 | 15 | FLDCT | B0016 | RM150 | 35 | | 1.06E+01 |
| ZZZZZ | 01T01 | 39 | 866.0 | 15 | FLDCT | B0016 | RM150 | 36 | | 1.23E+01 |
| ZZZZZ | 01T01 | 40 | 1,048.0 | 15 | FLDCT | B0016 | RM150 | 37 | | 1.48E+01 |
| ZZZZZ | 01T01 | 41 | 621.0 | 15 | FLDCT | B0016 | RM152 | 1 | | 8.79E+00 |
| ZZZZZ | 01T01 | 42 | 610.0 | 15 | FLDCT | B0016 | RM152 | 2 | | 8.64E+00 |
| ZZZZZ | 01T01 | 43 | 618.0 | 15 | FLDCT | B0016 | RM152 | 3 | | 8.75E+00 |
| ZZZZZ | 01T01 | 44 | 677.0 | 15 | FLDCT | B0016 | RM152 | 4 | | 9.58E+00 |
| ZZZZZ | 01T01 | 45 | 709.0 | 15 | FLDCT | B0016 | RM152 | 5 | | 1.00E+01 |
| ZZZZZ | 01T01 | 46 | 688.0 | 15 | FLDCT | B0016 | RM152 | 6 | | 9.74E+00 |
| ZZZZZ | 01T01 | 47 | 1,141.0 | 15 | FLDCT | B0016 | RM152 | 7 | | 1.62E+01 |
| ZZZZZ | 01T01 | 48 | 506.0 | 15 | FLDCT | B0016 | RM152 | 8 | | 7.16E+00 |
| ZZZZZ | 01T01 | 49 | 510.0 | 15 | FLDCT | B0016 | RM152 | 9 | | 7.22E+00 |
| ZZZZZ | 01T01 | 50 | 567.0 | 15 | FLDCT | B0016 | RM152 | 10 | | 8.03E+00 |
| ZZZZZ | 01T01 | 51 | 528.0 | 15 | FLDCT | B0016 | RM152 | 11 | | 7.47E+00 |
| ZZZZZ | 01T01 | 52 | 601.0 | 15 | FLDCT | B0016 | RM152 | 12 | | 8.51E+00 |
| ZZZZZ | 01T01 | 53 | 778.0 | 15 | FLDCT | B0016 | RM152 | 13 | | 1.10E+01 |
| ZZZZZ | 01T01 | 54 | 1,864.0 | 15 | FLDCT | B0016 | RM152 | 14 | | 2.64E+01 |
| ZZZZZ | 01T01 | 55 | 765.0 | 15 | FLDCT | B0016 | RM152 | 15 | | 1.08E+01 |
| ZZZZZ | 01T01 | 56 | 610.0 | 15 | FLDCT | B0016 | RM152 | 16 | | 8.64E+00 |
| ZZZZZ | 01T01 | 57 | 599.0 | 15 | FLDCT | B0016 | RM152 | 17 | | 8.48E+00 |
| ZZZZZ | 01T01 | 58 | 571.0 | 15 | FLDCT | B0016 | RM152 | 18 | | 8.08E+00 |
| ZZZZZ | 01T01 | 59 | 561.0 | 15 | FLDCT | B0016 | RM152 | 19 | | 7.94E+00 |
| ZZZZZ | 01T01 | 60 | 630.0 | 15 | FLDCT | B0016 | HALL | 1 | | 8.92E+00 |
| ZZZZZ | 01T01 | 61 | 654.0 | 15 | FLDCT | B0016 | HALL | 2 | | 9.26E+00 |
| ZZZZZ | 01T01 | 62 | 657.0 | 15 | FLDCT | B0016 | HALL | 3 | | 9.30E+00 |
| ZZZZZ | 01T01 | 63 | 659.0 | 15 | FLDCT | B0016 | HALL | 4 | | 9.33E+00 |
| ZZZZZ | 01T01 | 64 | 613.0 | 15 | FLDCT | B0016 | HALL | 5 | | 8.68E+00 |
| ZZZZZ | 01T01 | 65 | 578.0 | 15 | FLDCT | B0016 | RM148 | 1 | | 8.18E+00 |
| ZZZZZ | 01T01 | 66 | 605.0 | 15 | FLDCT | B0016 | RM148 | 2 | | 8.56E+00 |
| ZZZZZ | 01T01 | 67 | 583.0 | 15 | FLDCT | B0016 | RM148 | 3 | | 8.25E+00 |

| | |
|---|---|
| *Gamma Flag* | - |
| *Gamma Max Flag* | |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | µ R/hr: |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | 01T01 | 68 | 666.0 | 15 | FLDCT | B0016 | RM148 | 4 | | 9.43E+00 |
| ZZZZZ | 01T01 | 69 | 667.0 | 15 | FLDCT | B0016 | RM148 | 5 | | 9.44E+00 |
| ZZZZZ | 01T01 | 70 | 697.0 | 15 | FLDCT | B0016 | RM148 | 6 | | 9.87E+00 |
| ZZZZZ | 01T01 | 71 | 669.0 | 15 | FLDCT | B0016 | RM148 | 7 | | 9.47E+00 |
| ZZZZZ | 01T01 | 72 | 697.0 | 15 | FLDCT | B0016 | RM148 | 8 | | 9.87E+00 |
| ZZZZZ | 01T01 | 73 | 764.0 | 15 | FLDCT | B0016 | RM148 | 9 | | 1.08E+01 |
| ZZZZZ | 01T01 | 74 | 715.0 | 15 | FLDCT | B0016 | RM148 | 10 | | 1.01E+01 |
| ZZZZZ | 01T01 | 75 | 731.0 | 15 | FLDCT | B0016 | RM148 | 11 | | 1.03E+01 |
| ZZZZZ | 01T01 | 76 | 734.0 | 15 | FLDCT | B0016 | RM148 | 12 | | 1.04E+01 |
| ZZZZZ | 01T01 | 77 | 717.0 | 15 | FLDCT | B0016 | RM148 | 13 | | 1.01E+01 |
| ZZZZZ | 01T01 | 78 | 684.0 | 15 | FLDCT | B0016 | RM148 | 14 | | 9.68E+00 |
| ZZZZZ | 01T01 | 79 | 694.0 | 15 | FLDCT | B0016 | RM148 | 15 | | 9.82E+00 |
| ZZZZZ | 01T01 | 80 | 680.0 | 15 | FLDCT | B0016 | RM148 | 16 | | 9.63E+00 |
| ZZZZZ | 01T01 | 81 | 705.0 | 15 | FLDCT | B0016 | RM148 | 17 | | 9.98E+00 |
| ZZZZZ | 01T01 | 82 | 669.0 | 15 | FLDCT | B0016 | RM148 | 18 | | 9.47E+00 |
| ZZZZZ | 01T01 | 83 | 609.0 | 15 | FLDCT | B0016 | RM148 | 19 | | 8.62E+00 |
| ZZZZZ | 01T01 | 84 | 696.0 | 15 | FLDCT | B0016 | RM148 | 20 | | 9.85E+00 |
| ZZZZZ | 01T01 | 85 | 687.0 | 15 | FLDCT | B0016 | RM148 | 21 | | 9.73E+00 |
| ZZZZZ | 01T01 | 86 | 702.0 | 15 | FLDCT | B0016 | RM148 | 22 | | 9.94E+00 |
| ZZZZZ | 01T01 | 87 | 696.0 | 15 | FLDCT | B0016 | RM148 | 23 | | 9.85E+00 |
| ZZZZZ | 01T01 | 88 | 720.0 | 15 | FLDCT | B0016 | RM148 | 24 | | 1.02E+01 |
| ZZZZZ | 01T01 | 89 | 732.0 | 15 | FLDCT | B0016 | RM148 | 25 | | 1.04E+01 |
| ZZZZZ | 01T01 | 90 | 678.0 | 15 | FLDCT | B0016 | RM148 | 26 | | 9.60E+00 |
| ZZZZZ | 01T01 | 91 | 654.0 | 15 | FLDCT | B0016 | RM148 | 27 | | 9.26E+00 |
| ZZZZZ | 01T01 | 92 | 592.0 | 15 | FLDCT | B0016 | RM148 | 28 | | 8.38E+00 |
| ZZZZZ | 01T01 | 93 | 605.0 | 15 | FLDCT | B0016 | RM148 | 29 | | 8.56E+00 |
| ZZZZZ | 01T01 | 94 | 545.0 | 15 | FLDCT | B0016 | RM148 | 30 | | 7.71E+00 |
| ZZZZZ | ZZZZZ | 95 | 6,792.0 | 300 | PTGBK | ZZZZZ | ZZZZZ | 0 | | 4.81E+00 |
| ZZZZZ | 19453 | 96 | 473,674.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 1.68E+03 |
| ZZZZZ | 19453 | 97 | 10,973.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 3.88E+01 |
| ZZZZZ | 19453 | 98 | 2,854.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 1.01E+01 |

*Gamma Flag* - _____

*Gamma Max Flag* [redacted]

Duratek, Inc.
Survey Package Worksheet for Package A0400
Bristol-Myers Squibb Building 124, Rooms 151 & 153

| | |
|---|---|
| Package Identification No.: A0400 | Prepared by: Paul C. Ely |
| Location: Building 124 Rooms 151 & 153 Floors | Date prepared: 4/18/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors in Rooms 151 & 153.

## Historical Information

Room 151 was used for Reference standard Manufacturing & Filling. Radionuclides included Co-57, Se-75 and Hg-203. Room 153 was used for Albumotope LS, lung scanning products and Hipputope I-131 manufacturing. Radionuclides used included I-131.

No contamination levels >5,000 dpm/100 $cm^2$ were identified during the characterization except on equipment that removed during the decommissioning.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A0400 continued**

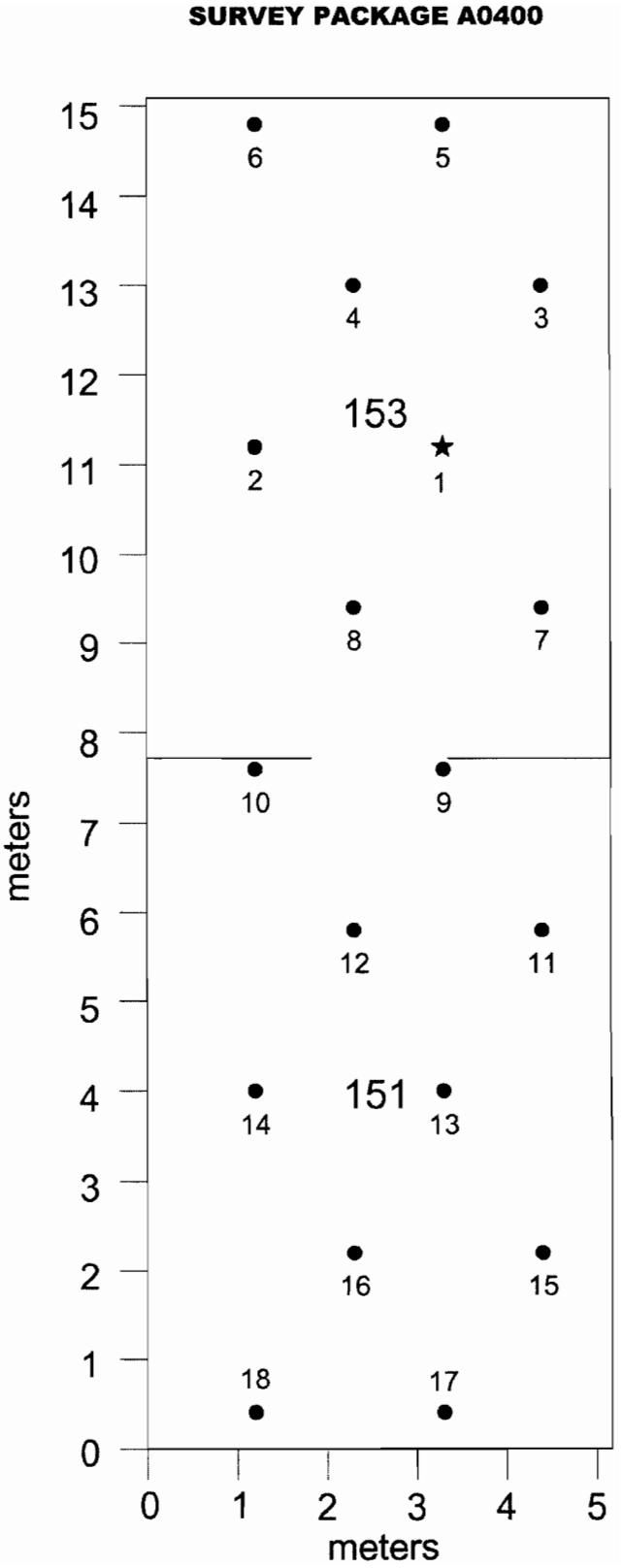
| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| Bristol Myers Squibb Building 124 Rooms 151 & 153 Floors | | | | | | | | | | | | |
| A0400 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | 4.22.03 | 4.26.03 | N/A | N/A | 4.28.03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: 4/29/03 |
| Package Reviewed by and Date: Paul C Ely 4/29/03 |

| Survey Comments |
| --- |
| |
| |
| |
| |
| |
| |
| |
| |

| Survey Point | Survey Location X | Y |
|---|---|---|
| 1 | 3.3 | 11.2 |
| 2 | 1.2 | 11.2 |
| 3 | 4.4 | 13.0 |
| 4 | 2.3 | 13.0 |
| 5 | 3.3 | 14.8 |
| 6 | 1.2 | 14.8 |
| 7 | 4.4 | 9.4 |
| 8 | 2.3 | 9.4 |
| 9 | 3.3 | 7.6 |
| 10 | 1.2 | 7.6 |
| 11 | 4.4 | 5.8 |
| 12 | 2.3 | 5.8 |
| 13 | 3.3 | 4.0 |
| 14 | 1.2 | 4.0 |
| 15 | 4.4 | 2.2 |
| 16 | 2.3 | 2.2 |
| 17 | 3.3 | 0.4 |
| 18 | 1.2 | 0.4 |



**Survey Package A0400**
**Rooms 151 & 153 floors**

| | | |
|---|---|---|
| **X (Max):** | 5 | meters |
| **Y (Max):** | 15 | meters |
| **A (Area):** | 94 | $m^2$ |
| **N (Points):** | 25 | |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 2.1 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.8 | meters | (distance between rows) |
| **L/2=** | 1.1 | meters | (row offset value) |
| **X (Random):** | 4.8 | | random number generator |
| **Y (Random):** | 4.8 | | random number generator |
| **X (Origin):** | 3.3 | | initially generated random number |
| **Y (Origin):** | 11.2 | | initially generated random number |
| **Number of rows:** | 8 | **8** | |
| **Number of columns:** | 2 | **2** | |

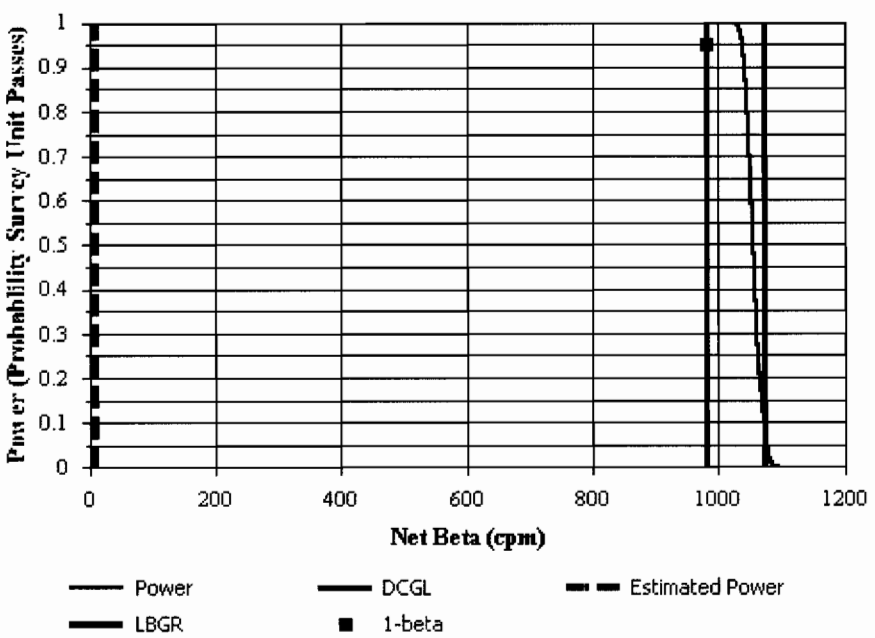
| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 3.3 | 11.2 | 6 |
| 2 | 1.2 | 11.2 | |
| 3 | 4.4 | 13.0 | 7 |
| 4 | 2.3 | 13.0 | |
| 5 | 3.3 | 14.8 | 8 |
| 6 | 1.2 | 14.8 | |
| 7 | 4.4 | 9.4 | 5 |
| 8 | 2.3 | 9.4 | |
| 9 | 3.3 | 7.6 | 4 |
| 10 | 1.2 | 7.6 | |
| 11 | 4.4 | 5.8 | 3 |
| 12 | 2.3 | 5.8 | |
| 13 | 3.3 | 4.0 | 2 |
| 14 | 1.2 | 4.0 | |
| 15 | 4.4 | 2.2 | 1 |
| 16 | 2.3 | 2.2 | |
| 17 | 3.3 | 0.4 | 0 |
| 18 | 1.2 | 0.4 | |

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0400 FSS Package | | |
| Comments: | B-124 Rooms 151 & 153 Floors | | |
| Area (m²): | 94 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 30.8 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 982 | Estimated Conc. (cpm): | 10.6 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 256 ± 22 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Linoleum | 46 | 244.9 | 21.7 | 501 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0500**
**Building 124 Southwest Lab Areas (Rooms 146-153)**

FSS Packages: A0200, A0310, A0400, B0300

| | Floor | | Wall | | Ceiling | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| 1 | 221 | 256 | 234 | 276 | 222 | 236 | 243 | 271 |
| 2 | 194 | 229 | 227 | 243 | 209 | 300 | 257 | 266 |
| 3 | 224 | 226 | 278 | 266 | 266 | 257 | 265 | 265 |
| 4 | 244 | 276 | 274 | 264 | 234 | 239 | 265 | 259 |
| 5 | 243 | 250 | 270 | 291 | 215 | 222 | 294 | 253 |
| 6 | 205 | 241 | 296 | 308 | 219 | 237 | 313 | 294 |
| 7 | 276 | 292 | 257 | 288 | 233 | 260 | 234 | 265 |
| 8 | 262 | 280 | 310 | 297 | 248 | 237 | 397 | 452 |
| 9 | 236 | 270 | 304 | 316 | 237 | 233 | 278 | 242 |
| 10 | 250 | 270 | 271 | 294 | 226 | 277 | 217 | 257 |
| 11 | 230 | 250 | 294 | 286 | | | 261 | 258 |
| 12 | 237 | 236 | 272 | 234 | | | 216 | 232 |
| 13 | 239 | 229 | 257 | 316 | | | 290 | 273 |
| 14 | 197 | 220 | 254 | 249 | | | 253 | 291 |
| 15 | 224 | 247 | 249 | 281 | | | 279 | 302 |
| 16 | 224 | 266 | 215 | 251 | | | 265 | 269 |
| 17 | 226 | 262 | 239 | 245 | | | | |
| 18 | 244 | 231 | 276 | 298 | | | | |
| 19 | 236 | 265 | 285 | 258 | | | | |
| 20 | 249 | 275 | 210 | 240 | | | | |
| 21 | 190 | 228 | 267 | 241 | | | | |
| 22 | 254 | 255 | 291 | 310 | | | | |
| 23 | 252 | 247 | 309 | 317 | | | | |
| 24 | 241 | 267 | 227 | 228 | | | | |
| 25 | 228 | 271 | | | | | | |
| 26 | 261 | 305 | | | | | | |
| **Average** | **234.1** | **255.5** | **265.3** | **274.9** | **230.9** | **249.8** | **270.4** | **278.1** |
| **Standard Deviation** | **21.2** | **21.8** | **29.0** | **29.0** | **16.8** | **23.8** | **42.8** | **49.8** |
| **No of Measurements** | **26** | **26** | **24** | **24** | **10** | **10** | **16** | **16** |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | **246.0** | **262.3** | **Average** | **267.5** |
| **Standard Deviation** | **28.5** | **27.0** | **Standard Deviation** | **29.6** |
| **No of Measurements** | **60** | **60** | **No of Measurements** | **34** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kjos **Signature:** Douglas R Kjos **Date:** 4-28-03

Download Station #: 1 Download File #: 88
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Betty S. Kjos **User ID** BSK0490 **Signature:** BS Kjos **Date:** 4-26-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: A0400, Bldg 124, Rooms 151 & 153 Floors
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ■ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☑ Beta β | 092524 | 43-68B | .229 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm !

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 329 | 2 319 | 3 329 | 4 n/a | 5 n/a | 6 n/a | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .143 PRBK - 254 PTBK - 287 (52-72)

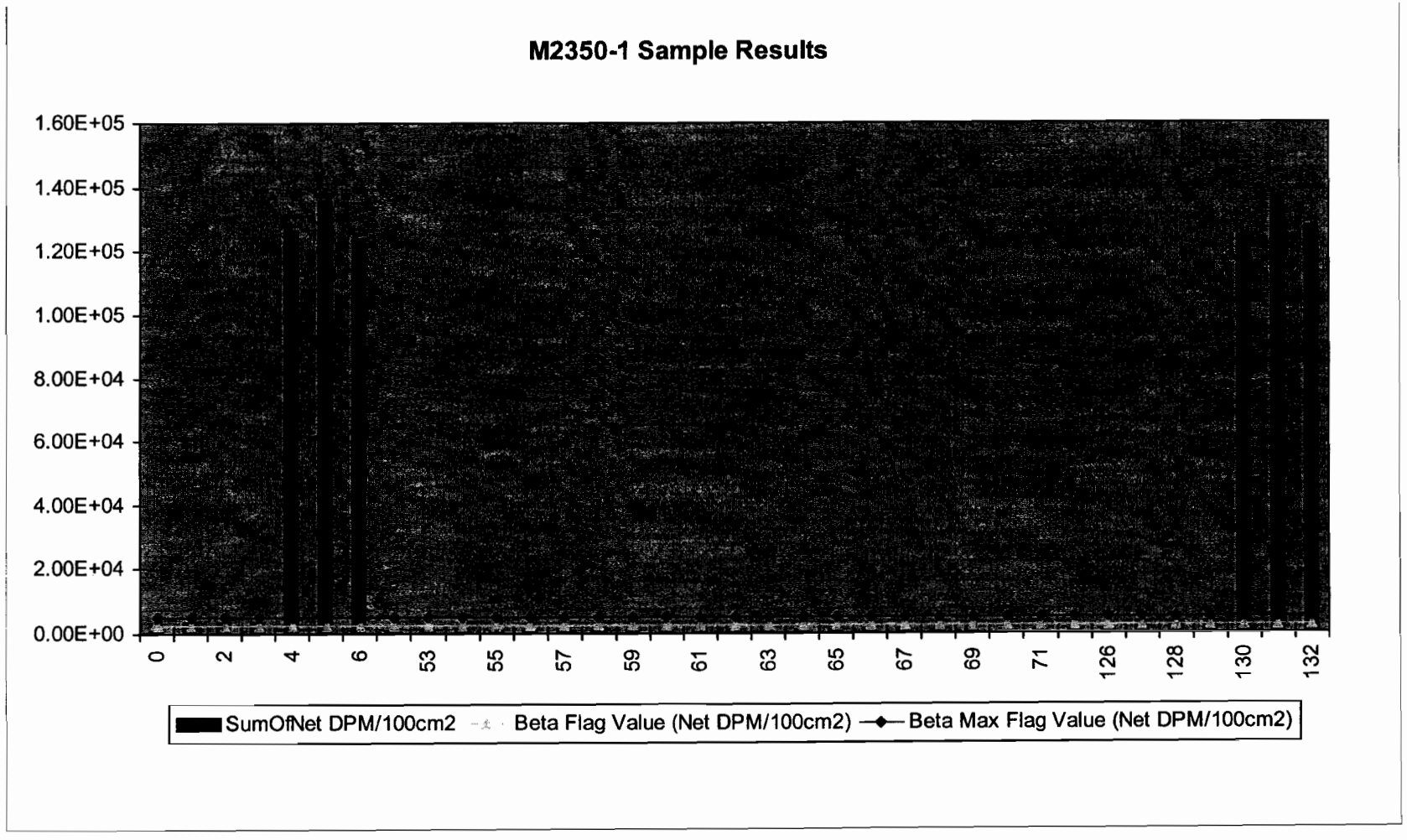
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000088 | Survey Description :Package A0400, B-124, Rooms 151 and 153 (Floors) | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.229 | Survey Date : 4/26/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSKjos | 8/25/03 |
| | | |

**Comments:**

*Sign-Off* Paul E. Ely (Print Name) Paul C Ely (Signature) 8/25/03 (Date)


M2350-1 Sample Results
1.60E+05
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
53
55
57
59
61
63
65
67
69
71
126
128
130
132
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000088

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,543.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 881 |
| ZZZZZ | 19655 | 1 | 1,207.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | 3,303 |
| ZZZZZ | 19655 | 2 | 1,214.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | 3,327 |
| ZZZZZ | 19655 | 3 | 1,224.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | 3,362 |
| ZZZZZ | 10002 | 4 | 36,815.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | [redacted] |
| ZZZZZ | 10002 | 5 | 39,391.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | [redacted] |
| ZZZZZ | 10002 | 6 | 36,085.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | [redacted] |
| A0400 | ZZZZZ | 52 | 329.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,140 |
| A0400 | ZZZZZ | 53 | 319.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,106 |
| A0400 | ZZZZZ | 54 | 329.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,140 |
| A0400 | 01F01 | 55 | 286.0 | 60 | FLDCT | B0021 | ZZZZZ | 1 | 0.0001 | 991 |
| A0400 | 01F01 | 56 | 343.0 | 60 | FLDCT | B0021 | ZZZZZ | 2 | 0.0001 | 1,189 |
| A0400 | 01F01 | 57 | 327.0 | 60 | FLDCT | B0021 | ZZZZZ | 3 | 0.0001 | 1,133 |
| A0400 | 01F01 | 58 | 351.0 | 60 | FLDCT | B0021 | ZZZZZ | 4 | 0.0001 | 1,216 |
| A0400 | 01F01 | 59 | 336.0 | 60 | FLDCT | B0021 | ZZZZZ | 5 | 0.0001 | 1,164 |
| A0400 | 01F01 | 60 | 304.0 | 60 | FLDCT | B0021 | ZZZZZ | 6 | 0.0001 | 1,054 |
| A0400 | 01F01 | 61 | 291.0 | 60 | FLDCT | B0021 | ZZZZZ | 7 | 0.0001 | 1,009 |
| A0400 | 01F01 | 62 | 293.0 | 60 | FLDCT | B0021 | ZZZZZ | 8 | 0.0001 | 1,015 |
| A0400 | 01F01 | 63 | 316.0 | 60 | FLDCT | B0021 | ZZZZZ | 9 | 0.0001 | 1,095 |
| A0400 | 01F01 | 64 | 346.0 | 60 | FLDCT | B0021 | ZZZZZ | 10 | 0.0001 | 1,199 |
| A0400 | 01F01 | 65 | 326.0 | 60 | FLDCT | B0021 | ZZZZZ | 11 | 0.0001 | 1,130 |
| A0400 | 01F01 | 66 | 322.0 | 60 | FLDCT | B0021 | ZZZZZ | 12 | 0.0001 | 1,116 |
| A0400 | 01F01 | 67 | 338.0 | 60 | FLDCT | B0021 | ZZZZZ | 13 | 0.0001 | 1,171 |
| A0400 | 01F01 | 68 | 351.0 | 60 | FLDCT | B0021 | ZZZZZ | 14 | 0.0001 | 1,216 |
| A0400 | 01F01 | 69 | 331.0 | 60 | FLDCT | B0021 | ZZZZZ | 15 | 0.0001 | 1,147 |
| A0400 | 01F01 | 70 | 328.0 | 60 | FLDCT | B0021 | ZZZZZ | 16 | 0.0001 | 1,137 |
| A0400 | 01F01 | 71 | 319.0 | 60 | FLDCT | B0021 | ZZZZZ | 17 | 0.0001 | 1,106 |
| A0400 | 01F01 | 72 | 314.0 | 60 | FLDCT | B0021 | ZZZZZ | 18 | 0.0001 | 1,088 |
| ZZZZZ | ZZZZZ | 126 | 2,867.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 994 |
| ZZZZZ | 19655 | 127 | 1,293.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | 3,487 |
| ZZZZZ | 19655 | 128 | 1,255.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | 3,355 |
| ZZZZZ | 19655 | 129 | 1,266.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | 3,393 |
| ZZZZZ | 10002 | 130 | 36,191.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | [redacted] |
| ZZZZZ | 10002 | 131 | 39,959.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | [redacted] |
| ZZZZZ | 10002 | 132 | 37,123.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

Survey #- A0700

# ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by Betty S. Kjos (Print) Signature BS Kj Date 4-28-03 Time 1510

Counted by Betty S. Kjos (Print) Signature BS Kj Date 4-29-03 Time 0740

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 105 dpm/100 cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 1 | 57 | 6 | < MDA |
| 2 | 55 | 4 | |
| 5 | 54 | 3 | |
| 11 | 58 | 7 | |
| 16 | 50 | 0 | < MDA |

N/A

| Circle: | MDA = 14 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 1 | 0 | 0 | < MDA |
| 2 | 1 | .70 | |
| 5 | 0 | 0 | |
| 11 | 0 | 0 | |
| 16 | 0 | 0 | < MDA |

N/A

Remarks-

Signature- BS Kj Reviewed by- Paul C Ely 4/29/03

Duratek, Inc.
Survey Package Worksheet for Package A0500
Bristol-Myers Squibb Building 124 Former Tank Area

| | |
|---|---|
| Package Identification No.: A0500 | Prepared by: Paul C. Ely |
| Location: Building 124 Former Tank Area Floors | Date prepared: 4/23/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors in Former Tank Area.

## Historical Information

The original Building 124 waste hold-up and sampling tanks were located underground and were removed during a major building renovation. A building addition was placed over the former tank area. The general area where the tanks were located is under the floor slab in B-124 Rooms 107, 108, 117 and 118.

No contamination levels >5,000 dpm/100 $cm^2$ were identified on the floors during the characterization.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

**Survey Package: A0500 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears in survey unit at five unspecified survey locations. |

**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| **Bristol Myers Squibb Building 124 Former Tank Area Floors** | | | | | | | | | | | | |
| A0500 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | NA/4-25-03 | BSK 4-16-03 | N/A | N/A | ~~NA~~ BSK 4-28-03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: 4/30/03 |
| Package Reviewed by and Date: Paul C Ely 4/30/03 |

| Survey Comments |
| --- |
| Points 4, 6-10, 14, 22 & 25 ARE IN TRENCH AREAS |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A0500**
**Former Tank Area, Rooms 107-109 & 116-118**

| | | |
|---|---|---|
| **X (Max):** | 10 | meters |
| **Y (Max):** | 10 | meters |
| **A (Area):** | 100 | $m^2$ |
| **N (Points):** | 25 | |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 2.1 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

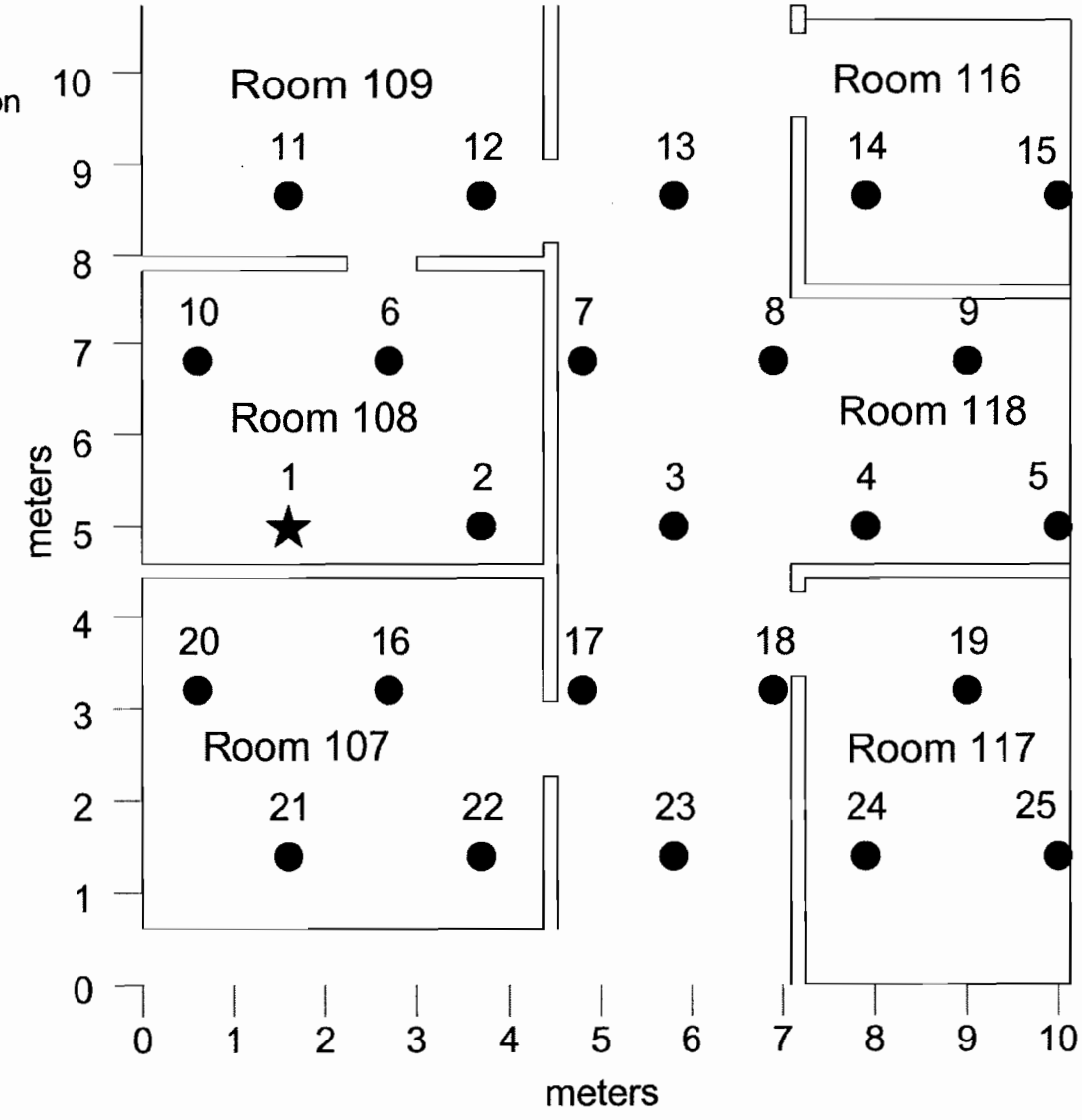
| | | | |
|---|---|---|---|
| **D=** | 1.8 | meters | (distance between rows) |
| **L/2=** | 1.1 | meters | (row offset value) |
| **X (Random):** | 2.1 | | random number generator |
| **Y (Random):** | 6.9 | | random number generator |
| **X (Origin):** | 1.6 | | initially generated random number |
| **Y (Origin):** | 5.0 | | initially generated random number |
| **Number of rows:** | 5 | **5** | |
| **Number of columns:** | 5 | **5** | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 1.6 | 5 | 3 |
| 2 | 3.7 | 5 | |
| 3 | 5.8 | 5 | |
| 4 | 7.9 | 5 | |
| 5 | 10.0 | 5 | |
| 6 | 2.7 | 6.8 | 4 |
| 7 | 4.8 | 6.8 | |
| 8 | 6.9 | 6.8 | |
| 9 | 9.0 | 6.8 | |
| 10 | 0.6 | 6.8 | |
| 11 | 1.6 | 8.6 | 5 |
| 12 | 3.7 | 8.6 | |
| 13 | 5.8 | 8.6 | |
| 14 | 7.9 | 8.6 | |
| 15 | 10.0 | 8.6 | |
| 16 | 2.7 | 3.2 | 2 |
| 17 | 4.8 | 3.2 | |
| 18 | 6.9 | 3.2 | |
| 19 | 9.0 | 3.2 | |
| 20 | 0.6 | 3.2 | |
| 21 | 1.6 | 1.4 | 1 |
| 22 | 3.7 | 1.4 | |
| 23 | 5.8 | 1.4 | |
| 24 | 7.9 | 1.4 | |
| 25 | 10.0 | 1.4 | |

**SURVEY PACKAGE A0500**

★ Starting Point

| Survey Point | Survey Location X | Survey Location Y |
|---|---|---|
| 1 | 1.6 | 5 |
| 2 | 3.7 | 5 |
| 3 | 5.8 | 5 |
| 4 | 7.9 | 5 |
| 5 | 10.0 | 5 |
| 6 | 2.7 | 6.8 |
| 7 | 4.8 | 6.8 |
| 8 | 6.9 | 6.8 |
| 9 | 9.0 | 6.8 |
| 10 | 0.6 | 6.8 |
| 11 | 1.6 | 8.6 |
| 12 | 3.7 | 8.6 |
| 13 | 5.8 | 8.6 |
| 14 | 7.9 | 8.6 |
| 15 | 10.0 | 8.6 |
| 16 | 2.7 | 3.2 |
| 17 | 4.8 | 3.2 |
| 18 | 6.9 | 3.2 |
| 19 | 9.0 | 3.2 |
| 20 | 0.6 | 3.2 |
| 21 | 1.6 | 1.4 |
| 22 | 3.7 | 1.4 |
| 23 | 5.8 | 1.4 |
| 24 | 7.9 | 1.4 |
| 25 | 10.0 | 1.4 |

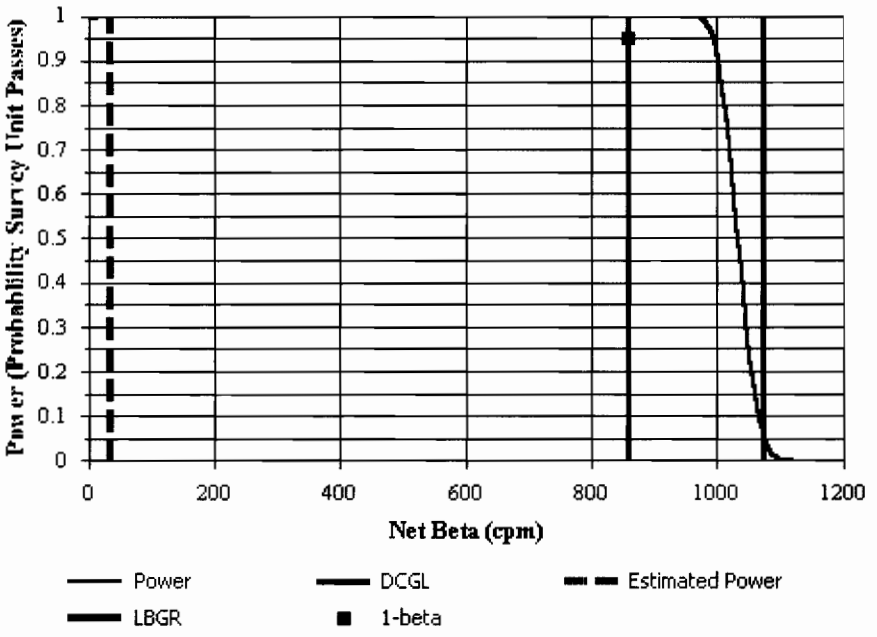


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0500 FSS Package | | |
| Comments: | Former Underslab Tank Area | | |
| Area (m²): | 100 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 71.8 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 859 | Estimated Conc. (cpm): | 34.3 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 213 ± 68 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 27 | 178.5 | 22.7 | 431 |

**BMS Download Survey Report Data Summary**
**Characterization Package A1100**
**Building 124 South Office Areas**

| Location | Area Surveyed | Background Counts/min | Gross counts/min |
|---|---|---|---|
| Former Tank Area | Floors | 177 | 206 |
| | | 162 | 219 |
| | | 152 | 166 |
| | | 173 | 184 |
| | | 173 | 175 |
| | | 238 | 323 |
| | | 213 | 283 |
| | | 159 | 216 |
| | | 162 | 158 |
| | | 173 | 166 |
| | | 212 | 395 |
| | | 152 | 152 |
| | | 167 | 204 |
| | | 178 | 184 |
| | | 153 | 168 |
| | | 169 | 167 |
| | | 178 | 199 |
| | | 168 | 171 |
| | | 170 | 188 |
| | | 185 | 205 |
| | | 233 | 420 |
| | | 197 | 197 |
| | | 176 | 193 |
| | | 172 | 183 |
| | | 197 | 215 |
| | | 163 | 197 |
| | **Average** | **178.9** | **212.8** |
| | **Standard Deviation** | **23.1** | **68.1** |
| | **No of Measurements** | **26** | **26** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kios **Signature:** Douglas R Kios **Date:** 4-26-03

Download Station #: 1 Download File #: 90
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Betty S. Kios **User ID** BSK0490 **Signature:** BSKios **Date:** 4-26-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: A0500, Bldg. 124, Rooms 107-109 & 116-118, Floors
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ■ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☑ Beta β | 092524 | 43-68B | .229 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 278 | 2 232 | 3 279 | 4 n/a | 5 n/a | 6 n/a | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 EFF = .143 PRBBK - 254 PTBBK - 287 (106-125)

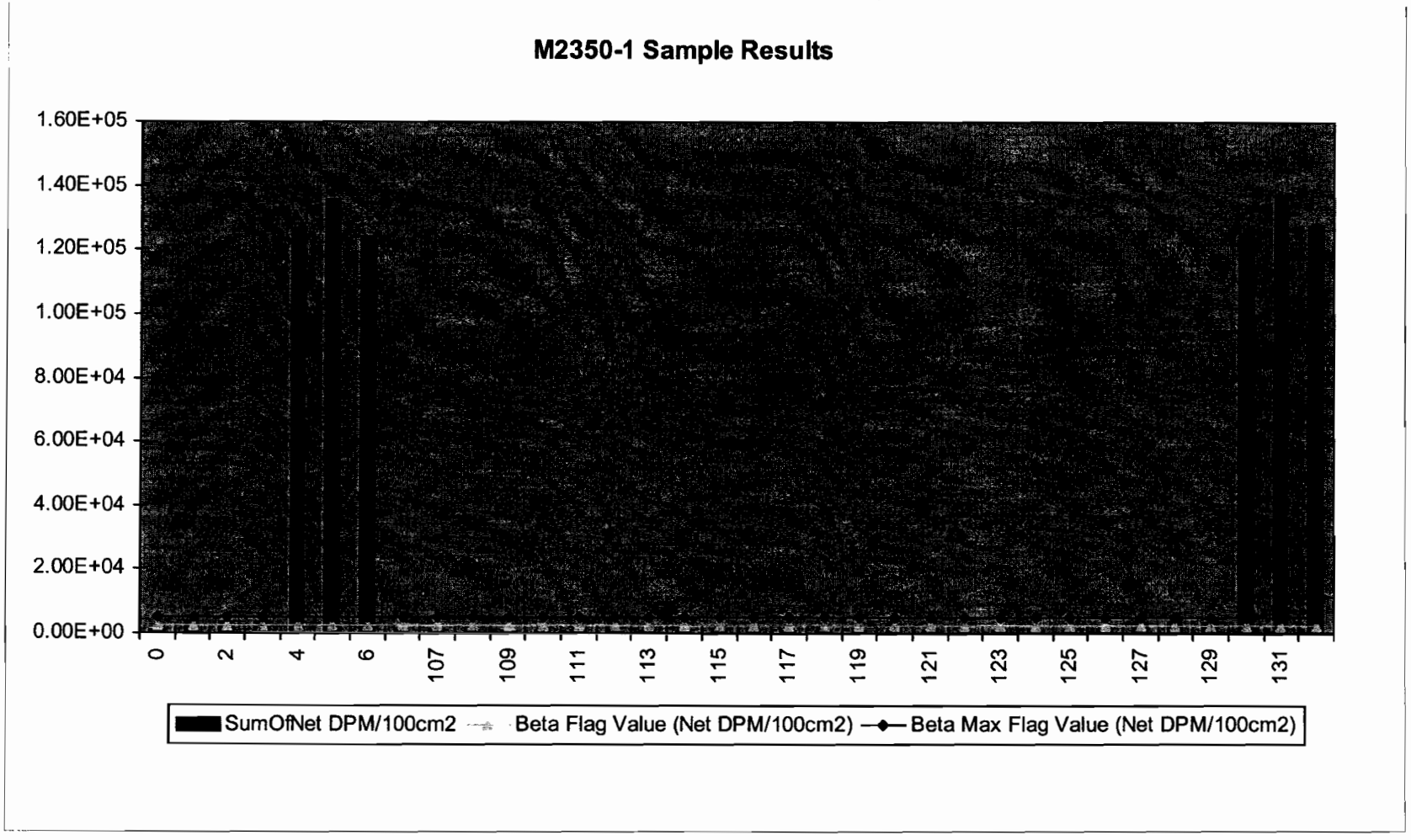
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000090 | Survey Description :Package A0500, B-124, Rooms 107-109 and 116-118 (F | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.229 | Survey Date : 4/26/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSKjos | 8/25/03 |
| | | |

**Comments:**

*Sign-Off* PAUL E. ELY (Print Name) Paul C Ely (Signature) 8/25/03 (Date)


M2350-1 Sample Results
1.60E+05
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
107
109
111
113
115
117
119
121
123
125
127
129
131
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

2 of 3

# *Duratek Beta Survey Report*

***Download File Name:*** 00000090

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,543.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 881 |
| ZZZZZ | 19655 | 1 | 1,207.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | 3,303 |
| ZZZZZ | 19655 | 2 | 1,214.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | 3,327 |
| ZZZZZ | 19655 | 3 | 1,224.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | 3,362 |
| ZZZZZ | 10002 | 4 | 36,815.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | [redacted] |
| ZZZZZ | 10002 | 5 | 39,391.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | [redacted] |
| ZZZZZ | 10002 | 6 | 36,085.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 254 | [redacted] |
| A0500 | ZZZZZ | 106 | 278.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 963 |
| A0500 | ZZZZZ | 107 | 232.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 804 |
| A0500 | ZZZZZ | 108 | 279.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 967 |
| A0500 | 01F01 | 109 | 272.0 | 60 | FLDCT | B0021 | ZZZZZ | 1 | 0.0001 | 943 |
| A0500 | 01F01 | 110 | 310.0 | 60 | FLDCT | B0021 | ZZZZZ | 2 | 0.0001 | 1,074 |
| A0500 | 01F01 | 111 | 315.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,092 |
| A0500 | 01F01 | 112 | 346.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 0.0001 | 1,199 |
| A0500 | 01F01 | 113 | 315.0 | 60 | FLDCT | B0003 | ZZZZZ | 9 | 0.0001 | 1,092 |
| A0500 | 01F01 | 114 | 345.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 1,196 |
| A0500 | 01F01 | 115 | 293.0 | 60 | FLDCT | B0003 | ZZZZZ | 13 | 0.0001 | 1,015 |
| A0500 | 01F01 | 116 | 306.0 | 60 | FLDCT | B9999 | ZZZZZ | 11 | 0.0001 | 1,061 |
| A0500 | 01F01 | 117 | 290.0 | 60 | FLDCT | B9999 | ZZZZZ | 12 | 0.0001 | 1,005 |
| A0500 | 01F01 | 118 | 323.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 1,119 |
| A0500 | 01F01 | 119 | 356.0 | 60 | FLDCT | B0003 | ZZZZZ | 18 | 0.0001 | 1,234 |
| A0500 | 01F01 | 120 | 355.0 | 60 | FLDCT | B0003 | ZZZZZ | 19 | 0.0001 | 1,230 |
| A0500 | 01F01 | 121 | 311.0 | 60 | FLDCT | B0003 | ZZZZZ | 23 | 0.0001 | 1,078 |
| A0500 | 01F01 | 122 | 356.0 | 60 | FLDCT | B0003 | ZZZZZ | 24 | 0.0001 | 1,234 |
| A0500 | 01F01 | 123 | 283.0 | 60 | FLDCT | B0021 | ZZZZZ | 16 | 0.0001 | 981 |
| A0500 | 01F01 | 124 | 313.0 | 60 | FLDCT | B0021 | ZZZZZ | 20 | 0.0001 | 1,085 |
| A0500 | 01F01 | 125 | 280.0 | 60 | FLDCT | B0021 | ZZZZZ | 21 | 0.0001 | 970 |
| ZZZZZ | ZZZZZ | 126 | 2,867.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 994 |
| ZZZZZ | 19655 | 127 | 1,293.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | 3,487 |
| ZZZZZ | 19655 | 128 | 1,255.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | 3,355 |
| ZZZZZ | 19655 | 129 | 1,266.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | 3,393 |
| ZZZZZ | 10002 | 130 | 36,191.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | [redacted] |
| ZZZZZ | 10002 | 131 | 39,959.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | [redacted] |
| ZZZZZ | 10002 | 132 | 37,123.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 287 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 - | _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

Survey #- A0500

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by Betty S. Kjos (Print) Signature BSKjos Date 4-28-03 Time 1430

Counted by Betty S. Kjos (Print) Signature BSKjos Date 4-29-03 Time 0830

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 105 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 3 | 55 | 4 | <MDA |
| 12 | 53 | 2 | |
| 13 | 59 | 8 | |
| 21 | 55 | 4 | |
| 24 | 55 | 4 | <MDA |
| | | | |
| | | | |
| | | |

Duratek, Inc.
Survey Package Worksheet for Package A0600
Bristol-Myers Squibb Building 124 Stack Base

| | |
|---|---|
| Package Identification No.: A0600 | Prepared by: Paul C. Ely |
| Location: Building 124 Stack Base | Date prepared: 4/23/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area comprising the Building 124 Stack Base.

## Historical Information

The Building 124 Stack served as the exhaust for the entire process area inside the building. The exhaust streams were HEPA filtered prior to exhausting them out the stack. The stack was removed and the concrete stack base remains.

No contamination levels >5,000 dpm/100 $cm^2$ were identified on the stack base during the characterization.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

**Survey Package: A0600 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| Bristol Myers Squibb Building 124 Stack Base | | | | | | | | | | | | |
| A0600 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | 3SK 4.7.03 | DRR 4.28.03 | N/A | N/A | DRR ~~N/A~~ 4.28.03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: 4/29/03 |
| Package Reviewed by and Date: Paul C Ely 4/29/03 |

| Survey Comments |
| --- |
| |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A0600**
**Stack Base**

| | | |
|---|---|---|
| **X (Max):** | 7 | meters |
| **Y (Max):** | 7 | meters |
| **A (Area):** | 49 | $m^2$ |
| **N (Points):** | 25 | |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

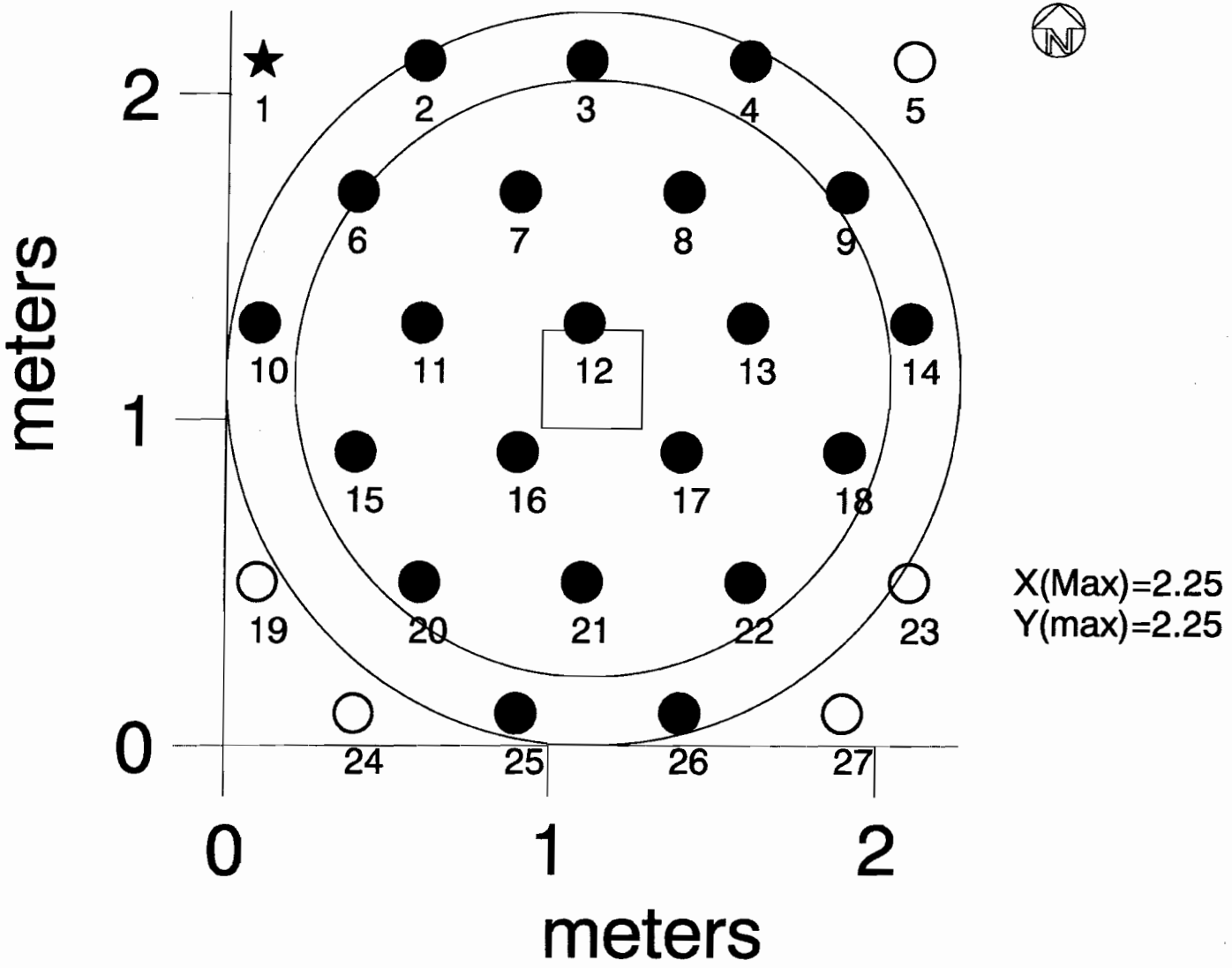
| | | | |
|---|---|---|---|
| **L=** | 1.5 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.3 | meters | (distance between rows) |
| **L/2=** | 0.8 | meters | (row offset value) |
| **X (Random):** | 5.9 | | random number generator |
| **Y (Random):** | 5.6 | | random number generator |
| **X (Origin):** | 5.2 | | initially generated random number |
| **Y (Origin):** | 1.4 | | initially generated random number |
| **Number of rows:** | 5 | **5** | |
| **Number of columns:** | 5 | **5** | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 5.2 | 1.4 | 1 |
| 2 | 6.7 | 1.4 | |
| 3 | 3.7 | 1.4 | |
| 4 | 2.2 | 1.4 | |
| 5 | 0.7 | 1.4 | |
| 6 | 6.0 | 2.7 | 2 |
| 7 | 4.5 | 2.7 | |
| 8 | 3.0 | 2.7 | |
| 9 | 1.5 | 2.7 | |
| 10 | 0.0 | 2.7 | |
| 11 | 5.2 | 4 | 3 |
| 12 | 6.7 | 4 | |
| 13 | 3.7 | 4 | |
| 14 | 2.2 | 4 | |
| 15 | 0.7 | 4 | |
| 16 | 6.0 | 5.3 | 4 |
| 17 | 4.5 | 5.3 | |
| 18 | 3.0 | 5.3 | |
| 19 | 1.5 | 5.3 | |
| 20 | 0.0 | 5.3 | |
| 21 | 5.2 | 6.6 | 5 |
| 22 | 6.7 | 6.6 | |
| 23 | 3.7 | 6.6 | |
| 24 | 2.2 | 6.6 | |
| 25 | 0.7 | 6.6 | |

# SURVEY PACKAGE A0600

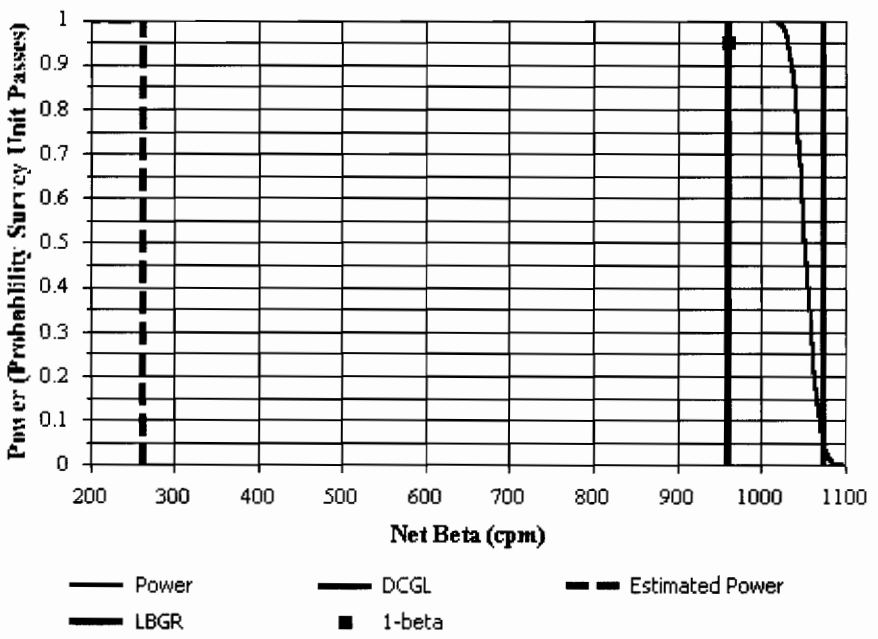


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0600 FSS Package | | |
| Comments: | B-124 Stack Base | | |
| Area (m²): | 37 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 37.8 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 961 | Estimated Conc. (cpm): | 263 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 442 ± 30 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 27 | 178.5 | 22.7 | 431 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0200**
**Building 124 Stack Base**

| Location | Area Surveyed | Background Counts/min | Gross counts/min |
|---|---|---|---|
| Stack Base | Walls | 271 | 473 |
| | | 321 | 408 |
| | | 302 | 414 |
| | | 329 | 460 |
| | | 305 | 464 |
| | | 322 | 425 |
| | | 305 | 489 |
| | | 298 | 408 |
| | | 311 | 432 |
| | | 334 | 396 |
| | | 306 | 425 |
| | | 281 | 451 |
| | | 314 | 453 |
| | | 313 | 484 |
| | **Average** | **308.0** | **441.6** |
| | **Standard Deviation** | **17.1** | **30.2** |
| | **No of Measurements** | **14** | **14** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyos **Signature:** [signature] **Date:** 4-28-03

Download Station #: 1 Download File #: _____
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kyos **User ID** NRK2986 **Signature:** [signature] **Date:** 4-28-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A0600, B-124, Stack Base
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR119337 | 43-68B | .223 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 424 | 2 401 | 3 372 | 4 N/A | 5 N/A | 6 N/A | 399 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 EFF = .130

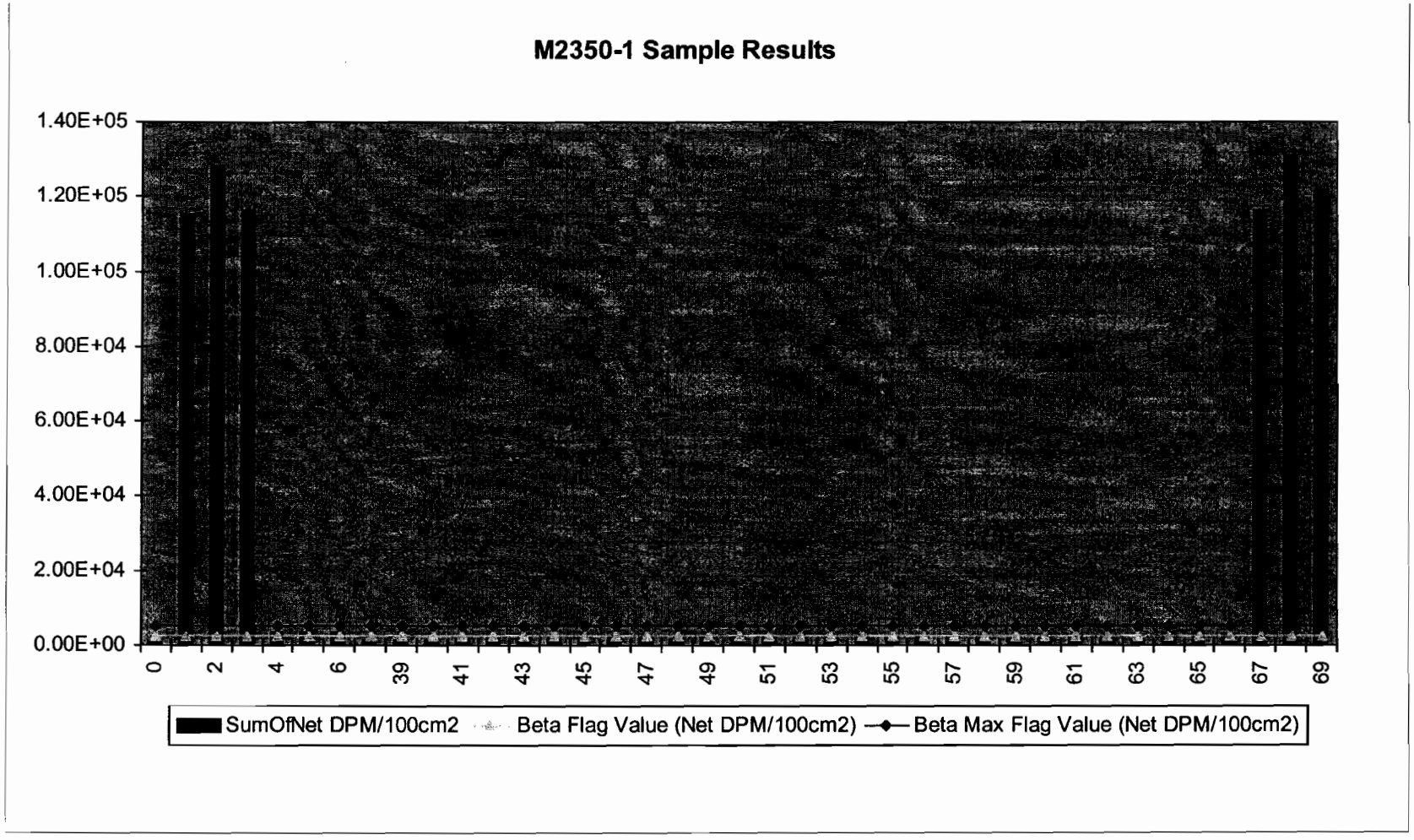
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000100 | Survey Description :Package A0600, B-124, Stack Base | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.223 | Survey Date : 4/28/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* PAUL C ELY (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
39
41
43
45
47
49
51
53
55
57
59
61
63
65
67
69
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000100

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,962.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,054 |
| ZZZZZ | 10002 | 1 | 32,762.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | [redacted] |
| ZZZZZ | 10002 | 2 | 36,400.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | [redacted] |
| ZZZZZ | 10002 | 3 | 32,907.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | [redacted] |
| ZZZZZ | FD184 | 4 | 1,280.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | 3,502 |
| ZZZZZ | FD184 | 5 | 1,281.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | 3,506 |
| ZZZZZ | FD184 | 6 | 1,273.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | 3,477 |
| A0600 | ZZZZZ | 38 | 424.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 1,509 |
| A0600 | ZZZZZ | 39 | 401.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 1,427 |
| A0600 | ZZZZZ | 40 | 372.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 1,324 |
| A0600 | 01F01 | 41 | 471.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 1,676 |
| A0600 | 01F01 | 42 | 678.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 2,413 |
| A0600 | 01F01 | 43 | 671.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 2,388 |
| A0600 | 01F01 | 44 | 535.0 | 60 | FLDCT | B0003 | ZZZZZ | 6 | 0.0001 | 1,904 |
| A0600 | 01F01 | 45 | 694.0 | 60 | FLDCT | B0003 | ZZZZZ | 7 | 0.0001 | 2,470 |
| A0600 | 01F01 | 46 | 630.0 | 60 | FLDCT | B0003 | ZZZZZ | 8 | 0.0001 | 2,242 |
| A0600 | 01F01 | 47 | 654.0 | 60 | FLDCT | B0003 | ZZZZZ | 9 | 0.0001 | 2,328 |
| A0600 | 01F01 | 48 | 544.0 | 60 | FLDCT | B0003 | ZZZZZ | 10 | 0.0001 | 1,936 |
| A0600 | 01F01 | 49 | 641.0 | 60 | FLDCT | B0003 | ZZZZZ | 11 | 0.0001 | 2,281 |
| A0600 | 01F01 | 50 | 616.0 | 60 | FLDCT | B0003 | ZZZZZ | 12 | 0.0001 | 2,192 |
| A0600 | 01F01 | 51 | 694.0 | 60 | FLDCT | B0003 | ZZZZZ | 13 | 0.0001 | 2,470 |
| A0600 | 01F01 | 52 | 580.0 | 60 | FLDCT | B0003 | ZZZZZ | 14 | 0.0001 | 2,064 |
| A0600 | 01F01 | 53 | 706.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 2,513 |
| A0600 | 01F01 | 54 | 770.0 | 60 | FLDCT | B0003 | ZZZZZ | 16 | 0.0001 | 2,740 |
| A0600 | 01F01 | 55 | 649.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 2,310 |
| A0600 | 01F01 | 56 | 635.0 | 60 | FLDCT | B0003 | ZZZZZ | 18 | 0.0001 | 2,260 |
| A0600 | 01F01 | 57 | 681.0 | 60 | FLDCT | B0003 | ZZZZZ | 19 | 0.0001 | 2,424 |
| A0600 | 01F01 | 58 | 682.0 | 60 | FLDCT | B0003 | ZZZZZ | 20 | 0.0001 | 2,427 |
| A0600 | 01F01 | 59 | 685.0 | 60 | FLDCT | B0003 | ZZZZZ | 21 | 0.0001 | 2,438 |
| A0600 | 01F01 | 60 | 596.0 | 60 | FLDCT | B0003 | ZZZZZ | 22 | 0.0001 | 2,121 |
| A0600 | 01F01 | 61 | 557.0 | 60 | FLDCT | B0003 | ZZZZZ | 25 | 0.0001 | 1,982 |
| A0600 | 01F01 | 62 | 586.0 | 60 | FLDCT | B0003 | ZZZZZ | 26 | 0.0001 | 2,086 |
| ZZZZZ | ZZZZZ | 63 | 3,256.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,159 |
| ZZZZZ | FD184 | 64 | 1,252.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 326 | 3,296 |
| ZZZZZ | FD184 | 65 | 1,314.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 326 | 3,516 |
| ZZZZZ | FD184 | 66 | 1,220.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 326 | 3,182 |
| ZZZZZ | 10002 | 67 | 33,035.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 326 | [redacted] |
| ZZZZZ | 10002 | 68 | 37,158.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 326 | [redacted] |
| ZZZZZ | 10002 | 69 | 34,539.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 326 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 - | _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A0600

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by D.R. Kjos (Print) Signature DR Kjos Date 4-28-03 Time 1600

Counted by Betty S. Kjos (Print) Signature BS Kjos Date 4-29-03 Time 0850

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 105 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 64 | 13 | <MDA |
| 7 | 47 | 0 | |
| 12 | 55 | 4 | |
| 17 | 56 | 5 | |
| 22 | 61 | 10 | <MDA |
| | | | |
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| Circle: | MDA = 14 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | <MDA |
| 7 | 0 | 0 | |
| 12 | 0 | 0 | |
| 17 | 1 | .70 | |
| 22 | 0 | 0 | <MDA |
| | | | |
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Remarks-

Signature- BS Kjos Reviewed by- Paul C Eby 4/29/03

of

Duratek, Inc.
Survey Package Worksheet for Package A0700
Bristol-Myers Squibb Building 124, Rooms 180 &181

| | |
|---|---|
| Package Identification No.: A0700 | Prepared by: Paul C. Ely |
| Location: Building 124 Room 180 &181 Floors | Date prepared: 4/14/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors in rooms 180 &181. This package does not include the MINITEC Cave or the pits located in these rooms.

## Historical Information

Rooms 180 and 181 are the MINITEC Cave operating Rooms. The MINITEC Cave was built to accommodate increased Molybdenum production. When Molybdenum production declined in the late 1980's, the cave was then used for strontium production. The radionuclides used in the MINITEC Cave area included Mo-99 and Sr-82/85.

No contamination levels >5,000 dpm/100 $cm^2$ were identified during the characterization survey except on equipment that was removed during the D&D phase.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second. Judgmental; systematic along transects or of randomly selected grids.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A0700 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears on floor in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| Bristol Myers Squibb Building 124 Rooms 180 & 181 | | | | | | | | | | | | |
| A0700 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | BSK 4-14-03 | BSK 4-15-03 | N/A | N/A | BSK N/A 4-28-03 | N/A | N/A |
| | | | | | | | | | | | | |
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| Package Review | |
|---|---|
| Date Package Completed: | 4/29/03 |
| Package Reviewed by and Date: | Paul C Ely 4/29/03 |

| Survey Comments |
|---|
| |
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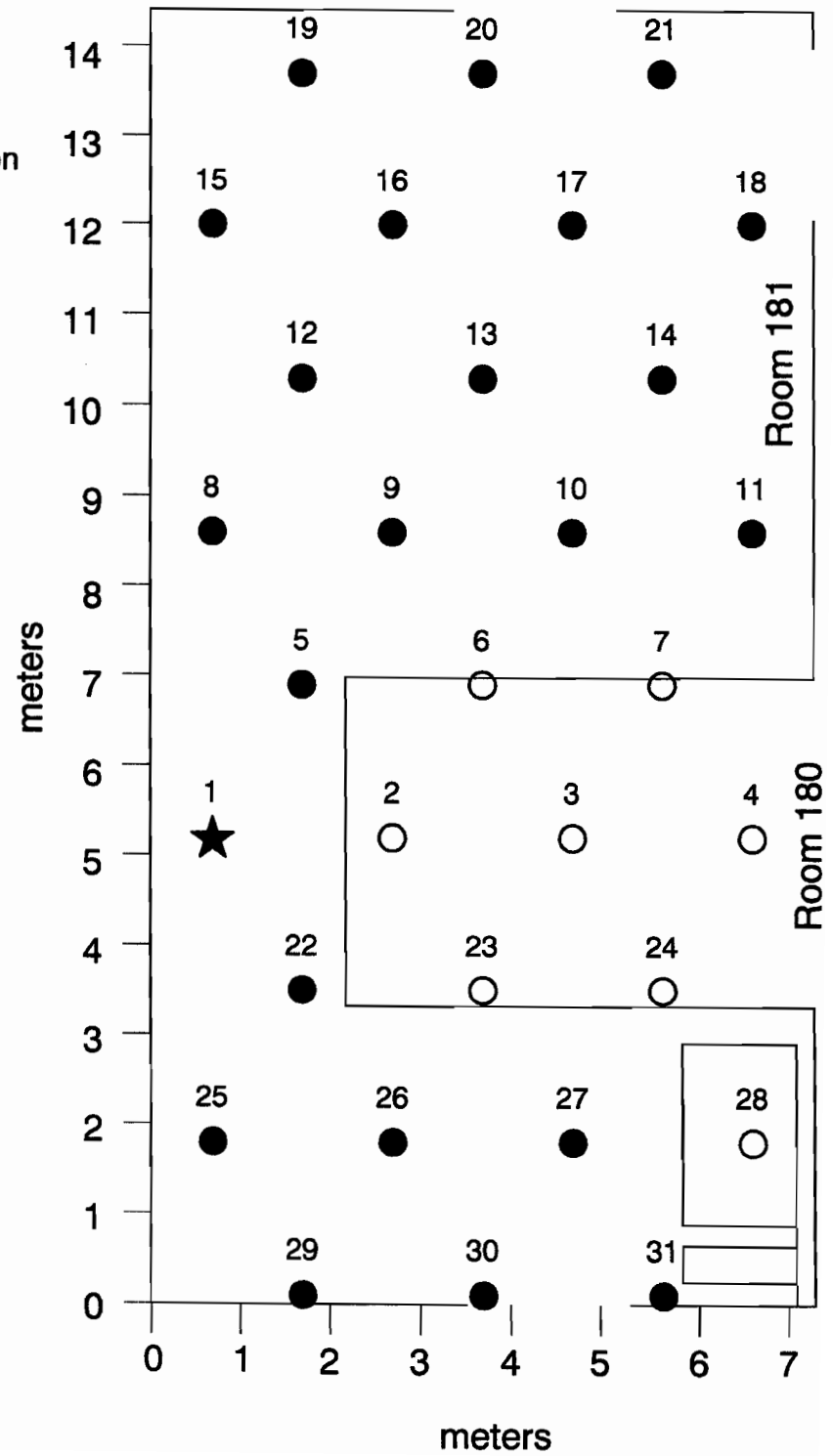
| |

## SURVEY PACKAGE A0700

★ Starting Point

| Survey Point | Survey Location X | Survey Location Y |
|---|---|---|
| 1 | 0.7 | 5.2 |
| 2 | 2.7 | 5.2 |
| 3 | 4.7 | 5.2 |
| 4 | 6.7 | 5.2 |
| 5 | 1.7 | 6.9 |
| 6 | 3.7 | 6.9 |
| 7 | 5.7 | 6.9 |
| 8 | 0.7 | 8.6 |
| 9 | 2.7 | 8.6 |
| 10 | 4.7 | 8.6 |
| 11 | 6.7 | 8.6 |
| 12 | 1.7 | 10.3 |
| 13 | 3.7 | 10.3 |
| 14 | 5.7 | 10.3 |
| 15 | 0.7 | 12.0 |
| 16 | 2.7 | 12.0 |
| 17 | 4.7 | 12.0 |
| 18 | 6.7 | 12.0 |
| 19 | 1.7 | 13.7 |
| 20 | 3.7 | 13.7 |
| 21 | 5.7 | 13.7 |
| 22 | 1.7 | 3.5 |
| 23 | 3.7 | 3.5 |
| 24 | 5.7 | 3.5 |
| 25 | 0.7 | 1.8 |
| 26 | 2.7 | 1.8 |
| 27 | 4.7 | 1.8 |
| 28 | 6.7 | 1.8 |
| 29 | 1.7 | 0.1 |
| 30 | 3.7 | 0.1 |
| 31 | 5.7 | 0.1 |



**Survey Package A0700**
**Rooms 180 & 181 Floors**

| | | |
|---|---|---|
| **X (Max):** | 7.4 | meters |
| **Y (Max):** | 14.4 | meters |
| **A (Area):** | 87 | $m^2$ |
| **N (Points):** | 25 | |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 2 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.7 | meters | (distance between rows) |
| **L/2=** | 1.0 | meters | (row offset value) |
| **X (Random):** | 2.3 | | random number generator |
| **Y (Random):** | 2.8 | | random number generator |
| **X (Origin):** | 0.7 | | initially generated random number |
| **Y (Origin):** | 5.2 | | initially generated random number |
| **Number of rows:** | 5 | **9** | |
| **Number of columns:** | 5 | **4** | |

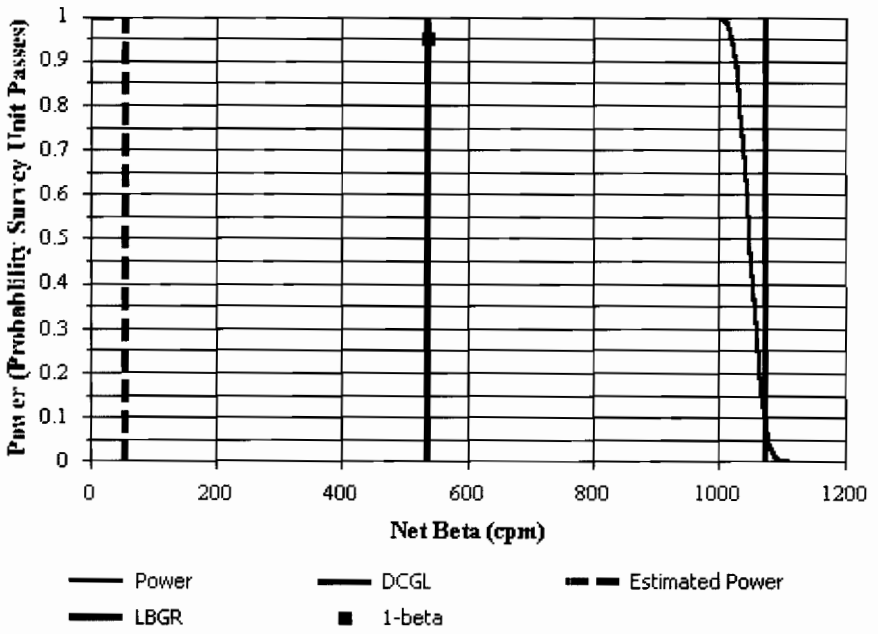
| **Survey Point** | **Survey Location X** | **Survey Location Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 0.7 | 5.2 | 4 |
| 2 | 2.7 | 5.2 | |
| 3 | 4.7 | 5.2 | |
| 4 | 6.7 | 5.2 | |
| 5 | 1.7 | 6.9 | 5 |
| 6 | 3.7 | 6.9 | |
| 7 | 5.7 | 6.9 | |
| 8 | 0.7 | 8.6 | 6 |
| 9 | 2.7 | 8.6 | |
| 10 | 4.7 | 8.6 | |
| 11 | 6.7 | 8.6 | |
| 12 | 1.7 | 10.3 | 7 |
| 13 | 3.7 | 10.3 | |
| 14 | 5.7 | 10.3 | |
| 15 | 0.7 | 12.0 | 8 |
| 16 | 2.7 | 12.0 | |
| 17 | 4.7 | 12.0 | |
| 18 | 6.7 | 12.0 | |
| 19 | 1.7 | 13.7 | 9 |
| 20 | 3.7 | 13.7 | |
| 21 | 5.7 | 13.7 | |
| 22 | 1.7 | 3.5 | 3 |
| 23 | 3.7 | 3.5 | |
| 24 | 5.7 | 3.5 | |
| 25 | 0.7 | 1.8 | 2 |
| 26 | 2.7 | 1.8 | |
| 27 | 4.7 | 1.8 | |
| 28 | 6.7 | 1.8 | |
| 29 | 1.7 | 0.1 | 1 |
| 30 | 3.7 | 0.1 | |
| 31 | 5.7 | 0.1 | |

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0700 FSS Package | | |
| Comments: | B-124 Room 180 & 181 Floors | | |
| Area (m²): | 87 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 50.9 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 13 |
| LBGR (cpm): | 537 | Estimated Conc. (cpm): | 55.4 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 13 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 300 ± 46 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Linoleum | 46 | 244.9 | 21.7 | 501 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0800,Rooms 179, 180, 181, 182, 183, 184, 190-213 and 217**
**Building 124**

| | Floor | | Wall | | Ceiling | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 253 | 242 | 340 | 388 | 350 | 442 | 300 | 341 |
| | 214 | 220 | 358 | 421 | 386 | 359 | 331 | 360 |
| | 199 | 223 | 360 | 450 | 455 | 451 | 299 | 365 |
| | 237 | 271 | 364 | 420 | 380 | 409 | 359 | 372 |
| | 292 | 290 | 362 | 456 | 371 | 453 | 349 | 346 |
| | 258 | 241 | 438 | 442 | 410 | 462 | 372 | 368 |
| | 249 | 258 | 339 | 449 | 384 | 424 | 341 | 372 |
| | 242 | 257 | 382 | 440 | 352 | 424 | 350 | 368 |
| | 243 | 209 | 365 | 436 | 369 | 410 | 342 | 340 |
| | 209 | 223 | 353 | 426 | 414 | 508 | 346 | 438 |
| | 211 | 244 | 341 | 392 | 409 | 429 | 385 | 421 |
| | 238 | 217 | 371 | 470 | 458 | 498 | 411 | 426 |
| | 216 | 236 | 309 | 420 | 407 | 463 | 328 | 336 |
| | 241 | 267 | 354 | 494 | 419 | 474 | 330 | 357 |
| | 273 | 305 | 331 | 391 | 322 | 367 | 311 | 353 |
| | 288 | 296 | 377 | 449 | 333 | 369 | 365 | 366 |
| | 260 | 285 | 390 | 376 | 393 | 381 | 369 | 368 |
| | 287 | 273 | 388 | 458 | 405 | 574 | 294 | 338 |
| | 257 | 257 | 403 | 481 | 393 | 400 | 362 | 412 |
| | 233 | 242 | 414 | 487 | 390 | 559 | 333 | 386 |
| | 224 | 198 | 379 | 474 | 343 | 448 | 368 | 383 |
| | 217 | 235 | 340 | 430 | 393 | 414 | 329 | 357 |
| | 252 | 220 | 324 | 415 | 336 | 402 | 354 | 395 |
| | 243 | 248 | 365 | 481 | 414 | 410 | 347 | 377 |
| | 224 | 198 | 340 | 408 | 417 | 412 | 364 | 385 |
| | 238 | 248 | 358 | 397 | 349 | 412 | | |
| | 235 | 257 | 383 | 437 | 359 | 397 | | |
| | 246 | 246 | 384 | 438 | 376 | 415 | | |
| | 256 | 254 | 315 | 346 | 339 | 372 | | |
| | 274 | 272 | 388 | 341 | 392 | 411 | | |
| | 255 | 222 | 356 | 444 | | | | |
| | 222 | 225 | 315 | 426 | | | | |
| | 248 | 246 | 500 | 662 | | | | |
| | 275 | 279 | 414 | 460 | | | | |
| | 256 | 241 | 346 | 448 | | | | |
| | 248 | 258 | 375 | 426 | | | | |
| | 229 | 236 | 485 | 962 | | | | |
| | 228 | 221 | 373 | 491 | | | | |
| | 239 | 228 | 330 | 424 | | | | |
| | 239 | 254 | 407 | 497 | | | | |
| | 232 | 210 | 427 | 475 | | | | |
| | 252 | 418 | 354 | 415 | | | | |
| | 231 | 212 | 369 | 479 | | | | |
| | 267 | 263 | 366 | 405 | | | | |
| | 261 | 255 | 327 | 423 | | | | |
| | 276 | 2271 | | | | | | |
| **Average** | **244.9** | **292.8** | **370.2** | **452.2** | **383.9** | **431.6** | **345.6** | **373.2** |
| **Standard Deviation** | **21.7** | **300.3** | **39.8** | **92.1** | **34.3** | **51.7** | **27.5** | **27.7** |
| **No of Measurements** | **46** | **46** | **45** | **45** | **30** | **30** | **25** | **25** |
| **All Measurement Average** | **326.0** | **386.5** | | | | | | |
| **Standard Deviation** | **71.6** | **207.5** | | | | | | |
| **No of Measurements** | **121** | **121** | | | | | | |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kjos **Signature:** [signature] **Date:** 4-16-03

Download Station #: 1 Download File #: 54
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** DD Kjos **User ID** BSK 0490 **Signature:** [signature] **Date:** 4-15-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 12697

Survey Unit Description: A0700, Rooms 180 & 181, Floors
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ☑ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☑ Beta β | 092524 | 43-68B | .241 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 331 | 2 348 | 3 316 | 4 | 5 | 6 | 332 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: ~~(32 thru 57)~~ 35K (0 thru 6) (32 thru 57 + 59 thru 65)
On sample # 59 change L5 code to PTBBK.
C-14 Eff - .139

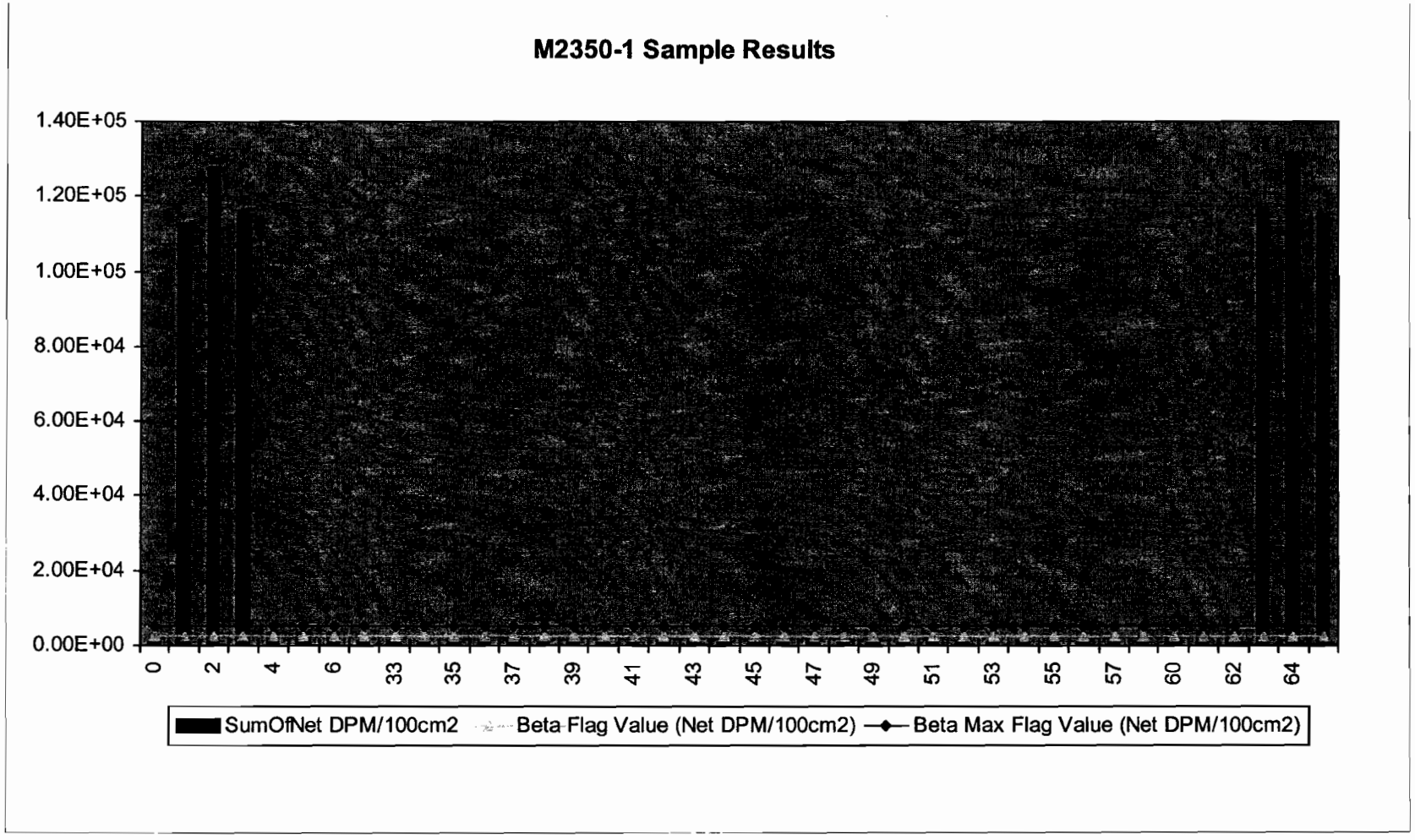
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000054 | Survey Description :Package A0700 Rooms 180 and 181 | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.241 | Survey Date : 4/15/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSK | 8/26/03 |
| | | |

**Comments:**

Sign-Off PAUL C. ELY (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
33
35
37
39
41
43
45
47
49
51
53
55
57
60
62
64
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000054

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,751.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 906 |
| ZZZZZ | 10002 | 1 | 34,502.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 275 | [redacted] |
| ZZZZZ | 10002 | 2 | 39,172.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 275 | [redacted] |
| ZZZZZ | 10002 | 3 | 35,160.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 275 | [redacted] |
| ZZZZZ | 19655 | 4 | 1,288.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 275 | 3,336 |
| ZZZZZ | 19655 | 5 | 1,383.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 275 | 3,649 |
| ZZZZZ | 19655 | 6 | 1,272.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 275 | 3,283 |
| A0700 | ZZZZZ | 32 | 331.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,090 |
| A0700 | ZZZZZ | 33 | 348.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,146 |
| A0700 | ZZZZZ | 34 | 316.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,041 |
| A0700 | 01F01 | 35 | 324.0 | 60 | FLDCT | B9999 | ZZZZZ | 1 | 0.0001 | 1,067 |
| A0700 | 01F01 | 36 | 294.0 | 60 | FLDCT | B9999 | ZZZZZ | 5 | 0.0001 | 968 |
| A0700 | 01F01 | 37 | 359.0 | 60 | FLDCT | B9999 | ZZZZZ | 8 | 0.0001 | 1,182 |
| A0700 | 01F01 | 38 | 317.0 | 60 | FLDCT | B9999 | ZZZZZ | 9 | 0.0001 | 1,044 |
| A0700 | 01F01 | 39 | 281.0 | 60 | FLDCT | B9999 | ZZZZZ | 10 | 0.0001 | 925 |
| A0700 | 01F01 | 40 | 269.0 | 60 | FLDCT | B9999 | ZZZZZ | 11 | 0.0001 | 886 |
| A0700 | 01F01 | 41 | 307.0 | 60 | FLDCT | B9999 | ZZZZZ | 12 | 0.0001 | 1,011 |
| A0700 | 01F01 | 42 | 347.0 | 60 | FLDCT | B9999 | ZZZZZ | 13 | 0.0001 | 1,143 |
| A0700 | 01F01 | 43 | 331.0 | 60 | FLDCT | B9999 | ZZZZZ | 14 | 0.0001 | 1,090 |
| A0700 | 01F01 | 44 | 286.0 | 60 | FLDCT | B9999 | ZZZZZ | 15 | 0.0001 | 942 |
| A0700 | 01F01 | 45 | 305.0 | 60 | FLDCT | B9999 | ZZZZZ | 16 | 0.0001 | 1,004 |
| A0700 | 01F01 | 46 | 294.0 | 60 | FLDCT | B9999 | ZZZZZ | 17 | 0.0001 | 968 |
| A0700 | 01F01 | 47 | 348.0 | 60 | FLDCT | B9999 | ZZZZZ | 18 | 0.0001 | 1,146 |
| A0700 | 01F01 | 48 | 312.0 | 60 | FLDCT | B9999 | ZZZZZ | 19 | 0.0001 | 1,027 |
| A0700 | 01F01 | 49 | 319.0 | 60 | FLDCT | B9999 | ZZZZZ | 20 | 0.0001 | 1,051 |
| A0700 | 01F01 | 50 | 281.0 | 60 | FLDCT | B9999 | ZZZZZ | 21 | 0.0001 | 925 |
| A0700 | 01F01 | 51 | 276.0 | 60 | FLDCT | B9999 | ZZZZZ | 22 | 0.0001 | 909 |
| A0700 | 01F01 | 52 | 259.0 | 60 | FLDCT | B9999 | ZZZZZ | 25 | 0.0001 | 853 |
| A0700 | 01F01 | 53 | 279.0 | 60 | FLDCT | B9999 | ZZZZZ | 26 | 0.0001 | 919 |
| A0700 | 01F01 | 54 | 362.0 | 60 | FLDCT | B9999 | ZZZZZ | 27 | 0.0001 | 1,192 |
| A0700 | 01F01 | 55 | 267.0 | 60 | FLDCT | B9999 | ZZZZZ | 29 | 0.0001 | 879 |
| A0700 | 01F01 | 56 | 267.0 | 60 | FLDCT | B9999 | ZZZZZ | 30 | 0.0001 | 879 |
| A0700 | 01F01 | 57 | 281.0 | 60 | FLDCT | B9999 | ZZZZZ | 31 | 0.0001 | 925 |
| ZZZZZ | ZZZZZ | 59 | 2,810.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 925 |
| ZZZZZ | 19655 | 60 | 1,260.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,224 |
| ZZZZZ | 19655 | 61 | 1,338.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,481 |
| ZZZZZ | 19655 | 62 | 1,280.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,290 |
| ZZZZZ | 10002 | 63 | 35,741.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |
| ZZZZZ | 10002 | 64 | 40,074.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | 10002 | 65 | 35,215.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A0700

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by Betty S. Kios (Print) Signature BS Kios Date 4-28-03 Time 1440

Counted by Betty S. Kios (Print) Signature BS Kios Date 4-29-03 Time 0900

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 105 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 4 | 52 | 1 | <MDA |
| 9 | 57 | 6 | |
| 13 | 72 | 21 | |
| 20 | 47 | 0 | |
| 26 | 45 | 0 | <MDA |

N A

| Circle: | MDA = 14 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 4 | 0 | 0 | <MDA |
| 9 | 0 | 0 | |
| 13 | 0 | 0 | |
| 20 | 0 | 0 | |
| 26 | 1 | .70 | <MDA |

N A

Remarks-

Signature- BS Kios Reviewed by- Paul CEG 4/29/03

of

Duratek, Inc.
Survey Package Worksheet for Package A0800
Bristol-Myers Squibb Building 124 MINITEC Cave

| | |
|---|---|
| Package Identification No.: A0800 | Prepared by: Paul C. Ely |
| Location: Building 124 MINITEC Cave | Date prepared: 4/14/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors walls and ceilings in MINITEC Cave.

## Historical Information

The MINITEC Cave was built to accommodate increased Molybdenum production. When Molybdenum production declined in the late 1980's, the cave was then used for strontium production. The radionuclides used in the MINITEC Cave area included Mo-99 and Sr-82/85.

Contamination levels >50,000 dpm/100 $cm^2$ were identified during the characterization on cave interior surfaces and on equipment that was removed during the D&D phase.

## General Survey Instructions

(Class 1):

1. Perform a minimum of 100% scan of accessible surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

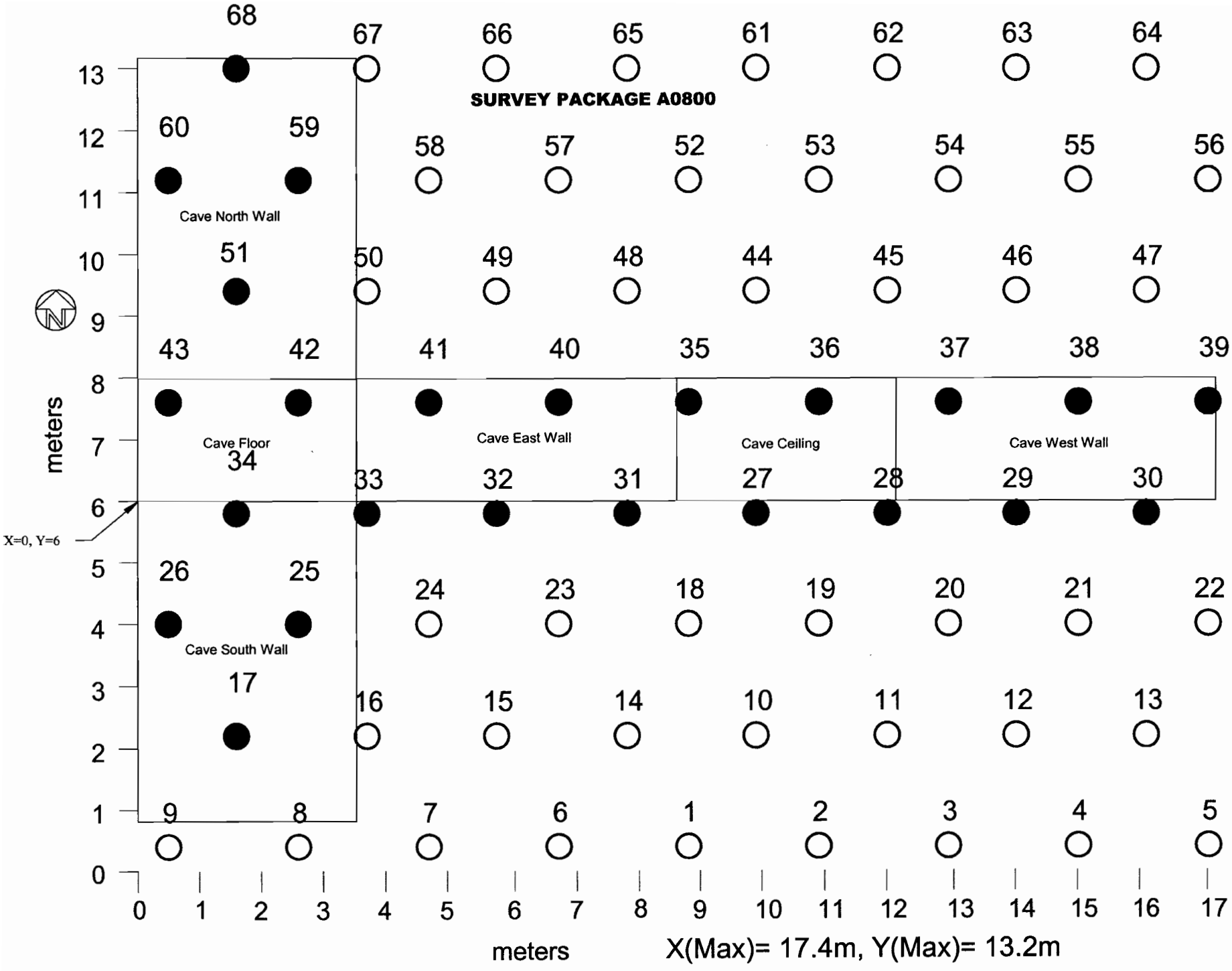
**Survey Package: A0800 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| Bristol Myers Squibb Building 124 MINITEC Cave | | | | | | | | | | | | |
| A0800 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | BSK 3-19-03 | NBK/4-17-03 | N/A | N/A | NBK/4/7/03 | N/A | N/A |
| A0800 | 01W01 | ZZZZZ | ZZZZZ | See map | Walls 100% | BSK 3-19-03 | NBK/4-17-03 | N/A | N/A | N/A | N/A | N/A |
| A0800 | 01C01 | ZZZZZ | ZZZZZ | See map | Ceilings 100% | NBK/4-17-03 | NBK/4-17-03 | N/A | N/A | N/A | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review | |
|---|---|
| Date Package Completed: | 4/30/03 |
| Package Reviewed by and Date: | Paul C Ely 4/30/03 |

| Survey Comments |
|---|
| |
| |
| |
| |
| |
| |
| |
| |


SURVEY PACKAGE A0800
Cave North Wall
Cave Floor
Cave East Wall
Cave Ceiling
Cave West Wall
Cave South Wall
X=0, Y=6
meters
meters
X(Max)= 17.4m, Y(Max)= 13.2m

**Survey Package A0800**
**Minitec Cave**

| | | | |
|---|---|---|---|
| **X (Max):** | 17.4 | meters | |
| **Y (Max):** | 13.2 | meters | |
| **A (Area):** | 230 | $m^2$ | |
| **Actual Survey Area:** | 71 | $m^2$ | |
| **COMPASS Survey Points:** | 15 | 69% | percent void area |
| **N (Points):** | 60 | 49 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 2.1 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.8 | meters | (distance between rows) |
| **L/2=** | 1.1 | meters | (row offset value) |
| **X (Random):** | 11.1 | | random number generator |
| **Y (Random):** | 7.5 | | random number generator |
| **X (Origin):** | 8.9 | | initially generated random number |
| **Y (Origin):** | 0.4 | | initially generated random number |
| **Number of rows:** | 7 | | |
| **Number of columns:** | 8 | | |

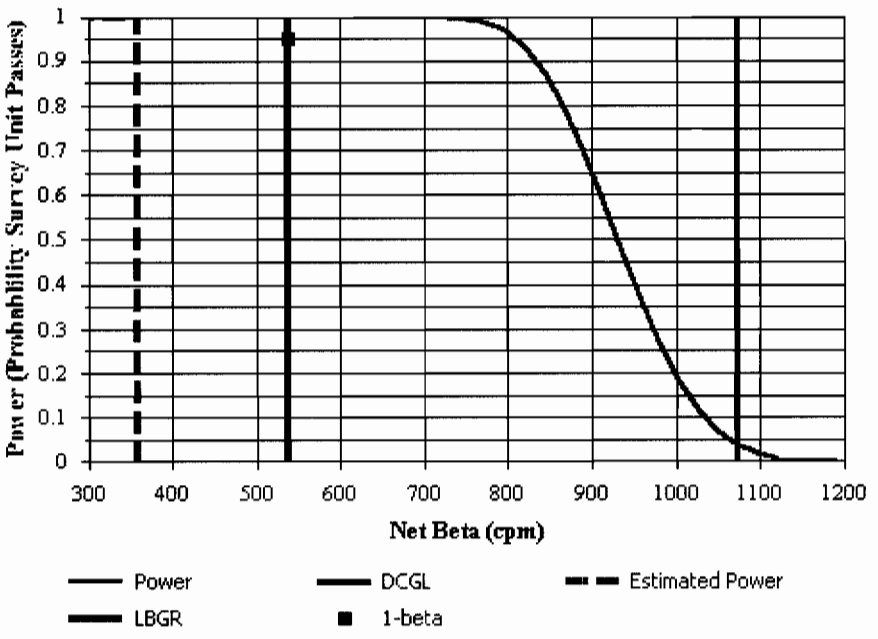
| **Survey Point** | **Survey Location X** | **Survey Location Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 8.9 | 0.4 | 1 |
| 2 | 11.0 | 0.4 | |
| 3 | 13.1 | 0.4 | |
| 4 | 15.2 | 0.4 | |
| 5 | 17.3 | 0.4 | |
| 6 | 6.8 | 0.4 | |
| 7 | 4.7 | 0.4 | |
| 8 | 2.6 | 0.4 | |
| 9 | 0.5 | 0.4 | |
| 10 | 10.0 | 2.2 | 2 |
| 11 | 12.1 | 2.2 | |
| 12 | 14.2 | 2.2 | |
| 13 | 16.3 | 2.2 | |
| 14 | 7.9 | 2.2 | |
| 15 | 5.8 | 2.2 | |
| 16 | 3.7 | 2.2 | |
| 17 | 1.6 | 2.2 | |
| 18 | 8.9 | 4.0 | 3 |
| 19 | 11.0 | 4.0 | |
| 20 | 13.1 | 4.0 | |
| 21 | 15.2 | 4.0 | |
| 22 | 17.3 | 4.0 | |
| 23 | 6.8 | 4.0 | |
| 24 | 4.7 | 4.0 | |
| 25 | 2.6 | 4.0 | |
| 26 | 0.5 | 4.0 | |
| 27 | 10.0 | 5.8 | 4 |
| 28 | 12.1 | 5.8 | |
| 29 | 14.2 | 5.8 | |
| 30 | 16.3 | 5.8 | |
| 31 | 7.9 | 5.8 | |
| 32 | 5.8 | 5.8 | |
| 33 | 3.7 | 5.8 | |
| 34 | 1.6 | 5.8 | |
| 35 | 8.9 | 7.6 | 5 |
| 36 | 11.0 | 7.6 | |
| 37 | 13.1 | 7.6 | |
| 38 | 15.2 | 7.6 | |
| 39 | 17.3 | 7.6 | |
| 40 | 6.8 | 7.6 | |
| 41 | 4.7 | 7.6 | |
| 42 | 2.6 | 7.6 | |
| 43 | 0.5 | 7.6 | |
| 44 | 10.0 | 9.4 | 6 |
| 45 | 12.1 | 9.4 | |
| 46 | 14.2 | 9.4 | |
| 47 | 16.3 | 9.4 | |
| 48 | 7.9 | 9.4 | |
| 49 | 5.8 | 9.4 | |
| 50 | 3.7 | 9.4 | |
| 51 | 1.6 | 9.4 | |
| 52 | 8.9 | 11.2 | 7 |
| 53 | 11.0 | 11.2 | |
| 54 | 13.1 | 11.2 | |
| 55 | 15.2 | 11.2 | |
| 56 | 17.3 | 11.2 | |
| 57 | 6.8 | 11.2 | |
| 58 | 4.7 | 11.2 | |
| 59 | 2.6 | 11.2 | |
| 60 | 0.5 | 11.2 | |
| 61 | 10.0 | 13 | 8 |
| 62 | 12.1 | 13 | |
| 63 | 14.2 | 13 | |
| 64 | 16.3 | 13 | |
| 65 | 7.9 | 13 | |
| 66 | 5.8 | 13 | |
| 67 | 3.7 | 13 | |
| 68 | 1.6 | 13 | |

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0800 FSS Package | | |
| Comments: | B-124 MINITEC Cave | | |
| Area (m²): | 46 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 229.6 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 15 |
| LBGR (cpm): | 537 | Estimated Conc. (cpm): | 359 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 15 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 600 ± 212 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |

**Estimated Data**
**Characterization Package A0800, M**
**Building 124**

| | Cave Gross Counts/min |
|---|---|
| Estimated Average | 600.0 |
| Estimated Standard Deviation | 212.0 |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kjos **Signature:** [signature] **Date:** 4-17-03

Download Station #: 1 Download File #: 64
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kjos **User ID** NOK2986 **Signature:** [signature] **Date:** 4-17-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 95359

Survey Unit Description: Package A0800 B-124 Minitec Cave
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-12-03 Detector Calibration Due Date: 10-15-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR088917 | 43-68B | .228 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 236 | 2 215 | 3 207 | 4 N/A | 5 N/A | 6 N/A | 219 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .136

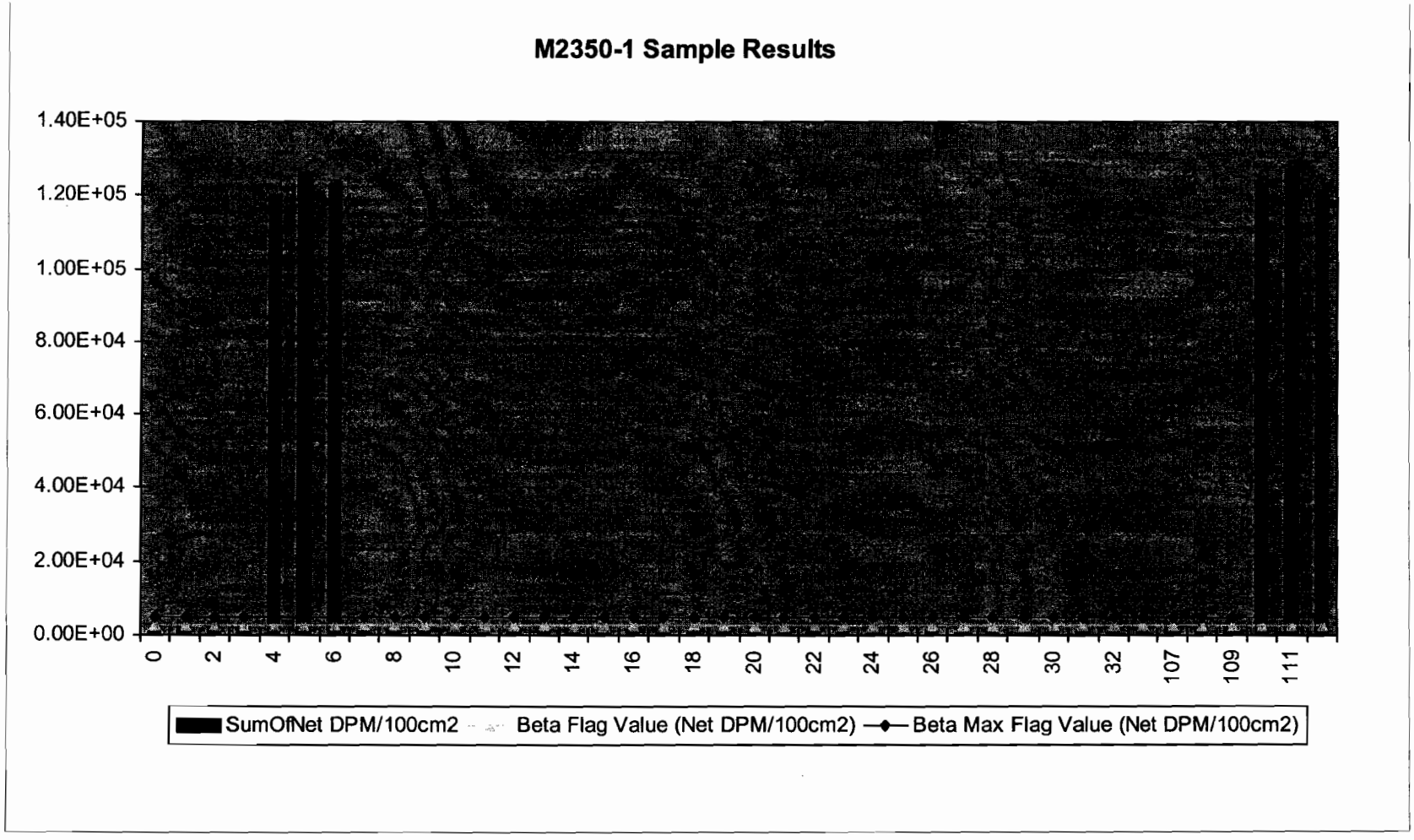
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000064 | Survey Description :Package A0800 B-124 Minitec Cave | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 95359 | Instrument Cal. Due : 6/12/03 |
| Detector Model : 43-68B | Detector S/N : 088917 | Detector Cal. Due : 10/15/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.228 | Survey Date : 4/17/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* PAUL C ELY (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
107
109
111
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000064

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,328.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 810 |
| ZZZZZ | FD184 | 1 | 1,190.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,331 |
| ZZZZZ | FD184 | 2 | 1,257.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,564 |
| ZZZZZ | FD184 | 3 | 1,141.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,161 |
| ZZZZZ | 10002 | 4 | 34,710.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 5 | 36,464.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,640.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| A0800 | ZZZZZ | 7 | 236.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 821 |
| A0800 | ZZZZZ | 8 | 215.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 748 |
| A0800 | ZZZZZ | 9 | 207.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 721 |
| A0800 | 01C01 | 10 | 185.0 | 60 | FLDCT | B0003 | ZZZZZ | 27 | 0.0001 | 644 |
| A0800 | 01C01 | 11 | 189.0 | 60 | FLDCT | B0003 | ZZZZZ | 28 | 0.0001 | 658 |
| A0800 | 01C01 | 12 | 192.0 | 60 | FLDCT | B0003 | ZZZZZ | 35 | 0.0001 | 668 |
| A0800 | 01C01 | 13 | 193.0 | 60 | FLDCT | B0003 | ZZZZZ | 36 | 0.0001 | 672 |
| A0800 | 01W01 | 14 | 146.0 | 60 | FLDCT | B0003 | ZZZZZ | 37 | 0.0001 | 508 |
| A0800 | 01W01 | 15 | 146.0 | 60 | FLDCT | B0003 | ZZZZZ | 38 | 0.0001 | 508 |
| A0800 | 01W01 | 16 | 218.0 | 60 | FLDCT | B0003 | ZZZZZ | 39 | 0.0001 | 759 |
| A0800 | 01W01 | 17 | 188.0 | 60 | FLDCT | B0003 | ZZZZZ | 40 | 0.0001 | 654 |
| A0800 | 01W01 | 18 | 267.0 | 60 | FLDCT | B0003 | ZZZZZ | 41 | 0.0001 | 929 |
| A0800 | 01W01 | 19 | 211.0 | 60 | FLDCT | B0003 | ZZZZZ | 31 | 0.0001 | 734 |
| A0800 | 01W01 | 20 | 156.0 | 60 | FLDCT | B0003 | ZZZZZ | 32 | 0.0001 | 543 |
| A0800 | 01W01 | 21 | 139.0 | 60 | FLDCT | B0003 | ZZZZZ | 29 | 0.0001 | 484 |
| A0800 | 01W01 | 22 | 212.0 | 60 | FLDCT | B9999 | ZZZZZ | 30 | 0.0001 | 738 |
| A0800 | 01W01 | 23 | 193.0 | 60 | FLDCT | B0003 | ZZZZZ | 68 | 0.0001 | 672 |
| A0800 | 01W01 | 24 | 173.0 | 60 | FLDCT | B0003 | ZZZZZ | 59 | 0.0001 | 602 |
| A0800 | 01W01 | 25 | 187.0 | 60 | FLDCT | B0003 | ZZZZZ | 60 | 0.0001 | 651 |
| A0800 | 01W01 | 26 | 320.0 | 60 | FLDCT | B9999 | ZZZZZ | 51 | 0.0001 | 1,114 |
| A0800 | 01W01 | 27 | 189.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 658 |
| A0800 | 01W01 | 28 | 175.0 | 60 | FLDCT | B0003 | ZZZZZ | 25 | 0.0001 | 609 |
| A0800 | 01W01 | 29 | 179.0 | 60 | FLDCT | B0003 | ZZZZZ | 26 | 0.0001 | 623 |
| A0800 | 01W01 | 30 | 306.0 | 60 | FLDCT | B0003 | ZZZZZ | 34 | 0.0001 | 1,065 |
| A0800 | 01F01 | 31 | 356.0 | 60 | FLDCT | B0003 | ZZZZZ | 42 | 0.0001 | 1,239 |
| A0800 | 01F01 | 32 | 284.0 | 60 | FLDCT | B0003 | ZZZZZ | 43 | 0.0001 | 989 |
| ZZZZZ | ZZZZZ | 106 | 2,391.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 832 |
| ZZZZZ | FD184 | 107 | 1,189.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,307 |
| ZZZZZ | FD184 | 108 | 1,207.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,370 |
| ZZZZZ | FD184 | 109 | 1,186.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,296 |
| ZZZZZ | 10002 | 110 | 35,672.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |
| ZZZZZ | 10002 | 111 | 36,738.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 - | _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

*Tuesday, August 26, 2003*

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | 10002 | 112 | 35,114.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |

| | | |
|---|---|---|
| *Beta Flag* | 2500 | - _____ |
| *Beta Max Flag* | 5000 | [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A0800

**ATTACHMENT 6.2**
**SMEAR SURVEY RESULTS FORM**
**(example)**

Performed by DRKjos (Print) Signature DRKjos PK Date 4-17-03 Time 1430

Counted by BS Kjos (Print) Signature BS Kjos Date 4-28-03 Time 0910

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 108 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 25 | 60 | 6 | < MDA |
| 32 | 46 | 0 | |
| 42 | 59 | 5 | |
| 43 | 49 | 0 | |
| 51 | 61 | 7 | < MDA |
| | | N A | |

| Circle: | MDA = 12.5 dpm/100cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 25 | 0 | 0 | < MDA |
| 32 | 1 | .85 | |
| 42 | 0 | 0 | |
| 43 | 0 | 0 | |
| 51 | 0 | 0 | < MDA |
| | | N A | |

Remarks-

Signature- BS Kjos Reviewed by- Paul C Eg 4/30/03

of

Duratek, Inc.
Survey Package Worksheet for Package A0810
Bristol-Myers Squibb Building 124 MINITEC Area Pits

| | |
|---|---|
| Package Identification No.: A0810 | Prepared by: Paul C. Ely |
| Location: Building 124 MINITEC Area Pits | Date prepared: 4/14/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors and walls in four (4) MINITEC Pits. These are the Entry Pit to the west on the cave, the Decay Pit to the south of the cave, the Pump Pit to the south of the Decay Pit and the shallow pit to the southwest of the cave.

## Historical Information

The MINITEC Cave was built to accommodate increased Molybdenum production. When Molybdenum production declined in the late 1980's, the cave was then used for strontium production. The radionuclides used in the MINITEC Cave area included Mo-99 and Sr-82/85.

Contamination levels >50,000 dpm/100 $cm^2$ were identified in the Decay Pit surfaces and on equipment that was removed during the D&D phase.

## General Survey Instructions

(Class 1):

1. Perform a minimum of 100% scan of accessible surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A0810 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears on floor in survey unit at five unspecified survey locations. |

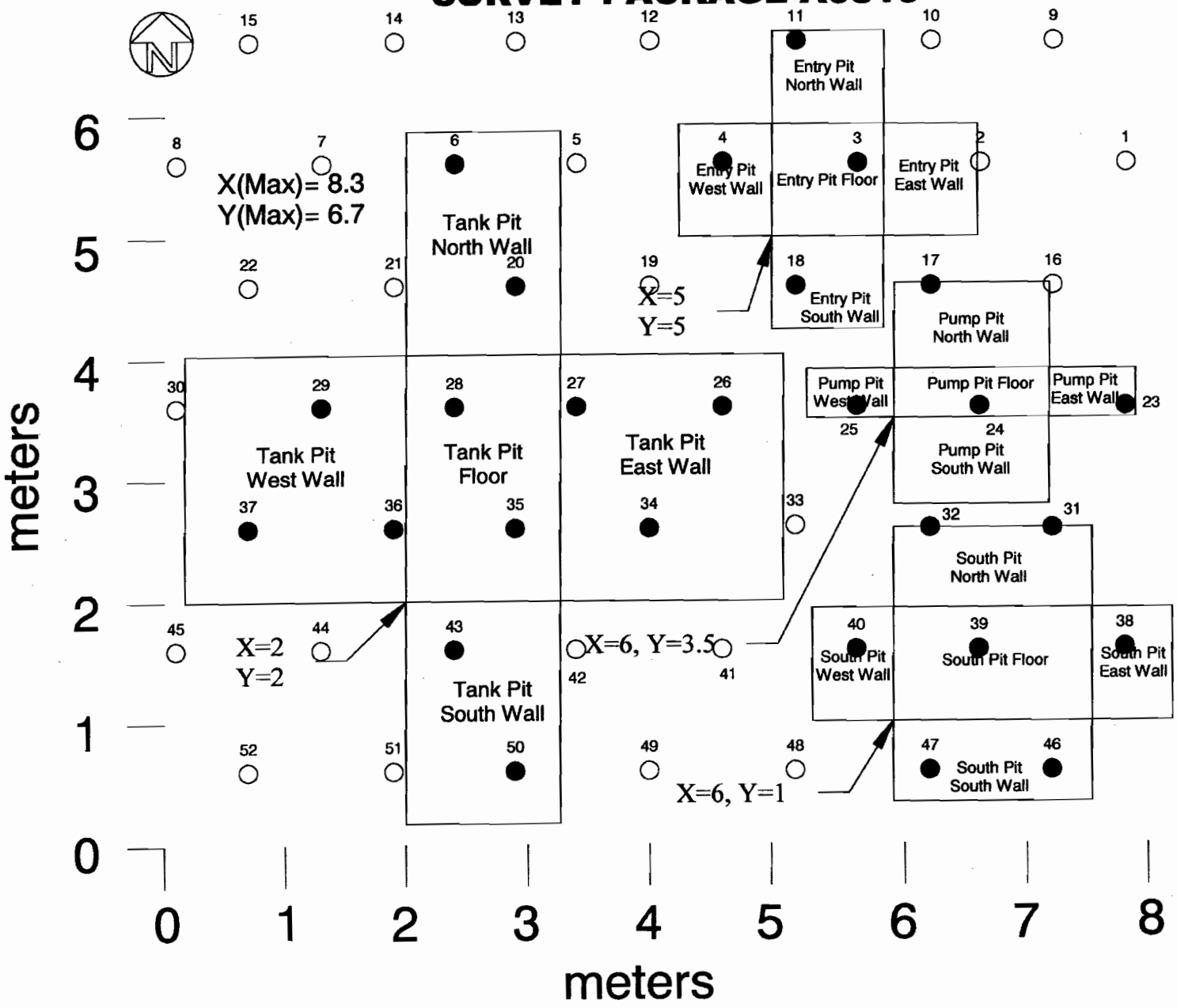
**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| **Bristol Myers Squibb Building 124 MINITEC Area Pits** | | | | | | | | | | | | |
| A0810 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 25% | BSK 4·3·03 | MAK/4-17-03 | N/A | N/A | MAK/4-17-03 | N/A | N/A |
| A0810 | 01W01 | ZZZZZ | ZZZZZ | See map | Walls 10% | BSK 4·3·03 | MAK/4-17-03 | N/A | N/A | N/A | N/A | N/A |
| A0810 | 01C01 | ZZZZZ | ZZZZZ | See map | Ceilings 10% | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| A0810 | 01S01 | ZZZZZ | ZZZZZ | If needed | Structure 10% | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| A0810 | 01EQ1 | ZZZZZ | ZZZZZ | If needed | Equipment 10% | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: 4/30/03 |
| Package Reviewed by and Date: Paul C Ely 4/30/03 |

| Survey Comments |
| --- |
| On points 20, 27, 28, 35, 36 and 43 points were not taken at these locations due to water seeping through wall; And wall is too wet to survey |

# SURVEY PACKAGE A0810



**Survey Package A0810**
**Minitec Pits**

| | | | |
|---|---|---|---|
| **X (Max):** | 8.3 | meters | |
| **Y (Max):** | 6.7 | meters | |
| **A (Area):** | 56 | $m^2$ | |
| **Actual Survey Area:** | 26 | $m^2$ | |
| **COMPASS Survey Points:** | 15 | 53% | percent void area |
| **N (Points):** | 56 | 32 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 1.1 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1 | meters | (distance between rows) |
| **L/2=** | 0.6 | meters | (row offset value) |
| **X (Random):** | 4 | | random number generator |
| **Y (Random):** | 1.2 | | random number generator |
| **X (Origin):** | 7.8 | | initially generated random number |
| **Y (Origin):** | 5.6 | | initially generated random number |
| **Number of rows:** | 7 | | |
| **Number of columns:** | 8 | | |

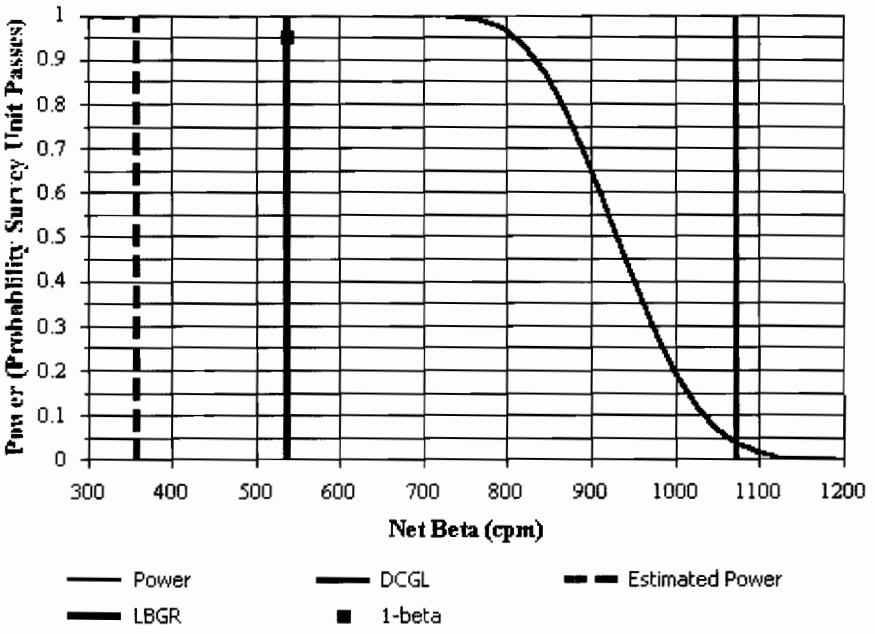
| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 7.8 | 5.6 | 6 |
| 2 | 6.7 | 5.6 | |
| 3 | 5.6 | 5.6 | |
| 4 | 4.5 | 5.6 | |
| 5 | 3.4 | 5.6 | |
| 6 | 2.3 | 5.6 | |
| 7 | 1.2 | 5.6 | |
| 8 | 0.1 | 5.6 | |
| 9 | 7.3 | 6.6 | 7 |
| 10 | 6.2 | 6.6 | |
| 11 | 5.1 | 6.6 | |
| 12 | 4.0 | 6.6 | |
| 13 | 2.9 | 6.6 | |
| 14 | 1.8 | 6.6 | |
| 15 | 0.7 | 6.6 | |
| 16 | 7.3 | 4.6 | 5 |
| 17 | 6.2 | 4.6 | |
| 18 | 5.1 | 4.6 | |
| 19 | 4.0 | 4.6 | |
| 20 | 2.9 | 4.6 | |
| 21 | 1.8 | 4.6 | |
| 22 | 0.7 | 4.6 | |
| 23 | 7.8 | 3.6 | 4 |
| 24 | 6.7 | 3.6 | |
| 25 | 5.6 | 3.6 | |
| 26 | 4.5 | 3.6 | |
| 27 | 3.4 | 3.6 | |
| 28 | 2.3 | 3.6 | |
| 29 | 1.2 | 3.6 | |
| 30 | 0.1 | 3.6 | |
| 31 | 7.3 | 2.6 | 3 |
| 32 | 6.2 | 2.6 | |
| 33 | 5.1 | 2.6 | |
| 34 | 4.0 | 2.6 | |
| 35 | 2.9 | 2.6 | |
| 36 | 1.8 | 2.6 | |
| 37 | 0.7 | 2.6 | |
| 38 | 7.8 | 1.6 | 2 |
| 39 | 6.7 | 1.6 | |
| 40 | 5.6 | 1.6 | |
| 41 | 4.5 | 1.6 | |
| 42 | 3.4 | 1.6 | |
| 43 | 2.3 | 1.6 | |
| 44 | 1.2 | 1.6 | |
| 45 | 0.1 | 1.6 | |
| 46 | 7.3 | 0.6 | 1 |
| 47 | 6.2 | 0.6 | |
| 48 | 5.1 | 0.6 | |
| 49 | 4.0 | 0.6 | |
| 50 | 2.9 | 0.6 | |
| 51 | 1.8 | 0.6 | |
| 52 | 0.7 | 0.6 | |

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0810 FSS Package | | |
| Comments: | B-124 MINITEC Cave Pits | | |
| Area (m²): | 26 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 229.6 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 15 |
| LBGR (cpm): | 537 | Estimated Conc. (cpm): | 359 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 15 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 600 ± 212 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |

**Estimated Data**
**FSS Package A0800, MINITEC Cave**
**Building 124**
FSS Packages: A0800, A0810

| | Cave Gross Counts/min |
|---|---|
| Estimated Average | 600.0 |
| Estimated Standard Deviation | 212.0 |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kjos **Signature:** Douglas R Kjos **Date:** 4-17-03

Download Station #: 1 Download File #: 66
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kjos **User ID** NRK2986 **Signature:** Douglas R Kjos **Date:** 4-17-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 95359

Survey Unit Description: Package A0810 B-124 Minitec Area Pits
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-12-03 Detector Calibration Due Date: 10-15-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR086917 | 43-68B | .228 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 186 | 2 162 | 3 193 | 4 N/A | 5 N/A | 6 N/A | 187 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .136

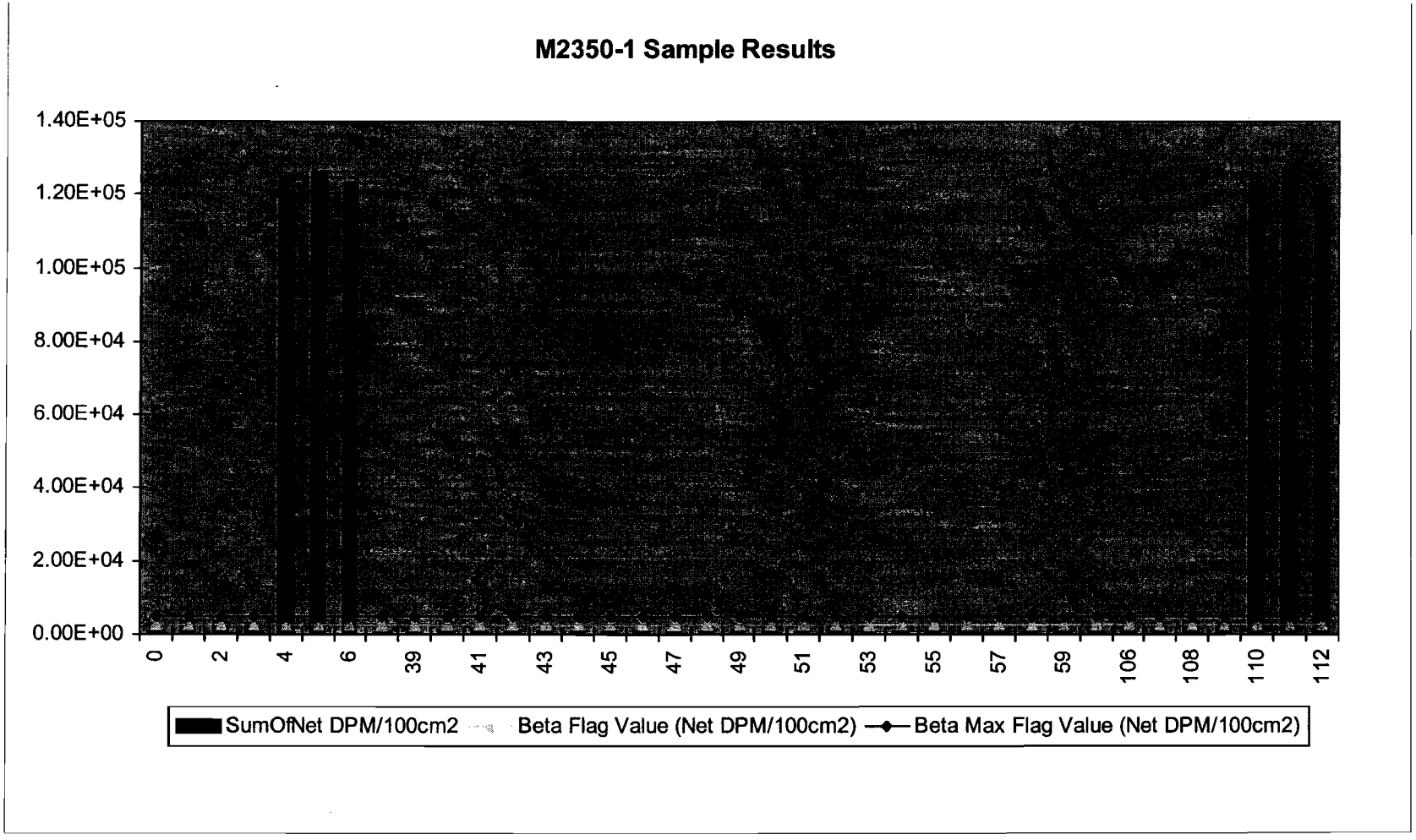
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000066 | Survey Description :Package A0810 B-124 Minitec Area Pits | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 95359 | Instrument Cal. Due : 6/12/03 |
| Detector Model : 43-68B | Detector S/N : 088917 | Detector Cal. Due : 10/15/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.228 | Survey Date : 4/17/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

Sign-Off Paul E. Ely (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
39
41
43
45
47
49
51
53
55
57
59
106
108
110
112
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# Duratek Beta Survey Report

**Download File Name:** 00000066

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,328.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 810 |
| ZZZZZ | FD184 | 1 | 1,190.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,331 |
| ZZZZZ | FD184 | 2 | 1,257.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,564 |
| ZZZZZ | FD184 | 3 | 1,141.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,161 |
| ZZZZZ | 10002 | 4 | 34,710.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 5 | 36,464.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,640.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| A0810 | ZZZZZ | 38 | 186.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 647 |
| A0810 | ZZZZZ | 39 | 182.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 634 |
| A0810 | ZZZZZ | 40 | 193.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 672 |
| A0810 | 01W01 | 41 | 243.0 | 60 | FLDCT | B0003 | ZZZZZ | 34 | 0.0001 | 846 |
| A0810 | 01W01 | 42 | 267.0 | 60 | FLDCT | B0003 | ZZZZZ | 26 | 0.0001 | 929 |
| A0810 | 01W01 | 43 | 274.0 | 60 | FLDCT | B0003 | ZZZZZ | 29 | 0.0001 | 954 |
| A0810 | 01W01 | 44 | 226.0 | 60 | FLDCT | B0003 | ZZZZZ | 37 | 0.0001 | 787 |
| A0810 | 01W01 | 45 | 242.0 | 60 | FLDCT | B0003 | ZZZZZ | 50 | 0.0001 | 842 |
| A0810 | 01W01 | 46 | 222.0 | 60 | FLDCT | B0003 | ZZZZZ | 23 | 0.0001 | 773 |
| A0810 | 01W01 | 47 | 241.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 839 |
| A0810 | 01W01 | 48 | 210.0 | 60 | FLDCT | B0003 | ZZZZZ | 25 | 0.0001 | 731 |
| A0810 | 01F01 | 49 | 380.0 | 60 | FLDCT | B0003 | ZZZZZ | 24 | 0.0001 | 1,323 |
| A0810 | 01F01 | 50 | 307.0 | 60 | FLDCT | B0003 | ZZZZZ | 39 | 0.0001 | 1,069 |
| A0810 | 01W01 | 51 | 212.0 | 60 | FLDCT | B0003 | ZZZZZ | 32 | 0.0001 | 738 |
| A0810 | 01W01 | 52 | 605.0 | 60 | FLDCT | B0003 | ZZZZZ | 31 | 0.0001 | 2,106 |
| A0810 | 01W01 | 53 | 188.0 | 60 | FLDCT | B0003 | ZZZZZ | 38 | 0.0001 | 654 |
| A0810 | 01W01 | 54 | 219.0 | 60 | FLDCT | B0003 | ZZZZZ | 46 | 0.0001 | 762 |
| A0810 | 01W01 | 55 | 193.0 | 60 | FLDCT | B0003 | ZZZZZ | 47 | 0.0001 | 672 |
| A0810 | 01W01 | 56 | 192.0 | 60 | FLDCT | B0003 | ZZZZZ | 40 | 0.0001 | 668 |
| A0810 | 01W01 | 57 | 414.0 | 60 | FLDCT | B0003 | ZZZZZ | 11 | 0.0001 | 1,441 |
| A0810 | 01W01 | 58 | 226.0 | 60 | FLDCT | B0003 | ZZZZZ | 18 | 0.0001 | 787 |
| A0810 | 01W01 | 59 | 197.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 686 |
| A0810 | 01F01 | 60 | 314.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,093 |
| ZZZZZ | ZZZZZ | 106 | 2,391.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 832 |
| ZZZZZ | FD184 | 107 | 1,189.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,307 |
| ZZZZZ | FD184 | 108 | 1,207.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,370 |
| ZZZZZ | FD184 | 109 | 1,186.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,296 |
| ZZZZZ | 10002 | 110 | 35,672.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |
| ZZZZZ | 10002 | 111 | 36,738.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |
| ZZZZZ | 10002 | 112 | 35,114.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |

| | |
|---|---|
| **Beta Flag** | 2500 - _____ |
| **Beta Max Flag** | 5000 [redacted] |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyos **Signature:** [signature] **Date:** 4-30-03

Download Station #: 1 Download File #: 113
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kyos **User ID** ARK2986 **Signature:** [signature] **Date:** 4-30-03

**Print Name:**_____ **User ID**_____ **Signature:**_____ **Date:**_____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A08ID, B-124, Tank Pit Floor and Lower Walls
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☐ Beta β | | 43-68B | | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ■ Gamma γ | AR088920 | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 | 2 | 3 | 4 | 5 | 6 | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS:

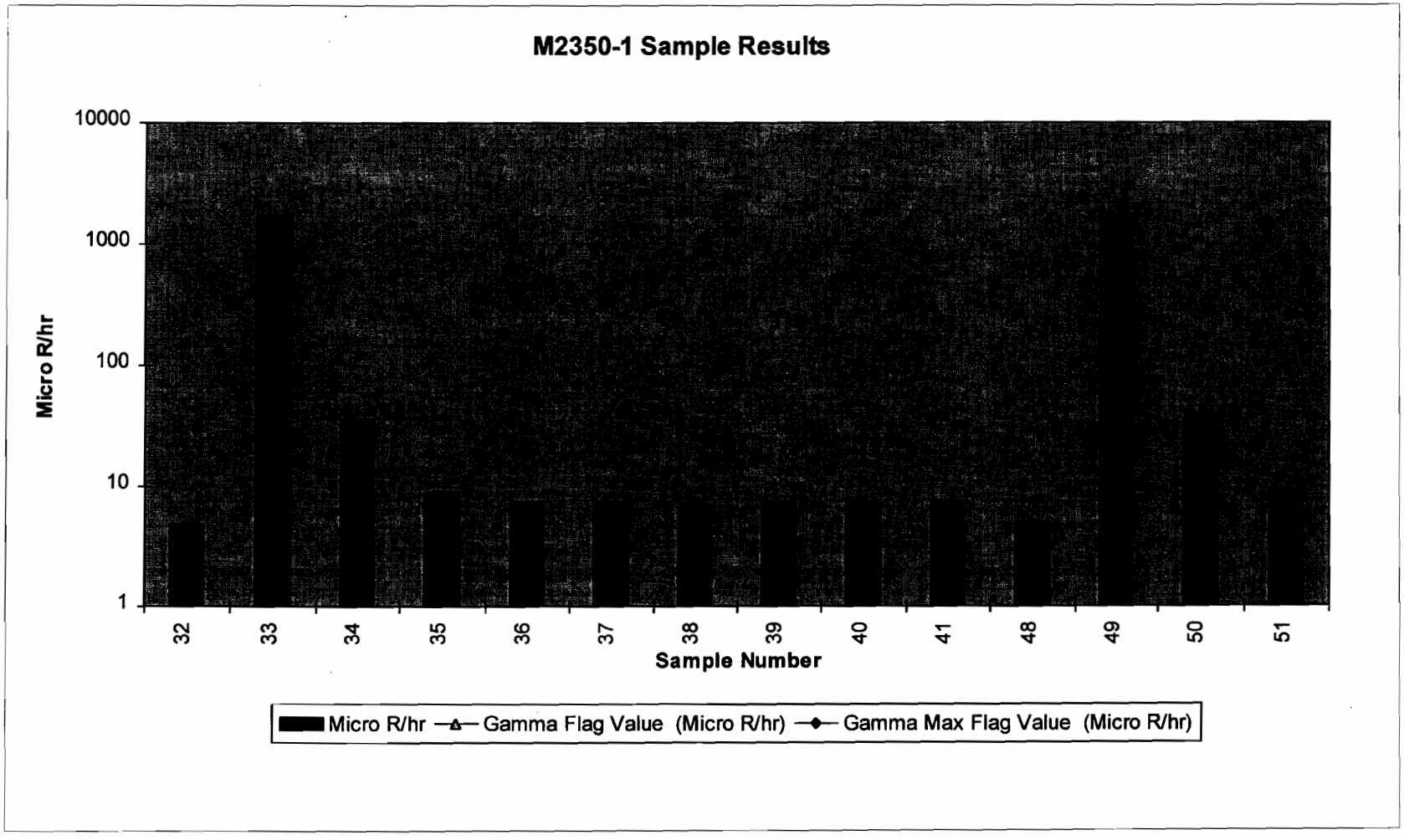
**M2350-1 Download Gamma Report**

| | | |
|---|---|---|
| File Name : 00000113 | Survey Description :Package A0810, B-124,Tank Pit Floor and Lower Wall | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : LMI 44-2 | Detector S/N : 088920 | Detector Cal. Due : 6/30/03 |
| Measurement Type : Gamma | Detector Type : 03100 : Measurement of average dose rate at 1 meter | |
| Cal. Constant : 16954100000 | | Survey Date : 4/30/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | | 4/30/03 |
| | | |

**Comments:**

*Sign-Off* Paul E Ely — Print Name; Signature; 4/30/03 — Date


M2350-1 Sample Results
10000
1000
100
10
1
Micro R/hr
32
33
34
35
36
37
38
39
40
41
48
49
50
51
Sample Number
Micro R/hr
Gamma Flag Value (Micro R/hr)
Gamma Max Flag Value (Micro R/hr)

# *Duratek Gamma Survey Report*

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *µ R/hr:* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 32 | 6,919.0 | 300 | PRGBK | ZZZZZ | ZZZZZ | 0 | | 4.90E+00 |
| ZZZZZ | 19453 | 33 | 483,833.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 1.71E+03 |
| ZZZZZ | 19453 | 34 | 10,162.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 3.60E+01 |
| ZZZZZ | 19453 | 35 | 2,605.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 9.22E+00 |
| A0810 | 01W01 | 36 | 528.0 | 15 | FLDCT | B0003 | ZZZZZ | 20 | | 7.47E+00 |
| A0810 | 01W01 | 37 | 534.0 | 15 | FLDCT | B0003 | ZZZZZ | 27 | | 7.56E+00 |
| A0810 | 01W01 | 38 | 499.0 | 15 | FLDCT | B0003 | ZZZZZ | 36 | | 7.06E+00 |
| A0810 | 01W01 | 39 | 529.0 | 15 | FLDCT | B0003 | ZZZZZ | 43 | | 7.49E+00 |
| A0810 | 01F01 | 40 | 524.0 | 15 | FLDCT | B0003 | ZZZZZ | 35 | | 7.42E+00 |
| A0810 | 01F01 | 41 | 529.0 | 15 | FLDCT | B0003 | ZZZZZ | 28 | | 7.49E+00 |
| ZZZZZ | ZZZZZ | 48 | 7,184.0 | 300 | PTGBK | ZZZZZ | ZZZZZ | 0 | | 5.08E+00 |
| ZZZZZ | 19453 | 49 | 491,375.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 1.74E+03 |
| ZZZZZ | 19453 | 50 | 10,223.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 3.62E+01 |
| ZZZZZ | 19453 | 51 | 2,692.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 9.53E+00 |

| | |
|---|---|
| *Gamma Flag* | - |
| *Gamma Max Flag* | [redacted] |

*Wednesday, April 30, 2003*

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A0818

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by DR Kjos (Print) Signature DR Kjos BSK Date 4-17-03 Time 1445

Counted by BS Kjos (Print) Signature BS Kjos Date 4-18-03 Time 0917

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 108 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 3 | 56 | 2 | < MDA |
| 18 | 50 | 0 | |
| 24 | 73 | 19 | |
| 39 | 44 | 0 | |
| 47 | 49 | 0 | < MDA |
| | | | |
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N A

| Circle: | MDA = 12.5 dpm/100cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 3 | 0 | 0 | < MDA |
| 18 | 1 | .85 | |
| 24 | 1 | .85 | |
| 39 | 0 | 0 | |
| 47 | 0 | 0 | < MDA |
| | | | |
| | | | |
| | | | |
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| | | | |
| | | | |

N A

Remarks-

Signature- BS Kjos Reviewed by- Paul C Eley 4/29/03

of

Duratek, Inc.
Survey Package Worksheet for Package A0900
Bristol-Myers Squibb Building 124, Rooms 172, 174, 175, 176 & 177

| | |
|---|---|
| Package Identification No.: A0900 | Prepared by: Paul C. Ely |
| Location: Building 124 Rooms 172, 174, 175, 176 & 177 Floors | Date prepared: 4/18/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors in Rooms 172, 174, 175, 176 & 177.

## Historical Information

Room 172 was the operating area for cave work that included Molybdenum generator manufacturing, Iodotope therapeutic oral manufacturing and filling, Bulk I-131 storage and dispensing, Molybdenum production until 1992. Radionuclides included Mo-99, I-131, Au-198 and Sr-82/85. Room 174 was the operating area for cave work that included occasional production of Molybdenum. Radionuclides included I-131and Strontium. Room 175 was the operating area for cave work that included Iodotope therapeutic capsule manufacturing and filling. Radionuclides included I-131 and Au-198. Rooms 176 and 177 were refrigerated rooms used for storage for prefills prior to packaging, storage of water for injection and some raw materials and storage of Co-57 and Co-60 with vitamin B12. Radionuclides included I-131, Se-75, Co-57 and Co-60.

No contamination levels >5,000 dpm/100 $cm^2$ were identified during the characterization except on equipment that removed during the decommissioning.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

**Survey Package: A0900 continued**

## Special Instructions

Source check meters to Tc-99 and C-14 for beta measurements.

Use gas proportional detector model numbers 43-68 or 43-106 for surveys.

Perform a minimum of three one minute field backgrounds in air prior to survey.

Take five smears in survey unit at five unspecified survey locations.

**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| **Bristol Myers Squibb Building 124 Rooms 172, 174, 175, 176 & 177 Floors** | | | | | | | | | | | | |
| A0900 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | DAS 4-23-03 | NRL/4-26-03 | N/A | N/A | ~~N/A~~ 5 NRL/4-26-03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review | |
|---|---|
| Date Package Completed: | 4/29/03 |
| Package Reviewed by and Date: | Paul C Ely 4/29/03 |

| Survey Comments |
|---|
| |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A0900**
**Room Floors 172, 174, 175, 176 & 177**

| | | | |
|---|---|---|---|
| **X (Max):** | 17.3 | meters | |
| **Y (Max):** | 6.8 | meters | |
| **A (Area):** | 117.64 | $m^2$ | |
| **Actual Survey Area:** | 82 | $m^2$ | |
| **COMPASS Survey Points:** | 14 | 30% | percent void area |
| **N (Points):** | 36 | 20 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 1.9 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.6 | meters | (distance between rows) |
| **L/2=** | 1.0 | meters | (row offset value) |
| **X (Random):** | 8.5 | | random number generator |
| **Y (Random):** | 3.1 | | random number generator |
| **X (Origin):** | 14.3 | | initially generated random number |
| **Y (Origin):** | 5.4 | | initially generated random number |
| **Number of rows:** | 4 | | |
| **Number of columns:** | 9 | | |

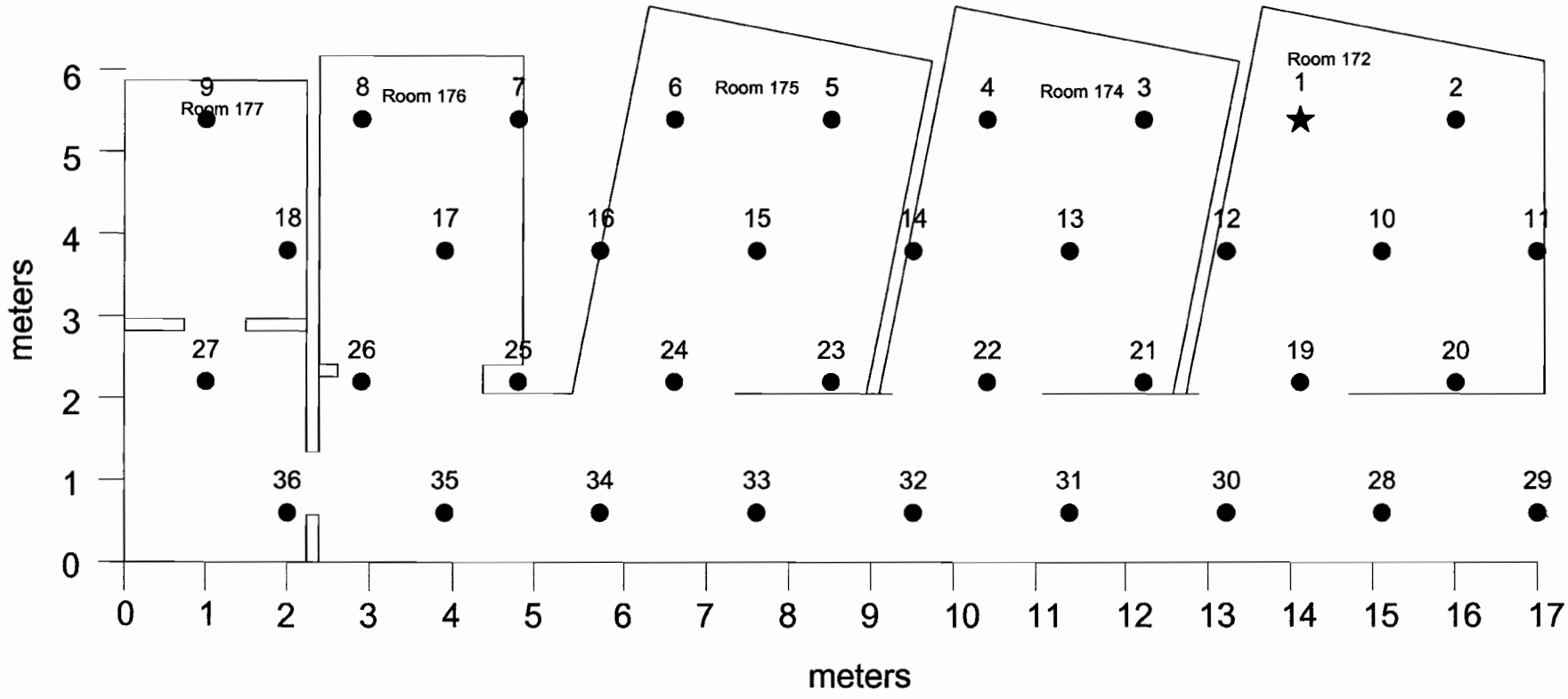
| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 14.3 | 5.4 | 4 |
| 2 | 16.2 | 5.4 | |
| 3 | 12.4 | 5.4 | |
| 4 | 10.5 | 5.4 | |
| 5 | 8.6 | 5.4 | |
| 6 | 6.7 | 5.4 | |
| 7 | 4.8 | 5.4 | |
| 8 | 2.9 | 5.4 | |
| 9 | 1.0 | 5.4 | |
| 10 | 15.3 | 3.8 | 3 |
| 11 | 17.2 | 3.8 | |
| 12 | 13.4 | 3.8 | |
| 13 | 11.5 | 3.8 | |
| 14 | 9.6 | 3.8 | |
| 15 | 7.7 | 3.8 | |
| 16 | 5.8 | 3.8 | |
| 17 | 3.9 | 3.8 | |
| 18 | 2.0 | 3.8 | |
| 19 | 14.3 | 2.2 | 2 |
| 20 | 16.2 | 2.2 | |
| 21 | 12.4 | 2.2 | |
| 22 | 10.5 | 2.2 | |
| 23 | 8.6 | 2.2 | |
| 24 | 6.7 | 2.2 | |
| 25 | 4.8 | 2.2 | |
| 26 | 2.9 | 2.2 | |
| 27 | 1.0 | 2.2 | |
| 28 | 15.3 | 0.6 | 1 |
| 29 | 17.2 | 0.6 | |
| 30 | 13.4 | 0.6 | |
| 31 | 11.5 | 0.6 | |
| 32 | 9.6 | 0.6 | |
| 33 | 7.7 | 0.6 | |
| 34 | 5.8 | 0.6 | |
| 35 | 3.9 | 0.6 | |
| 36 | 2.0 | 0.6 | |

**LBGR Determination**
**Package A0900**

| | | |
|---|---|---|
| $\sigma$ = | 107.5 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 10.0 | >3 |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **752** | **cpm** |

**SURVEY PACKAGE A0900**

X(Max)= 17.3 m
Y(Max)=6.8 m

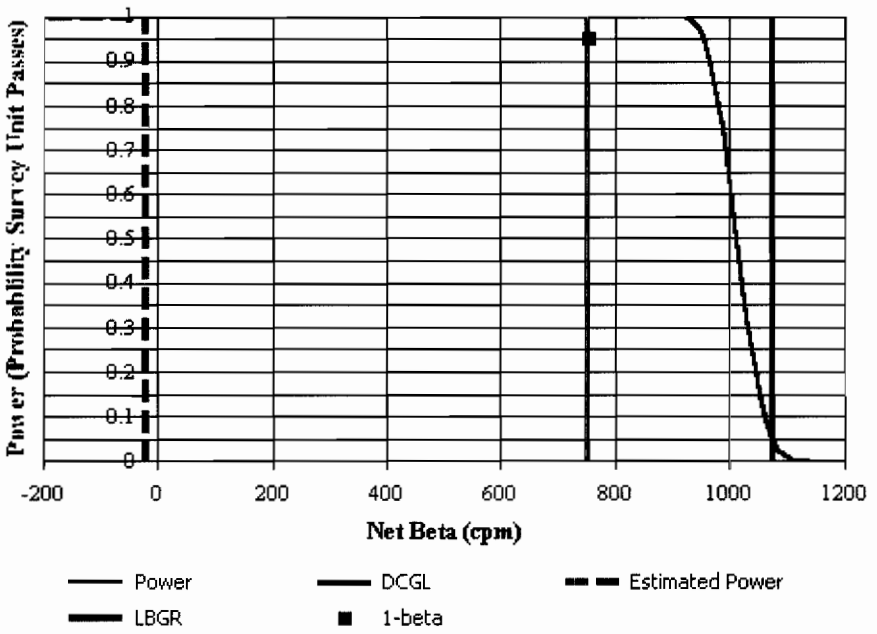


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A0900 FSS Package | | |
| Comments: | Floors Rooms 172, 174, 175, 176 & 177 | | |
| Area ($m^2$): | 82 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 107.5 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 752 | Estimated Conc. (cpm): | -19.2 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 222 ± 62 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |
| Linoleum | 46 | 244.9 | 21.7 | 501 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0100**
**B-124 Cave Areas (Rooms 171 – 178, 180, and 181)**
FSS Packages: A0700, A0900, A1000, B0900, B0910

| | Floor | | Wall | | Ceiling | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 370 | 376 | 369 | 406 | 220 | 250 | 330 | 406 |
| | 153 | 180 | 473 | 552 | 215 | 187 | 371 | 380 |
| | 192 | 242 | 349 | 404 | 357 | 416 | 377 | 389 |
| | 184 | 223 | 367 | 407 | 431 | 437 | 437 | 425 |
| | 181 | 194 | 297 | 339 | 287 | 313 | 320 | 330 |
| | 197 | 211 | 247 | 284 | 340 | 419 | 384 | 442 |
| | 219 | 193 | 334 | 558 | 379 | 437 | 442 | 461 |
| | 219 | 176 | 264 | 332 | 358 | 424 | | |
| | 238 | 200 | 316 | 323 | 408 | 458 | | |
| | | | 222 | 250 | | | | |
| | | | 297 | 374 | | | | |
| | | | 288 | 326 | | | | |
| | | | 379 | 377 | | | | |
| | | | 335 | 392 | | | | |
| | | | 340 | 345 | | | | |
| | | | 337 | 416 | | | | |
| | | | 347 | 309 | | | | |
| | | | 332 | 351 | | | | |
| | | | 363 | 426 | | | | |
| | | | 341 | 325 | | | | |
| | | | 326 | 377 | | | | |
| | | | 325 | 416 | | | | |
| **Average** | **217.0** | **221.7** | **329.5** | **376.8** | **332.8** | **371.2** | **380.1** | **404.7** |
| **Standard Deviation** | **62.6** | **61.5** | **51.1** | **73.8** | **77.0** | **97.0** | **47.1** | **43.6** |
| **No of Measurements** | **9** | **9** | **22** | **22** | **9** | **9** | **7** | **7** |
| **All Measurement** | | | | | | | | |
| **Average** | **304.9** | **340.6** | | | | | | |
| **Standard Deviation** | **75.7** | **99.3** | | | | | | |
| **No of Measurements** | **40** | **40** | | | | | | |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kos **Signature:** [signature] **Date:** 4-28-03

Download Station #: 1 Download File #: 91
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kos **User ID** DRK2986 **Signature:** [signature] **Date:** 4-28-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package AD400, B-124, Rooms 172, 174-177 (Floors)
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR 119337 | 43-68B | .234 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 261 | 2 254 | 3 239 | 4 N/A | 5 N/A | 6 N/A | 251 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .133

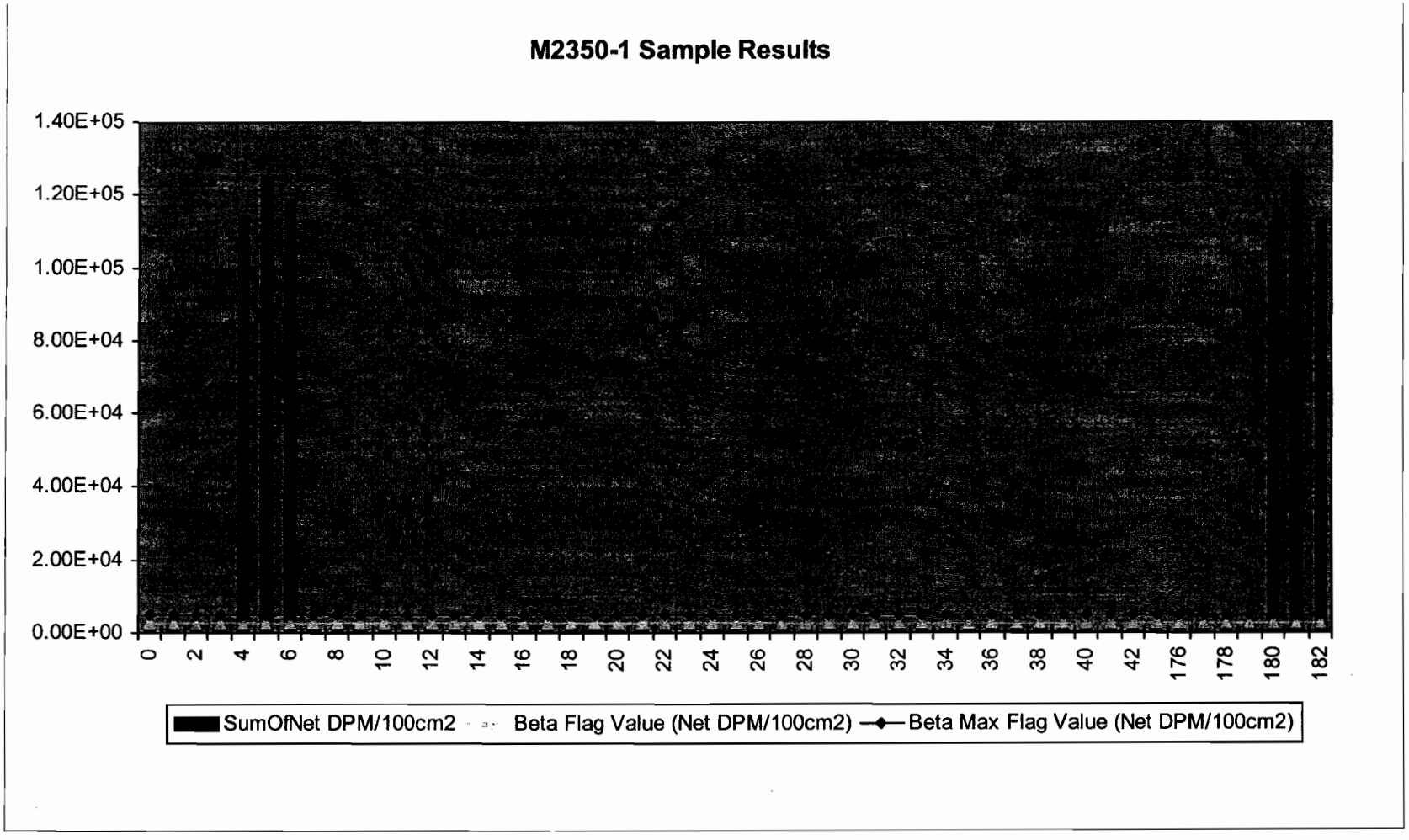
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000091 | Survey Description :Package A0900, B-124, Rooms 172,174-177 (Floors) | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.234 | Survey Date : 4/26/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* PAUL E. ELY (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
176
178
180
182
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000091

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,980.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,011 |
| ZZZZZ | FD184 | 1 | 1,386.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,690 |
| ZZZZZ | FD184 | 2 | 1,331.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,504 |
| ZZZZZ | FD184 | 3 | 1,319.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,463 |
| ZZZZZ | 10002 | 4 | 34,049.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 5 | 37,162.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,181.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| A0900 | ZZZZZ | 7 | 261.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 885 |
| A0900 | ZZZZZ | 8 | 254.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 861 |
| A0900 | ZZZZZ | 9 | 239.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 811 |
| A0900 | 01F01 | 10 | 293.0 | 60 | FLDCT | B9999 | ZZZZZ | 1 | 0.0001 | 994 |
| A0900 | 01F01 | 11 | 257.0 | 60 | FLDCT | B9999 | ZZZZZ | 2 | 0.0001 | 872 |
| A0900 | 01F01 | 12 | 344.0 | 60 | FLDCT | B0003 | ZZZZZ | 10 | 0.0001 | 1,167 |
| A0900 | 01F01 | 13 | 314.0 | 60 | FLDCT | B9999 | ZZZZZ | 12 | 0.0001 | 1,065 |
| A0900 | 01F01 | 14 | 284.0 | 60 | FLDCT | B9999 | ZZZZZ | 19 | 0.0001 | 963 |
| A0900 | 01F01 | 15 | 311.0 | 60 | FLDCT | B9999 | ZZZZZ | 20 | 0.0001 | 1,055 |
| A0900 | 01F01 | 16 | 343.0 | 60 | FLDCT | B9999 | ZZZZZ | 28 | 0.0001 | 1,163 |
| A0900 | 01F01 | 17 | 316.0 | 60 | FLDCT | B9999 | ZZZZZ | 29 | 0.0001 | 1,072 |
| A0900 | 01F01 | 18 | 281.0 | 60 | FLDCT | B9999 | ZZZZZ | 30 | 0.0001 | 953 |
| A0900 | 01F01 | 19 | 358.0 | 60 | FLDCT | B9999 | ZZZZZ | 31 | 0.0001 | 1,214 |
| A0900 | 01F01 | 20 | 295.0 | 60 | FLDCT | B9999 | ZZZZZ | 32 | 0.0001 | 1,001 |
| A0900 | 01F01 | 21 | 304.0 | 60 | FLDCT | B9999 | ZZZZZ | 22 | 0.0001 | 1,031 |
| A0900 | 01F01 | 22 | 357.0 | 60 | FLDCT | B9999 | ZZZZZ | 21 | 0.0001 | 1,211 |
| A0900 | 01F01 | 23 | 271.0 | 60 | FLDCT | B9999 | ZZZZZ | 13 | 0.0001 | 919 |
| A0900 | 01F01 | 24 | 306.0 | 60 | FLDCT | B9999 | ZZZZZ | 14 | 0.0001 | 1,038 |
| A0900 | 01F01 | 25 | 295.0 | 60 | FLDCT | B9999 | ZZZZZ | 3 | 0.0001 | 1,001 |
| A0900 | 01F01 | 26 | 294.0 | 60 | FLDCT | B9999 | ZZZZZ | 4 | 0.0001 | 997 |
| A0900 | 01F01 | 27 | 332.0 | 60 | FLDCT | B9999 | ZZZZZ | 33 | 0.0001 | 1,126 |
| A0900 | 01F01 | 28 | 337.0 | 60 | FLDCT | B9999 | ZZZZZ | 34 | 0.0001 | 1,143 |
| A0900 | 01F01 | 29 | 325.0 | 60 | FLDCT | B9999 | ZZZZZ | 24 | 0.0001 | 1,102 |
| A0900 | 01F01 | 30 | 312.0 | 60 | FLDCT | B9999 | ZZZZZ | 23 | 0.0001 | 1,058 |
| A0900 | 01F01 | 31 | 318.0 | 60 | FLDCT | B9999 | ZZZZZ | 15 | 0.0001 | 1,079 |
| A0900 | 01F01 | 32 | 287.0 | 60 | FLDCT | B9999 | ZZZZZ | 16 | 0.0001 | 973 |
| A0900 | 01F01 | 33 | 270.0 | 60 | FLDCT | B9999 | ZZZZZ | 5 | 0.0001 | 916 |
| A0900 | 01F01 | 34 | 324.0 | 60 | FLDCT | B9999 | ZZZZZ | 6 | 0.0001 | 1,099 |
| A0900 | 01F01 | 35 | 312.0 | 60 | FLDCT | B9999 | ZZZZZ | 35 | 0.0001 | 1,058 |
| A0900 | 01F01 | 36 | 298.0 | 60 | FLDCT | B9999 | ZZZZZ | 26 | 0.0001 | 1,011 |
| A0900 | 01F01 | 37 | 296.0 | 60 | FLDCT | B9999 | ZZZZZ | 25 | 0.0001 | 1,004 |
| A0900 | 01F01 | 38 | 304.0 | 60 | FLDCT | B9999 | ZZZZZ | 17 | 0.0001 | 1,031 |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 - | _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| A0900 | 01F01 | 39 | 324.0 | 60 | FLDCT | B9999 | ZZZZZ | 7 | 0.0001 | 1,099 |
| A0900 | 01F01 | 40 | 309.0 | 60 | FLDCT | B9999 | ZZZZZ | 8 | 0.0001 | 1,048 |
| A0900 | 01F01 | 41 | 322.0 | 60 | FLDCT | B0003 | ZZZZZ | 36 | 0.0001 | 1,092 |
| A0900 | 01F01 | 42 | 301.0 | 60 | FLDCT | B9999 | ZZZZZ | 27 | 0.0001 | 1,021 |
| A0900 | 01F01 | 43 | 278.0 | 60 | FLDCT | B9999 | ZZZZZ | 9 | 0.0001 | 943 |
| ZZZZZ | ZZZZZ | 176 | 3,122.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,059 |
| ZZZZZ | FD184 | 177 | 1,268.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,242 |
| ZZZZZ | FD184 | 178 | 1,339.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,483 |
| ZZZZZ | FD184 | 179 | 1,276.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,270 |
| ZZZZZ | 10002 | 180 | 33,499.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |
| ZZZZZ | 10002 | 181 | 37,359.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |
| ZZZZZ | 10002 | 182 | 33,817.0 | 60 | PTBBK | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |

| | | |
|---|---|---|
| *Beta Flag* | 2500 | - _____ |
| *Beta Max Flag* | 5000 | [redacted] |

Survey #- A0980

# ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by D.R. Kjos (Print) Signature DR Kjos Date 4-26-03 Time 1600

Counted by BS Kjos. (Print) Signature BS Kj Date 4-28-03 Time 0645

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .335

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA- 108 dpm/100 cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 57 | 3 | <MDA |
| 3 | 52 | 0 | |
| 5 | 60 | 6 | |
| 30 | 49 | 0 | |
| 34 | 55 | 1 | <MDA |
| | | N | |
| | | A | |

| Circle: | MDA- 12.5 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | <MDA |
| 3 | 1 | .85 | |
| 5 | 0 | 0 | |
| 30 | 0 | 0 | |
| 34 | 1 | .85 | <MDA |
| | | N | |
| | | A | |

Remarks-

Signature BS Kj Reviewed by- Paul C Eg 4/29/03

Duratek, Inc.
Survey Package Worksheet for Package A1000
Bristol-Myers Squibb Building 124, Rooms 171 & 178

| | |
|---|---|
| Package Identification No.: A1000 | Prepared by: Paul C. Ely |
| Location: Building 124 Rooms 171 & 178 Floors | Date prepared: 4/18/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising floors in Rooms 171 & 178.

## Historical Information

Room 171 is the corridor behind the Iodine caves. Room 178 is an entry area to Room 171. No radionuclide processing occurred in these corridors. However the Room 171 corridor runs behind the Iodine Caves that had shield doors opening into the corridor. Potential radioactive materials would include all those used in the Iodine caves.

No contamination levels >5,000 dpm/100 $cm^2$ were identified during the characterization except on equipment that removed during the decommissioning.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

**Survey Package: A1000 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| Bristol Myers Squibb Building 124 Rooms 171 & 178 Floors | | | | | | | | | | | | |
| A1000 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | JM / 4-22-03 | MK / 4-28-03 | N/A | N/A | ~~N/A~~ 5 MK / 4-28-03 | N/A | N/A |
| | | | | | | | | | | | | |
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| Package Review |
| --- |
| Date Package Completed: 4/29/03 |
| Package Reviewed by and Date: Paul C Ely 4/29/03 |

| Survey Comments |
| --- |
| Extra survey points included at y= 3 meters. |
| |
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| |

**Survey Package A1000**
**Room Floors 171 & 178**

| | | | |
|---|---|---|---|
| **X (Max):** | 17.7 | meters | |
| **Y (Max):** | 6.0 | meters | |
| **A (Area):** | 106.2 | $m^2$ | |
| **Actual Survey Area:** | 72.6 | $m^2$ | |
| **COMPASS Survey Points:** | 14 | 32% | percent void area |
| **N (Points):** | 36 | 20 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 1.8 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.6 | meters | (distance between rows) |
| **L/2=** | 0.9 | meters | (row offset value) |
| **X (Random):** | 9.6 | | random number generator |
| **Y (Random):** | 3.9 | | random number generator |
| **X (Origin):** | 9.0 | | initially generated random number |
| **Y (Origin):** | 3.1 | | initially generated random number |
| **Number of rows:** | 4 | | |
| **Number of columns:** | 10 | | |

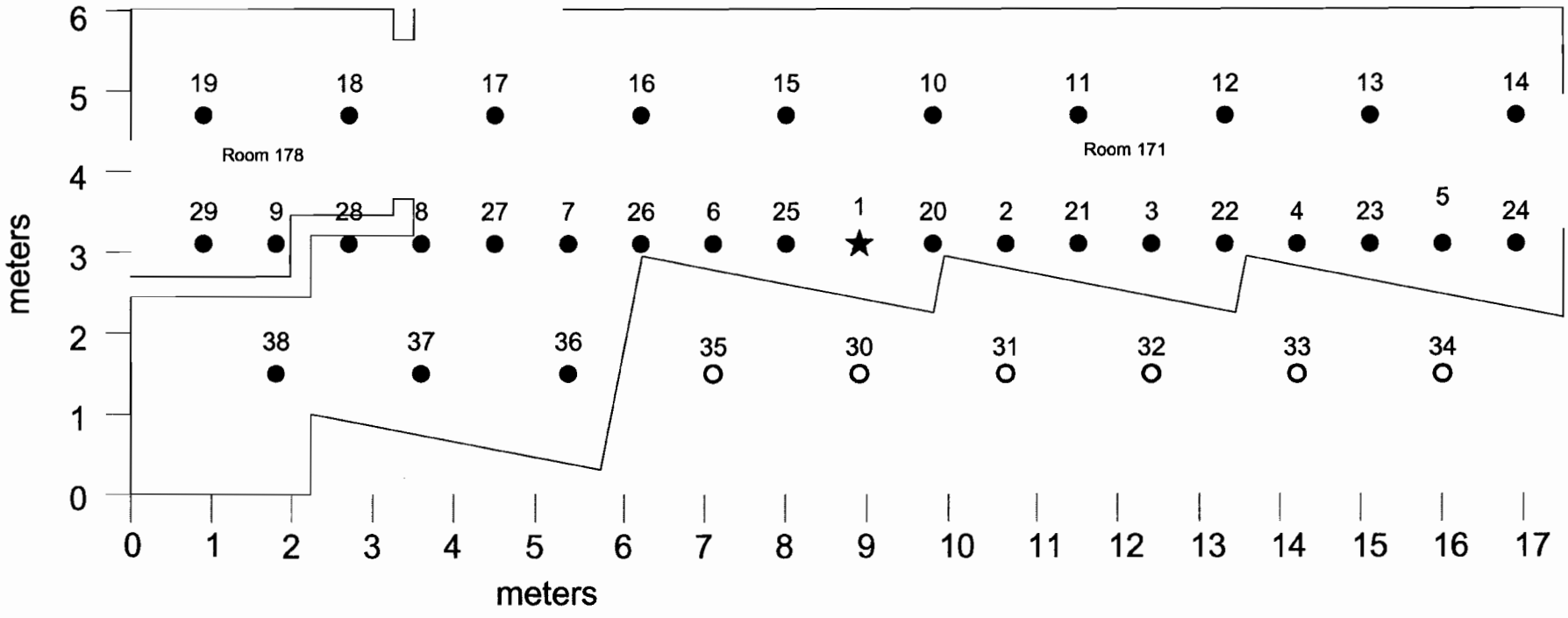
| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 9.0 | 3.1 | 3 |
| 2 | 10.8 | 3.1 | |
| 3 | 12.6 | 3.1 | |
| 4 | 14.4 | 3.1 | |
| 5 | 16.2 | 3.1 | |
| 6 | 7.2 | 3.1 | |
| 7 | 5.4 | 3.1 | |
| 8 | 3.6 | 3.1 | |
| 9 | 1.8 | 3.1 | |
| 10 | 9.9 | 4.7 | 4 |
| 11 | 11.7 | 4.7 | |
| 12 | 13.5 | 4.7 | |
| 13 | 15.3 | 4.7 | |
| 14 | 17.1 | 4.7 | |
| 15 | 8.1 | 4.7 | |
| 16 | 6.3 | 4.7 | |
| 17 | 4.5 | 4.7 | |
| 18 | 2.7 | 4.7 | |
| 19 | 0.9 | 4.7 | |
| 20 | 9.9 | 3.1 | 2 |
| 21 | 11.7 | 3.1 | |
| 22 | 13.5 | 3.1 | |
| 23 | 15.3 | 3.1 | |
| 24 | 17.1 | 3.1 | |
| 25 | 8.1 | 3.1 | |
| 26 | 6.3 | 3.1 | |
| 27 | 4.5 | 3.1 | |
| 28 | 2.7 | 3.1 | |
| 29 | 0.9 | 3.1 | |
| 30 | 9.0 | 1.5 | 1 |
| 31 | 10.8 | 1.5 | |
| 32 | 12.6 | 1.5 | |
| 33 | 14.4 | 1.5 | |
| 34 | 16.2 | 1.5 | |
| 35 | 7.2 | 1.5 | |
| 36 | 5.4 | 1.5 | |
| 37 | 3.6 | 1.5 | |
| 38 | 1.8 | 1.5 | |

**LBGR Determination**
**Package A1000**

| | | |
|---|---|---|
| $\sigma$ = | 107.5 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 10.0 | >3 |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **752** | **cpm** |

X(Max)= 17.7 m
Y(Max)=6.0 m

**SURVEY PACKAGE A1000**

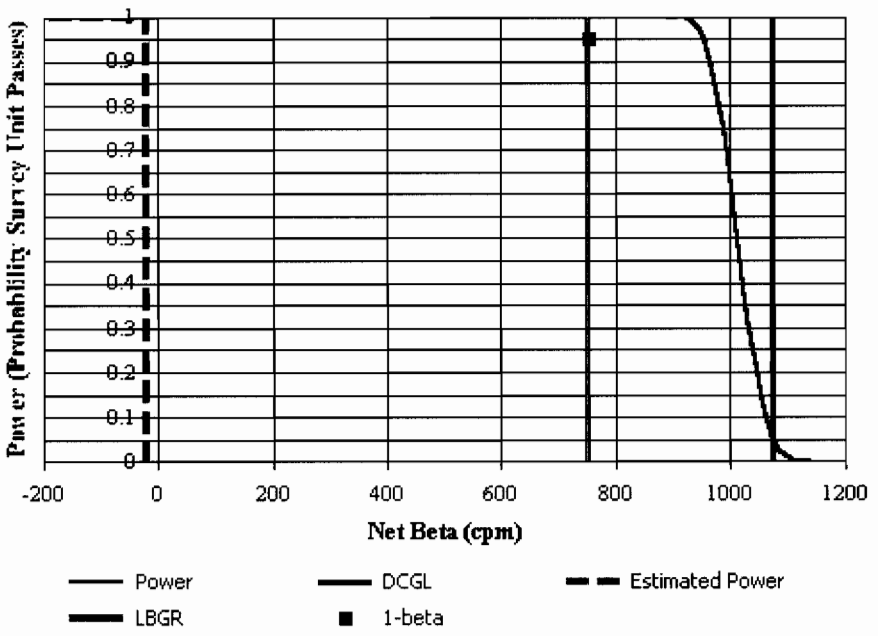


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1000 FSS Package | | |
| Comments: | Floor Corridor 171 & 178 | | |
| Area (m²): | 74 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 107.5 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 752 | Estimated Conc. (cpm): | -19.2 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 222 ± 62 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |
| Linoleum | 46 | 244.9 | 21.7 | 501 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0100**
**B-124 Cave Areas (Rooms 171 – 178, 180, and 181)**
FSS Packages: A0700, A0900, A1000, B0900, B0910

| | Floor | | Wall | | Ceiling | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 370 | 376 | 369 | 406 | 220 | 250 | 330 | 406 |
| | 153 | 180 | 473 | 552 | 215 | 187 | 371 | 380 |
| | 192 | 242 | 349 | 404 | 357 | 416 | 377 | 389 |
| | 184 | 223 | 367 | 407 | 431 | 437 | 437 | 425 |
| | 181 | 194 | 297 | 339 | 287 | 313 | 320 | 330 |
| | 197 | 211 | 247 | 284 | 340 | 419 | 384 | 442 |
| | 219 | 193 | 334 | 558 | 379 | 437 | 442 | 461 |
| | 219 | 176 | 264 | 332 | 358 | 424 | | |
| | 238 | 200 | 316 | 323 | 408 | 458 | | |
| | | | 222 | 250 | | | | |
| | | | 297 | 374 | | | | |
| | | | 288 | 326 | | | | |
| | | | 379 | 377 | | | | |
| | | | 335 | 392 | | | | |
| | | | 340 | 345 | | | | |
| | | | 337 | 416 | | | | |
| | | | 347 | 309 | | | | |
| | | | 332 | 351 | | | | |
| | | | 363 | 426 | | | | |
| | | | 341 | 325 | | | | |
| | | | 326 | 377 | | | | |
| | | | 325 | 416 | | | | |
| **Average** | **217.0** | **221.7** | **329.5** | **376.8** | **332.8** | **371.2** | **380.1** | **404.7** |
| **Standard Deviation** | **62.6** | **61.5** | **51.1** | **73.8** | **77.0** | **97.0** | **47.1** | **43.6** |
| **No of Measurements** | **9** | **9** | **22** | **22** | **9** | **9** | **7** | **7** |
| **All Measurement Average** | **304.9** | **340.6** | | | | | | |
| **Standard Deviation** | **75.7** | **99.3** | | | | | | |
| **No of Measurements** | **40** | **40** | | | | | | |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kiss **Signature:** [signature] **Date:** 4-28-03

Download Station #: 1 Download File #: 95
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kiss **User ID** DRK2986 **Signature:** [signature] **Date:** 4-28-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A1000, B-124, Rooms 171 and 178 (Floors)
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR119337 | 43-68B | .234 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements MEAN Value in cpm !

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 | 2 | 3 | 4 N/A | 5 N/A | 6 N/A | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .133

**M2350-1 Download BETA Report**

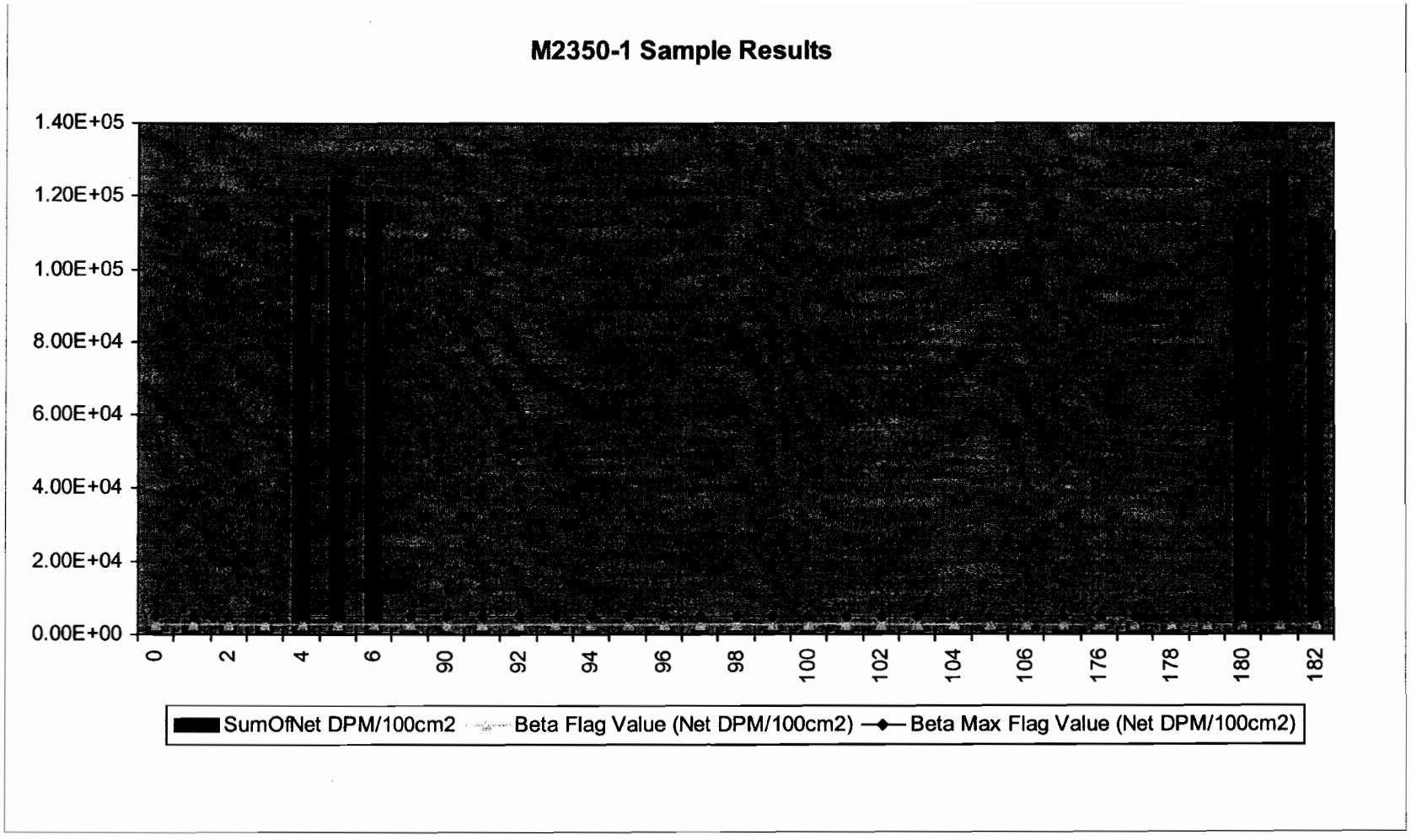
| | | |
|---|---|---|
| File Name : 00000095 | Survey Description :Package A1000, B-124, Rooms 171 and 178 (Floors) | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.234 | Survey Date : 4/26/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

Sign-Off

| Print Name | Signature | Date |
|---|---|---|
| Paul E. Ely | Paul C Ely | 8/26/03 |


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
90
92
94
96
98
100
102
104
106
176
178
180
182
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000095

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,980.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,011 |
| ZZZZZ | FD184 | 1 | 1,386.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,690 |
| ZZZZZ | FD184 | 2 | 1,331.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,504 |
| ZZZZZ | FD184 | 3 | 1,319.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,463 |
| ZZZZZ | 10002 | 4 | 34,049.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 5 | 37,162.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,181.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| A1000 | ZZZZZ | 89 | 209.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 709 |
| A1000 | ZZZZZ | 90 | 195.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 661 |
| A1000 | ZZZZZ | 91 | 199.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 675 |
| A1000 | 01F01 | 92 | 260.0 | 60 | FLDCT | B9999 | ZZZZZ | 14 | 0.0001 | 882 |
| A1000 | 01F01 | 93 | 294.0 | 60 | FLDCT | B9999 | ZZZZZ | 13 | 0.0001 | 997 |
| A1000 | 01F01 | 94 | 265.0 | 60 | FLDCT | B9999 | ZZZZZ | 11 | 0.0001 | 899 |
| A1000 | 01F01 | 95 | 243.0 | 60 | FLDCT | B9999 | ZZZZZ | 10 | 0.0001 | 824 |
| A1000 | 01F01 | 96 | 310.0 | 60 | FLDCT | B0003 | ZZZZZ | 20 | 0.0001 | 1,051 |
| A1000 | 01F01 | 97 | 343.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 1,163 |
| A1000 | 01F01 | 98 | 237.0 | 60 | FLDCT | B9999 | ZZZZZ | 7 | 0.0001 | 804 |
| A1000 | 01F01 | 99 | 282.0 | 60 | FLDCT | B0003 | ZZZZZ | 8 | 0.0001 | 956 |
| A1000 | 01F01 | 100 | 280.0 | 60 | FLDCT | B9999 | ZZZZZ | 37 | 0.0001 | 950 |
| A1000 | 01F01 | 101 | 287.0 | 60 | FLDCT | B9999 | ZZZZZ | 38 | 0.0001 | 973 |
| A1000 | 01F01 | 102 | 232.0 | 60 | FLDCT | B9999 | ZZZZZ | 36 | 0.0001 | 787 |
| A1000 | 01F01 | 103 | 316.0 | 60 | FLDCT | B9999 | ZZZZZ | 28 | 0.0001 | 1,072 |
| A1000 | 01F01 | 104 | 351.0 | 60 | FLDCT | B9999 | ZZZZZ | 9 | 0.0001 | 1,190 |
| A1000 | 01F01 | 105 | 374.0 | 60 | FLDCT | B9999 | ZZZZZ | 29 | 0.0001 | 1,268 |
| A1000 | 01F01 | 106 | 366.0 | 60 | FLDCT | B9999 | ZZZZZ | 19 | 0.0001 | 1,241 |
| A1000 | 01F01 | 107 | 338.0 | 60 | FLDCT | B9999 | ZZZZZ | 18 | 0.0001 | 1,146 |
| ZZZZZ | ZZZZZ | 176 | 3,122.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,059 |
| ZZZZZ | FD184 | 177 | 1,268.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,242 |
| ZZZZZ | FD184 | 178 | 1,339.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,483 |
| ZZZZZ | FD184 | 179 | 1,276.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,270 |
| ZZZZZ | 10002 | 180 | 33,499.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |
| ZZZZZ | 10002 | 181 | 37,359.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |
| ZZZZZ | 10002 | 182 | 33,817.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 - | _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

***Tuesday, August 26, 2003***

Survey #- A1000

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by D.R. Kjos (Print) Signature D.K. / BSK Date 4-26-03 Time 1530

Counted by BS Kjos (Print) Signature BS Kjos Date 4-28-03 Time 0715

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .25

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA=108 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 8 | 52 | 0 | <MDA |
| 11 | 52 | 0 | |
| 14 | 50 | 0 | |
| 29 | 50 | 0 | |
| 37 | 55 | 1 | <MDA |
| | | | |
| | | | |
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N A

| Circle: | MDA=12.5 dpm/100cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 8 | 0 | 0 | <MDA |
| 11 | 0 | 0 | |
| 14 | 1 | .85 | |
| 29 | 0 | 0 | |
| 37 | 0 | 0 | <MDA |
| | | | |
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N A

Remarks-

Signature- BS Kjos Reviewed by- Paul C Ely 4/29/03

Duratek, Inc.
Survey Package Worksheet for Package A1100
Bristol-Myers Squibb Building 124 Iodine Caves

| | |
|---|---|
| Package Identification No.: A1100 | Prepared by: Paul C. Ely |
| Location: Building 124 Iodine Caves | Date prepared: 4/18/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising all surfaces inside Iodine Caves.

## Historical Information

The 172 Cave work included Molybdenum generator manufacturing, Iodotope therapeutic oral manufacturing and filling, Bulk I-131 storage and dispensing, Molybdenum production until 1992. Radionuclides included Mo-99, I-131, Au-198 and Sr-82/85. The 174 Cave work included occasional production of Molybdenum. Radionuclides included I-131and Strontium. The 175 Cave work included Iodotope therapeutic capsule manufacturing and filling. Radionuclides included I-131 and Au-198.

All caves had areas of contamination levels >5,000 dpm/100 $cm^2$. Contamination levels up to 1,014,820 dpm/100 $cm^2$ were identified during the characterization.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of all surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

**Survey Package: A1100 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears in survey unit at five unspecified survey locations. |

**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| **Bristol Myers Squibb Building 124 Iodine Caves** | | | | | | | | | | | | |
| A1100 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | DJS 4-22-03 | MRL/4-26-03 | N/A | N/A | N/A MRL/4-26-03 | N/A | N/A |
| A1100 | 01W01 | ZZZZZ | ZZZZZ | See map | Walls 100% | DJS 4-22-03 | MRL/4-26-03 | N/A | N/A | N/A | N/A | N/A |
| A1100 | 01C01 | ZZZZZ | ZZZZZ | See map | Ceilings 100% | DJS 4-22-03 | MRL/4-26-03 | N/A | N/A | N/A | N/A | N/A |
| A1100 | 01S01 | ZZZZZ | ZZZZZ | If needed | Structure 100% | DJS 4-22-03 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review | |
|---|---|
| Date Package Completed: | 4/29/03 |
| Package Reviewed by and Date: | Paul C Elg 4/29/03 |

| Survey Comments |
|---|
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| |

**Survey Package A1100**
**Iodine Caves**

| | | | |
|---|---|---|---|
| **X (Max):** | 27.0 | meters | |
| **Y (Max):** | 8.9 | meters | |
| **A (Area):** | 240.3 | $m^2$ | |
| **Actual Survey Area:** | 77.6 | $m^2$ | |
| **COMPASS Survey Points:** | 19 | 68% | percent void area |
| **N (Points):** | 120 | 59 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 1.5 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.3 | meters | (distance between rows) |
| **L/2=** | 0.8 | meters | (row offset value) |
| **X (Random):** | 8.4 | | random number generator |
| **Y (Random):** | 0.8 | | random number generator |
| **X (Origin):** | 15.2 | | initially generated random number |
| **Y (Origin):** | 6.2 | | initially generated random number |
| **Number of rows:** | 7 | | |
| **Number of columns:** | 18 | | |

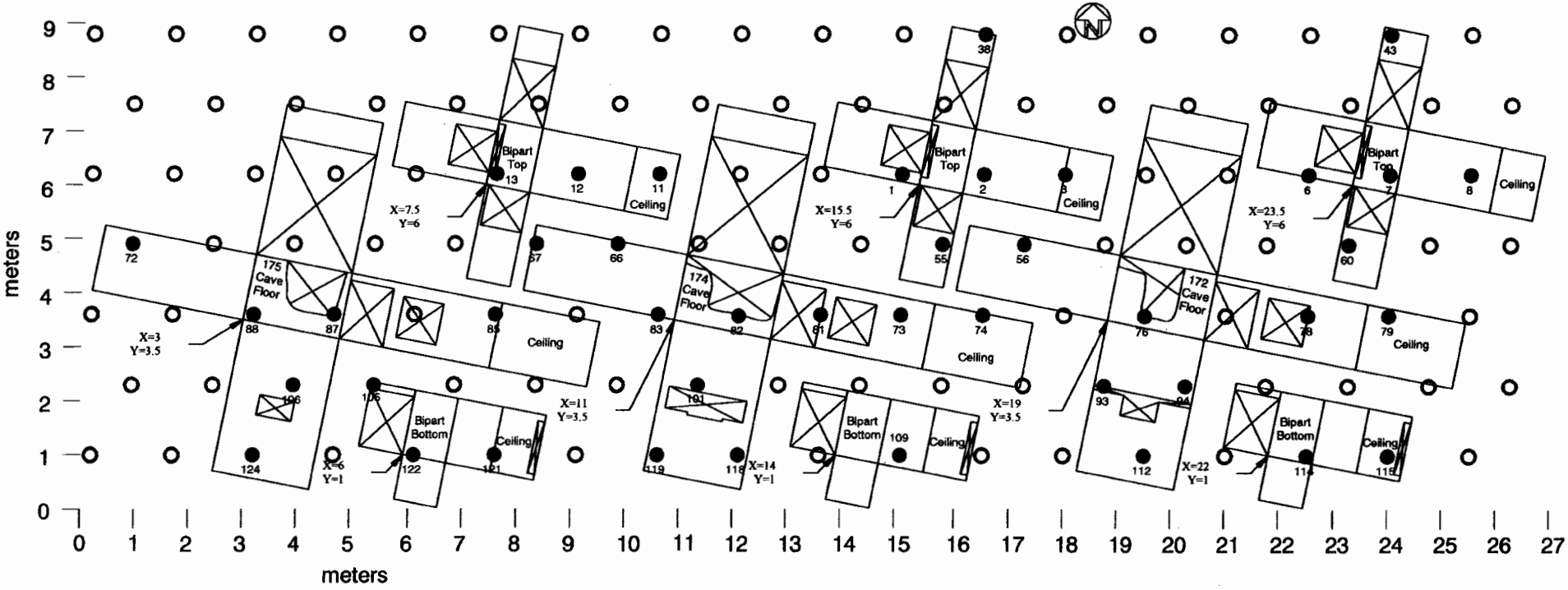
| **Survey Point** | **Survey Location X** | **Y** | **Row** | **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|---|---|---|---|
| Starting Point (1) | 15.2 | 6.2 | 5 | 55 | 16.0 | 4.9 | 4 |
| 2 | 16.7 | 6.2 | | 56 | 17.5 | 4.9 | |
| 3 | 18.2 | 6.2 | | 57 | 19.0 | 4.9 | |
| 4 | 19.7 | 6.2 | | 58 | 20.5 | 4.9 | |
| 5 | 21.2 | 6.2 | | 59 | 22.0 | 4.9 | |
| 6 | 22.7 | 6.2 | | 60 | 23.5 | 4.9 | |
| 7 | 24.2 | 6.2 | | 61 | 25.0 | 4.9 | |
| 8 | 25.7 | 6.2 | | 62 | 26.5 | 4.9 | |
| 9 | 13.7 | 6.2 | | 63 | 14.5 | 4.9 | |
| 10 | 12.2 | 6.2 | | 64 | 13.0 | 4.9 | |
| 11 | 10.7 | 6.2 | | 65 | 11.5 | 4.9 | |
| 12 | 9.2 | 6.2 | | 66 | 10.0 | 4.9 | |
| 13 | 7.7 | 6.2 | | 67 | 8.5 | 4.9 | |
| 14 | 6.2 | 6.2 | | 68 | 7.0 | 4.9 | |
| 15 | 4.7 | 6.2 | | 69 | 5.5 | 4.9 | |
| 16 | 3.2 | 6.2 | | 70 | 4.0 | 4.9 | |
| 17 | 1.7 | 6.2 | | 71 | 2.5 | 4.9 | |
| 18 | 0.2 | 6.2 | | 72 | 0.9 | 4.9 | |
| 19 | 16.0 | 7.5 | 6 | 73 | 15.2 | 3.6 | 3 |
| 20 | 17.5 | 7.5 | | 74 | 16.7 | 3.6 | |
| 21 | 19.0 | 7.5 | | 75 | 18.2 | 3.6 | |
| 22 | 20.5 | 7.5 | | 76 | 19.7 | 3.6 | |
| 23 | 22.0 | 7.5 | | 77 | 21.2 | 3.6 | |
| 24 | 23.5 | 7.5 | | 78 | 22.7 | 3.6 | |
| 25 | 25.0 | 7.5 | | 79 | 24.2 | 3.6 | |
| 26 | 26.5 | 7.5 | | 80 | 25.7 | 3.6 | |
| 27 | 14.5 | 7.5 | | 81 | 13.7 | 3.6 | |
| 28 | 13.0 | 7.5 | | 82 | 12.2 | 3.6 | |
| 29 | 11.5 | 7.5 | | 83 | 10.7 | 3.6 | |
| 30 | 10.0 | 7.5 | | 84 | 9.2 | 3.6 | |
| 31 | 8.5 | 7.5 | | 85 | 7.7 | 3.6 | |
| 32 | 7.0 | 7.5 | | 86 | 6.2 | 3.6 | |
| 33 | 5.5 | 7.5 | | 87 | 4.7 | 3.6 | |
| 34 | 4.0 | 7.5 | | 88 | 3.2 | 3.6 | |
| 35 | 2.5 | 7.5 | | 89 | 1.7 | 3.6 | |
| 36 | 0.9 | 7.5 | | 90 | 0.2 | 3.6 | |
| 37 | 15.2 | 8.8 | 7 | 91 | 16.0 | 2.3 | 2 |
| 38 | 16.7 | 8.8 | | 92 | 17.5 | 2.3 | |
| 39 | 18.2 | 8.8 | | 93 | 19.0 | 2.3 | |
| 40 | 19.7 | 8.8 | | 94 | 20.5 | 2.3 | |
| 41 | 21.2 | 8.8 | | 95 | 22.0 | 2.3 | |
| 42 | 22.7 | 8.8 | | 96 | 23.5 | 2.3 | |
| 43 | 24.2 | 8.8 | | 97 | 25.0 | 2.3 | |
| 44 | 25.7 | 8.8 | | 98 | 26.5 | 2.3 | |
| 45 | 13.7 | 8.8 | | 99 | 14.5 | 2.3 | |
| 46 | 12.2 | 8.8 | | 100 | 13.0 | 2.3 | |
| 47 | 10.7 | 8.8 | | 101 | 11.5 | 2.3 | |
| 48 | 9.2 | 8.8 | | 102 | 10.0 | 2.3 | |
| 49 | 7.7 | 8.8 | | 103 | 8.5 | 2.3 | |
| 50 | 6.2 | 8.8 | | 104 | 7.0 | 2.3 | |
| 51 | 4.7 | 8.8 | | 105 | 5.5 | 2.3 | |
| 52 | 3.2 | 8.8 | | 106 | 4.0 | 2.3 | |
| 53 | 1.7 | 8.8 | | 107 | 2.5 | 2.3 | |
| 54 | 0.2 | 8.8 | | 108 | 0.9 | 2.3 | |
| | | | | 109 | 15.2 | 1.0 | 1 |
| | | | | 110 | 16.7 | 1.0 | |
| | | | | 111 | 18.2 | 1.0 | |
| | | | | 112 | 19.7 | 1.0 | |
| | | | | 113 | 21.2 | 1.0 | |
| | | | | 114 | 22.7 | 1.0 | |
| | | | | 115 | 24.2 | 1.0 | |
| | | | | 116 | 25.7 | 1.0 | |
| | | | | 117 | 13.7 | 1.0 | |
| | | | | 118 | 12.2 | 1.0 | |
| | | | | 119 | 10.7 | 1.0 | |
| | | | | 120 | 9.2 | 1.0 | |
| | | | | 121 | 7.7 | 1.0 | |
| | | | | 122 | 6.2 | 1.0 | |
| | | | | 123 | 4.7 | 1.0 | |
| | | | | 124 | 3.2 | 1.0 | |
| | | | | 125 | 1.7 | 1.0 | |
| | | | | 126 | 0.2 | 1.0 | |

**LBGR Determination**
**Package A1100**

| | | |
|---|---|---|
| $\sigma$ = | 360.9 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 3.0 | 2.9758936 |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **537** | **cpm** |

X(Max)= 27.0 m
Y(Max)=8.9 m

**SURVEY PACKAGE A1100**



**Survey Package A1100**
**Iodine Caves**

| | | | |
|---|---|---|---|
| X (Max): | 27.0 | meters | |
| Y (Max): | 8.9 | meters | |
| A (Area): | 240.3 | $m^2$ | |
| Actual Survey Area: | 77.6 | $m^2$ | |
| COMPASS Survey Points: | 19 | 68% | percent void area |
| N (Points): | 120 | 59 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| L= | 1.5 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| D= | 1.3 | meters | (distance between rows) |
| L/2= | 0.8 | meters | (row offset value) |
| X (Random): | 6.4 | | random number generator |
| Y (Random): | 0.8 | | random number generator |
| X (Origin): | 15.2 | | initially generated random number |
| Y (Origin): | 6.2 | | initially generated random number |
| Number of rows: | 7 | | |
| Number of columns: | 18 | | |

| Survey Point | Survey Location X | Survey Location Y | Row |
|---|---|---|---|
| Starting Point | 15.2 | 6.2 | 5 |
| 2 | 16.7 | 6.2 | |
| 3 | 18.2 | 6.2 | |
| 4 | 19.7 | 6.2 | |
| 5 | 21.2 | 6.2 | |
| 6 | 22.7 | 6.2 | |
| 7 | 24.2 | 6.2 | |
| 8 | 25.7 | 6.2 | |
| 9 | 13.7 | 6.2 | |
| 10 | 12.2 | 6.2 | |
| 11 | 10.7 | 6.2 | |
| 12 | 9.2 | 6.2 | |
| 13 | 7.7 | 6.2 | |
| 14 | 6.2 | 6.2 | |
| 15 | 4.7 | 6.2 | |
| 16 | 3.2 | 6.2 | |
| 17 | 1.7 | 6.2 | |
| 18 | 0.2 | 6.2 | |
| 19 | 16.0 | 7.5 | 6 |
| 20 | 17.5 | 7.5 | |
| 21 | 19.0 | 7.5 | |
| 22 | 20.5 | 7.5 | |
| 23 | 22.0 | 7.5 | |
| 24 | 23.5 | 7.5 | |
| 25 | 25.0 | 7.5 | |
| 26 | 26.5 | 7.5 | |
| 27 | 14.5 | 7.5 | |
| 28 | 13.0 | 7.5 | |
| 29 | 11.5 | 7.5 | |
| 30 | 10.0 | 7.5 | |
| 31 | 8.5 | 7.5 | |
| 32 | 7.0 | 7.5 | |
| 33 | 5.5 | 7.5 | |
| 34 | 4.0 | 7.5 | |
| 35 | 2.5 | 7.5 | |
| 36 | 0.9 | 7.5 | |
| 37 | 15.2 | 8.8 | 7 |
| 38 | 16.7 | 8.8 | |
| 39 | 18.2 | 8.8 | |
| 40 | 19.7 | 8.8 | |
| 41 | 21.2 | 8.8 | |
| 42 | 22.7 | 8.8 | |
| 43 | 24.2 | 8.8 | |
| 44 | 25.7 | 8.8 | |
| 45 | 13.7 | 8.8 | |
| 46 | 12.2 | 8.8 | |
| 47 | 10.7 | 8.8 | |
| 48 | 9.2 | 8.8 | |
| 49 | 7.7 | 8.8 | |
| 50 | 6.2 | 8.8 | |
| 51 | 4.7 | 8.8 | |
| 52 | 3.2 | 8.8 | |
| 53 | 1.7 | 8.8 | |
| 54 | 0.2 | 8.8 | |

| Survey Point | Survey Location X | Survey Location Y | Row |
|---|---|---|---|
| 55 | 16.0 | 4.9 | 4 |
| 56 | 17.5 | 4.9 | |
| 57 | 19.0 | 4.9 | |
| 58 | 20.5 | 4.9 | |
| 59 | 22.0 | 4.9 | |
| 60 | 23.5 | 4.9 | |
| 61 | 25.0 | 4.9 | |
| 62 | 26.5 | 4.9 | |
| 63 | 14.5 | 4.9 | |
| 64 | 13.0 | 4.9 | |
| 65 | 11.5 | 4.9 | |
| 66 | 10.0 | 4.9 | |
| 67 | 8.5 | 4.9 | |
| 68 | 7.0 | 4.9 | |
| 69 | 5.5 | 4.9 | |
| 70 | 4.0 | 4.9 | |
| 71 | 2.5 | 4.9 | |
| 72 | 0.9 | 4.9 | |
| 73 | 15.2 | 3.6 | 3 |
| 74 | 16.7 | 3.6 | |
| 75 | 18.2 | 3.6 | |
| 76 | 19.7 | 3.6 | |
| 77 | 21.2 | 3.6 | |
| 78 | 22.7 | 3.6 | |
| 79 | 24.2 | 3.6 | |
| 80 | 25.7 | 3.6 | |
| 81 | 13.7 | 3.6 | |
| 82 | 12.2 | 3.6 | |
| 83 | 10.7 | 3.6 | |
| 84 | 9.2 | 3.6 | |
| 85 | 7.7 | 3.6 | |
| 86 | 6.2 | 3.6 | |
| 87 | 4.7 | 3.6 | |
| 88 | 3.2 | 3.6 | |
| 89 | 1.7 | 3.6 | |
| 90 | 0.2 | 3.6 | |
| 91 | 16.0 | 2.3 | 2 |
| 92 | 17.5 | 2.3 | |
| 93 | 19.0 | 2.3 | |
| 94 | 20.5 | 2.3 | |
| 95 | 22.0 | 2.3 | |
| 96 | 23.5 | 2.3 | |
| 97 | 25.0 | 2.3 | |
| 98 | 26.5 | 2.3 | |
| 99 | 14.5 | 2.3 | |
| 100 | 13.0 | 2.3 | |
| 101 | 11.5 | 2.3 | |
| 102 | 10.0 | 2.3 | |
| 103 | 8.5 | 2.3 | |
| 104 | 7.0 | 2.3 | |
| 105 | 5.5 | 2.3 | |
| 106 | 4.0 | 2.3 | |
| 107 | 2.5 | 2.3 | |
| 108 | 0.9 | 2.3 | |
| 109 | 15.2 | 1.0 | 1 |
| 110 | 16.7 | 1.0 | |
| 111 | 18.2 | 1.0 | |
| 112 | 19.7 | 1.0 | |
| 113 | 21.2 | 1.0 | |
| 114 | 22.7 | 1.0 | |
| 115 | 24.2 | 1.0 | |
| 116 | 25.7 | 1.0 | |
| 117 | 13.7 | 1.0 | |
| 118 | 12.2 | 1.0 | |
| 119 | 10.7 | 1.0 | |
| 120 | 9.2 | 1.0 | |
| 121 | 7.7 | 1.0 | |
| 122 | 6.2 | 1.0 | |
| 123 | 4.7 | 1.0 | |
| 124 | 3.2 | 1.0 | |
| 125 | 1.7 | 1.0 | |
| 126 | 0.2 | 1.0 | |

**LBGR Determination**
**Package A1100**

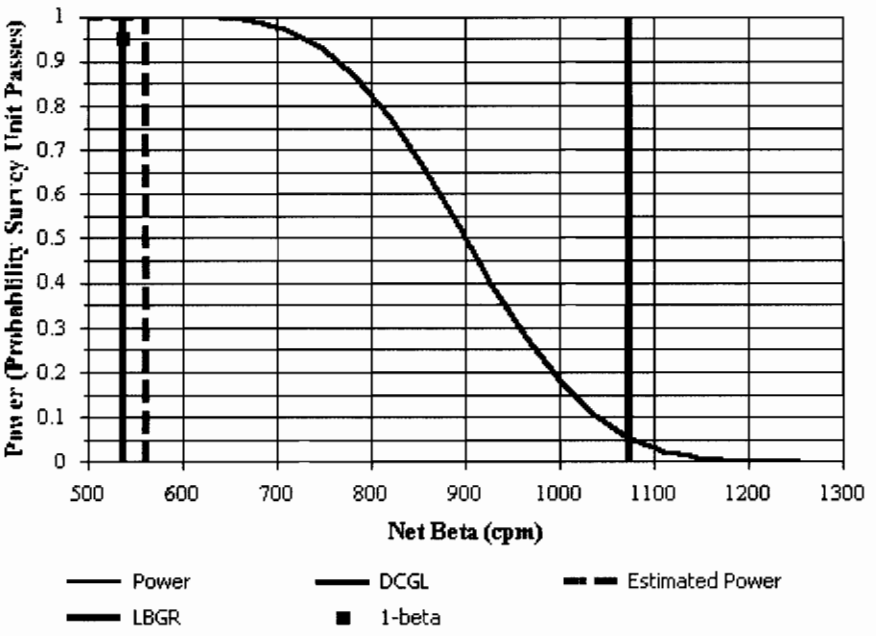
| | | |
|---|---|---|
| $\sigma$ = | 360.9 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 3.0 | 2.9758936 |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| LBGR = | 537 | cpm |

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1100 FSS Package | | |
| Comments: | B-124 Iodine Caves | | |
| Area (m²): | 78 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 360.9 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 19 |
| LBGR (cpm): | 537 | Estimated Conc. (cpm): | 562 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 19 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 700 ± 350 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |
| Steel Panel | 28 | 137.9 | 18.4 | 381 |

**Estimated Data**
**FSS Package A1100, Iodine Caves**
**Building 124**

| | Cave Gross Counts/min |
|---|---|
| Estimated Average | 700.0 |
| Estimated Standard Deviation | 350.0 |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyes **Signature:** [signature] **Date:** 4-28-03

Download Station #: 1 Download File #: 93
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kyes **User ID** DRK2986 **Signature:** [signature] **Date:** 4-26-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A1100, B-124, Iodine Caves
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR 119337 | 43-68B | .234 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 262 | 2 269 | 3 260 | 4 N/A | 5 N/A | 6 N/A | 264 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .133

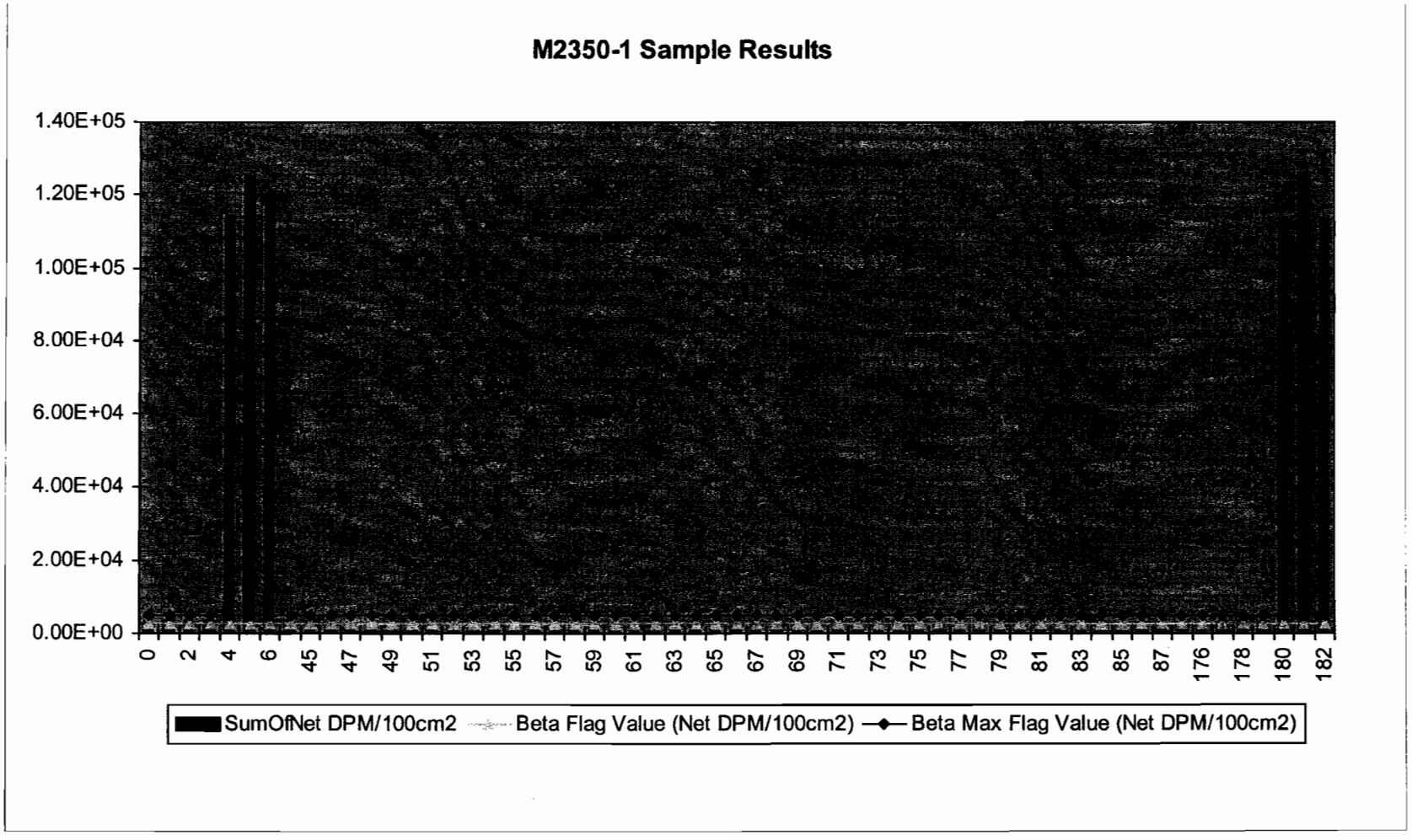
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000093 | Survey Description :Package A1100, B-124, Iodine Caves | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.234 | Survey Date : 4/26/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* PAUL L. ELY (Print Name) — Paul C Ely (Signature) — 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
45
47
49
51
53
55
57
59
61
63
65
67
69
71
73
75
77
79
81
83
85
87
176
178
180
182
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# Duratek Beta Survey Report

**Download File Name:** 00000093

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,980.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,011 |
| ZZZZZ | FD184 | 1 | 1,386.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,690 |
| ZZZZZ | FD184 | 2 | 1,331.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,504 |
| ZZZZZ | FD184 | 3 | 1,319.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | 3,463 |
| ZZZZZ | 10002 | 4 | 34,049.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 5 | 37,162.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,181.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| A1100 | ZZZZZ | 44 | 262.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 889 |
| A1100 | ZZZZZ | 45 | 269.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 912 |
| A1100 | ZZZZZ | 46 | 260.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 882 |
| A1100 | 01F01 | 47 | 386.0 | 60 | FLDCT | B0003 | ZZZZZ | 114 | 0.0001 | 1,309 |
| A1100 | 01F01 | 48 | 276.0 | 60 | FLDCT | B9999 | ZZZZZ | 115 | 0.0001 | 936 |
| A1100 | 01C01 | 49 | 151.0 | 60 | FLDCT | B0001 | ZZZZZ | 8 | 0.0001 | 512 |
| A1100 | 01W01 | 50 | 192.0 | 60 | FLDCT | B0001 | ZZZZZ | 6 | 0.0001 | 651 |
| A1100 | 01W01 | 51 | 197.0 | 60 | FLDCT | B0001 | ZZZZZ | 60 | 0.0001 | 668 |
| A1100 | 01W01 | 52 | 171.0 | 60 | FLDCT | B0001 | ZZZZZ | 43 | 0.0001 | 580 |
| A1100 | 01W01 | 53 | 175.0 | 60 | FLDCT | B9999 | ZZZZZ | 94 | 0.0001 | 594 |
| A1100 | 01W01 | 54 | 235.0 | 60 | FLDCT | B9999 | ZZZZZ | 112 | 0.0001 | 797 |
| A1100 | 01W01 | 55 | 176.0 | 60 | FLDCT | B9999 | ZZZZZ | 93 | 0.0001 | 597 |
| A1100 | 01W01 | 56 | 206.0 | 60 | FLDCT | B9999 | ZZZZZ | 56 | 0.0001 | 699 |
| A1100 | 01W01 | 57 | 157.0 | 60 | FLDCT | B9999 | ZZZZZ | 78 | 0.0001 | 532 |
| A1100 | 01C01 | 58 | 158.0 | 60 | FLDCT | B9999 | ZZZZZ | 79 | 0.0001 | 536 |
| A1100 | 01F01 | 59 | 337.0 | 60 | FLDCT | B0003 | ZZZZZ | 76 | 0.0001 | 1,143 |
| A1100 | 01W01 | 60 | 165.0 | 60 | FLDCT | B0003 | ZZZZZ | 109 | 0.0001 | 560 |
| A1100 | 01W01 | 61 | 168.0 | 60 | FLDCT | B0001 | ZZZZZ | 55 | 0.0001 | 570 |
| A1100 | 01W01 | 62 | 150.0 | 60 | FLDCT | B0001 | ZZZZZ | 3 | 0.0001 | 509 |
| A1100 | 01W01 | 63 | 218.0 | 60 | FLDCT | B0001 | ZZZZZ | 2 | 0.0001 | 739 |
| A1100 | 01W01 | 64 | 225.0 | 60 | FLDCT | B0001 | ZZZZZ | 1 | 0.0001 | 763 |
| A1100 | 01W01 | 65 | 160.0 | 60 | FLDCT | B0001 | ZZZZZ | 38 | 0.0001 | 543 |
| A1100 | 01W01 | 66 | 233.0 | 60 | FLDCT | B9999 | ZZZZZ | 66 | 0.0001 | 790 |
| A1100 | 01W01 | 67 | 149.0 | 60 | FLDCT | B9999 | ZZZZZ | 67 | 0.0001 | 505 |
| A1100 | 01W01 | 68 | 306.0 | 60 | FLDCT | B9999 | ZZZZZ | 83 | 0.0001 | 1,038 |
| A1100 | 01W01 | 69 | 160.0 | 60 | FLDCT | B9999 | ZZZZZ | 101 | 0.0001 | 543 |
| A1100 | 01W01 | 70 | 175.0 | 60 | FLDCT | B9999 | ZZZZZ | 119 | 0.0001 | 594 |
| A1100 | 01W01 | 71 | 240.0 | 60 | FLDCT | B9999 | ZZZZZ | 118 | 0.0001 | 814 |
| A1100 | 01W01 | 72 | 222.0 | 60 | FLDCT | B9999 | ZZZZZ | 81 | 0.0001 | 753 |
| A1100 | 01W01 | 73 | 189.0 | 60 | FLDCT | B9999 | ZZZZZ | 73 | 0.0001 | 641 |
| A1100 | 01C01 | 74 | 184.0 | 60 | FLDCT | B9999 | ZZZZZ | 74 | 0.0001 | 624 |
| A1100 | 01F01 | 75 | 242.0 | 60 | FLDCT | B0003 | ZZZZZ | 82 | 0.0001 | 821 |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| A1100 | 01F01 | 76 | 706.0 | 60 | FLDCT | B0003 | ZZZZZ | 122 | 0.0001 | 2,395 |
| A1100 | 01W01 | 77 | 243.0 | 60 | FLDCT | B0003 | ZZZZZ | 121 | 0.0001 | 824 |
| A1100 | 01W01 | 78 | 473.0 | 60 | FLDCT | B9999 | ZZZZZ | 105 | 0.0001 | 1,604 |
| A1100 | 01C01 | 79 | 199.0 | 60 | FLDCT | B0001 | ZZZZZ | 11 | 0.0001 | 675 |
| A1100 | 01W01 | 80 | 162.0 | 60 | FLDCT | B0001 | ZZZZZ | 12 | 0.0001 | 549 |
| A1100 | 01F01 | 81 | 267.0 | 60 | FLDCT | B0001 | ZZZZZ | 13 | 0.0001 | 906 |
| A1100 | 01W01 | 82 | 141.0 | 60 | FLDCT | B9999 | ZZZZZ | 85 | 0.0001 | 478 |
| A1100 | 01W01 | 83 | 158.0 | 60 | FLDCT | B9999 | ZZZZZ | 106 | 0.0001 | 536 |
| A1100 | 01W01 | 84 | 135.0 | 60 | FLDCT | B9999 | ZZZZZ | 124 | 0.0001 | 458 |
| A1100 | 01W01 | 85 | 157.0 | 60 | FLDCT | B9999 | ZZZZZ | 72 | 0.0001 | 532 |
| A1100 | 01F01 | 86 | 255.0 | 60 | FLDCT | B0003 | ZZZZZ | 87 | 0.0001 | 865 |
| A1100 | 01F01 | 87 | 244.0 | 60 | FLDCT | B0003 | ZZZZZ | 88 | 0.0001 | 828 |
| A1100 | 01F01 | 88 | 240.0 | 60 | FLDCT | B0003 | ZZZZZ | 7 | 0.0001 | 814 |
| ZZZZZ | ZZZZZ | 176 | 3,122.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,059 |
| ZZZZZ | FD184 | 177 | 1,268.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,242 |
| ZZZZZ | FD184 | 178 | 1,339.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,483 |
| ZZZZZ | FD184 | 179 | 1,276.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | 3,270 |
| ZZZZZ | 10002 | 180 | 33,499.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |
| ZZZZZ | 10002 | 181 | 37,359.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |
| ZZZZZ | 10002 | 182 | 33,817.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 312 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kjos **Signature:** [signature] **Date:** 4-3-03

Download Station #: 1 Download File #: 45
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kjos **User ID** NRK2986 **Signature:** [signature] **Date:** 4-3-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: Package A1100 Rm 172 Floor under Wall Brace
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR092524 | 43-68B | .241 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 205 | 2 190 | 3 207 | 4 n/a | 5 n/a | 6 n/a | 201 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS:

**M2350-1 Download BETA Report**

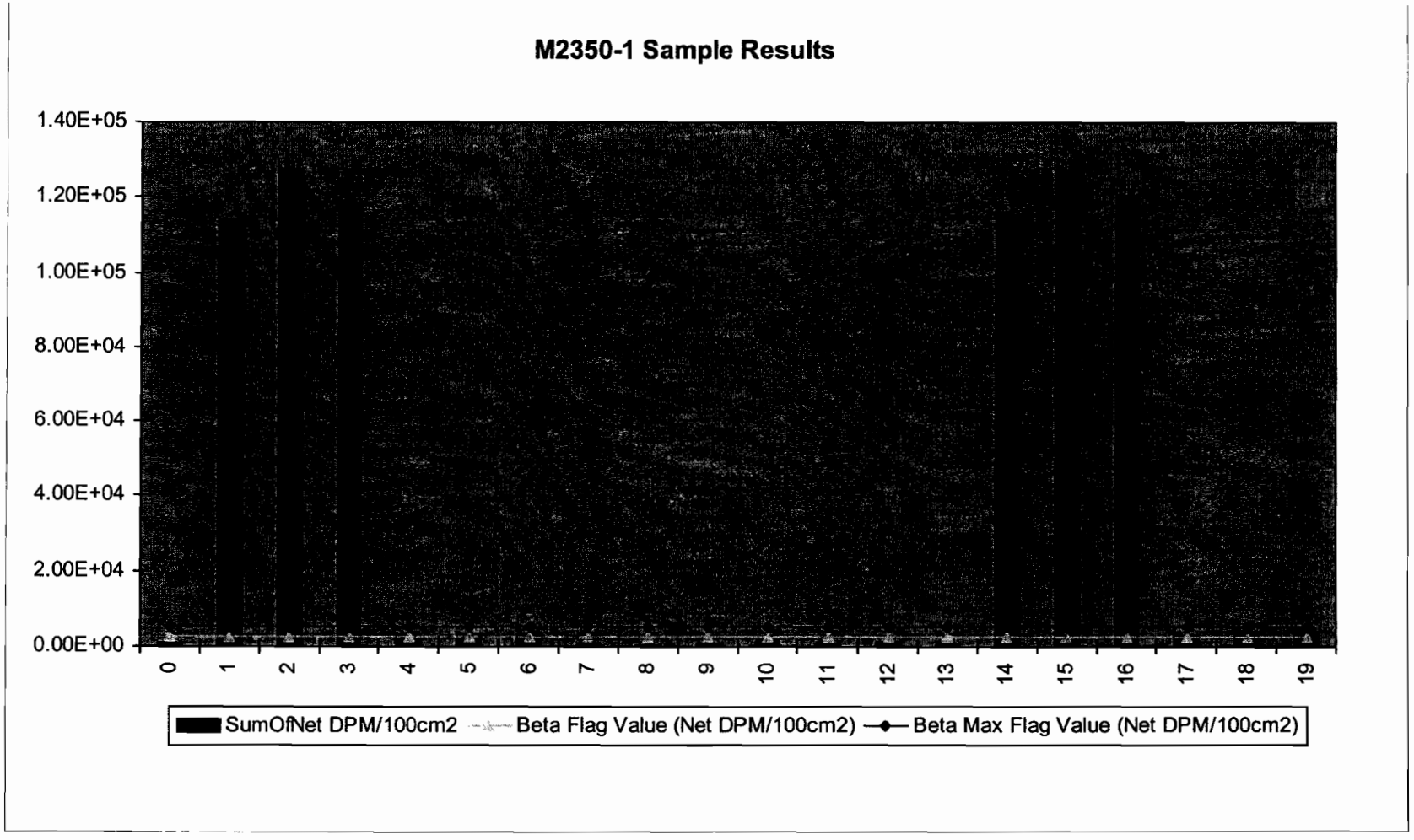
| | | |
|---|---|---|
| File Name : 00000045 | Survey Description :Package A1100 RM 172 Wall Support (floor under wal | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.241 | Survey Date : 4/3/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

Sign-Off

| Print Name | Signature | Date |
|---|---|---|
| Paul C. Ely | Paul C Ely | 8/26/03 |


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000045

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,326.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 766 |
| ZZZZZ | 10002 | 1 | 34,879.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 2 | 38,929.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 3 | 35,878.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | FD184 | 4 | 1,231.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,287 |
| ZZZZZ | FD184 | 5 | 1,242.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,323 |
| ZZZZZ | FD184 | 6 | 1,311.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,550 |
| A1100 | ZZZZZ | 7 | 205.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 675 |
| A1100 | ZZZZZ | 8 | 190.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 626 |
| A1100 | ZZZZZ | 9 | 207.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 682 |
| A1100 | 01F01 | 10 | 515.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 0.0001 | 1,696 |
| A1100 | 01F01 | 11 | 314.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 1,034 |
| A1100 | 01F01 | 12 | 351.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,156 |
| ZZZZZ | ZZZZZ | 13 | 2,398.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 790 |
| ZZZZZ | 10002 | 14 | 35,225.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 240 | [redacted] |
| ZZZZZ | 10002 | 15 | 38,778.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 240 | [redacted] |
| ZZZZZ | 10002 | 16 | 36,860.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 240 | [redacted] |
| ZZZZZ | FD184 | 17 | 1,218.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 240 | 3,221 |
| ZZZZZ | FD184 | 18 | 1,291.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 240 | 3,461 |
| ZZZZZ | FD184 | 19 | 1,239.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 240 | 3,290 |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyos **Signature:** [signature] **Date:** 4-10-03

Download Station #: 1 Download File #: 46
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kyos **User ID** NRK2986 **Signature:** [signature] **Date:** 4-10-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: PACKAGE A1100 Room 172 AREA UNDER WALL SUPPORT
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ☐ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PRO92524 | 43-68B | .237 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 194 | 2 200 | 3 210 | 4 N/A | 5 N/A | 6 N/A | 201 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .137

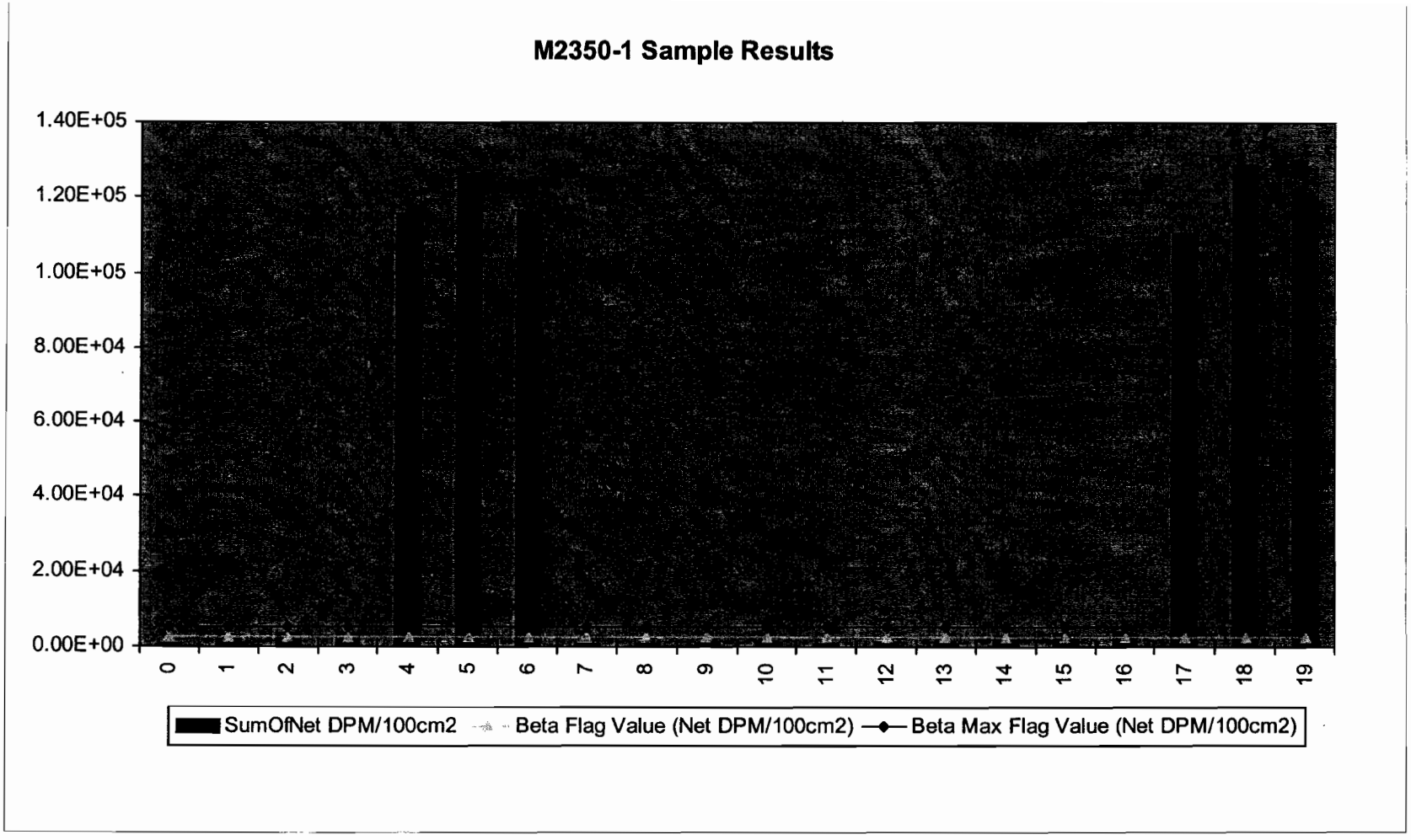
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000046 | Survey Description :Package A1100 Room 172 (area under wall support) | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.237 | Survey Date : 4/9/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | | 8/26/03 |
| | | |

**Comments:**

Sign-Off Paul C. Ely (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# Duratek Beta Survey Report

**Download File Name:** 00000046

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,689.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 900 |
| ZZZZZ | FD184 | 1 | 1,158.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 269 | 2,977 |
| ZZZZZ | FD184 | 2 | 1,352.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 269 | 3,627 |
| ZZZZZ | FD184 | 3 | 1,300.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 269 | 3,453 |
| ZZZZZ | 10002 | 4 | 34,706.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 269 | [redacted] |
| ZZZZZ | 10002 | 5 | 37,908.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 269 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,012.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 269 | [redacted] |
| A1100 | ZZZZZ | 7 | 194.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 650 |
| A1100 | ZZZZZ | 8 | 200.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 670 |
| A1100 | ZZZZZ | 9 | 210.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 703 |
| A1100 | 01F01 | 10 | 499.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 1,671 |
| A1100 | 01F01 | 11 | 305.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 0.0001 | 1,021 |
| A1100 | 01F01 | 12 | 400.0 | 60 | FLDCT | B0003 | ZZZZZ | 6 | 0.0001 | 1,339 |
| ZZZZZ | ZZZZZ | 13 | 2,880.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 964 |
| ZZZZZ | FD184 | 14 | 1,201.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 288 | 3,057 |
| ZZZZZ | FD184 | 15 | 1,356.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 288 | 3,576 |
| ZZZZZ | FD184 | 16 | 1,283.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 288 | 3,332 |
| ZZZZZ | 10002 | 17 | 33,260.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 288 | [redacted] |
| ZZZZZ | 10002 | 18 | 38,773.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 288 | [redacted] |
| ZZZZZ | 10002 | 19 | 36,189.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 288 | [redacted] |

| | | |
|---|---|---|
| **Beta Flag** | 2500 - | _____ |
| **Beta Max Flag** | 5000 | [redacted] |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas Rios **Signature:** [signature] **Date:** 4-16-03

Download Station #: 1 Download File #: 51
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas Rios **User ID** NOL 2986 **Signature:** [signature] **Date:** 4-15-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A1100 (under wall Room 172)
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR119337 | 43-68B | .230 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 182 | 2 176 | 3 167 | 4 N/A | 5 N/A | 6 N/A | 175 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 EFF: .129

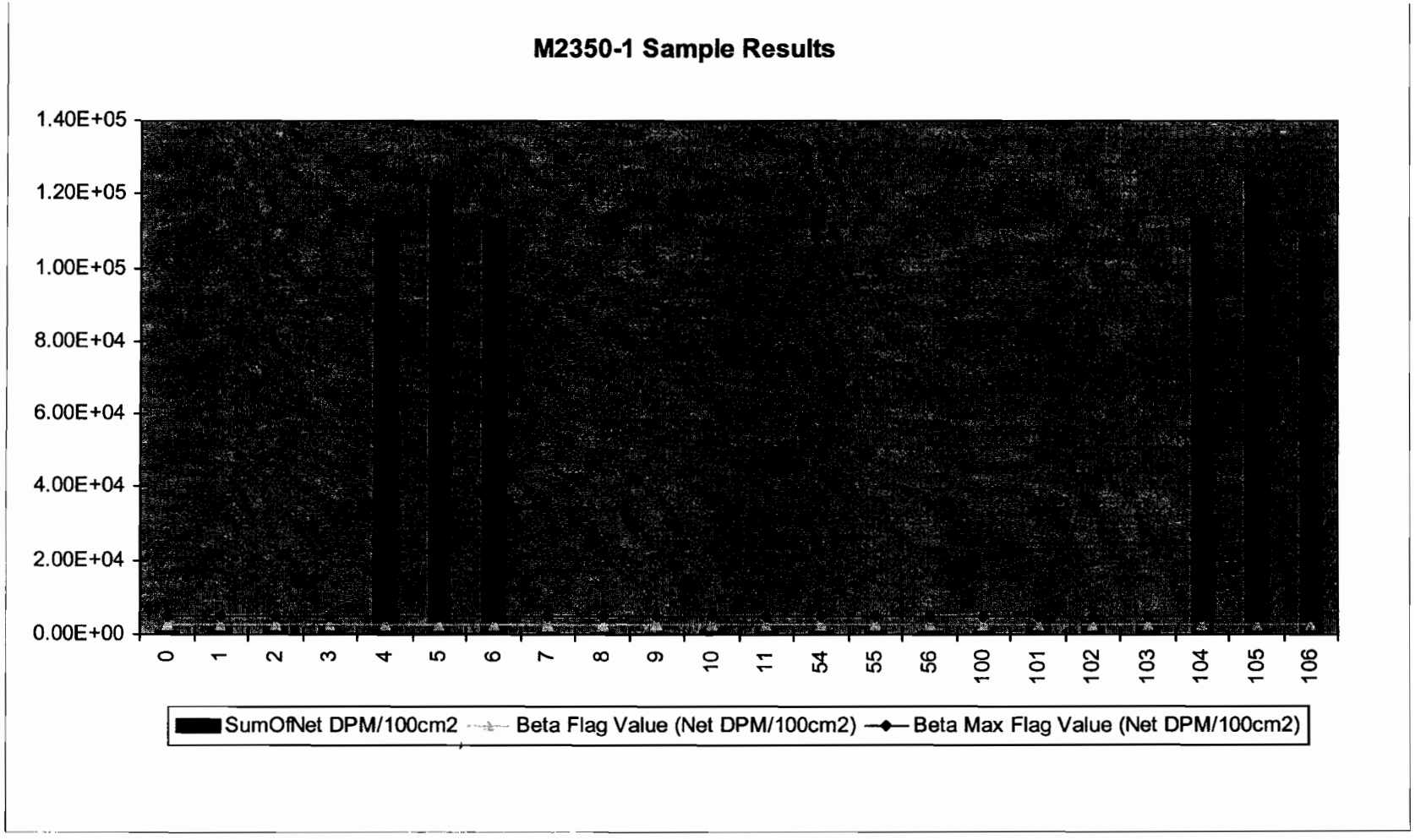
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000051 | Survey Description :Package A1100 (under wall in room 172) | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.23 | Survey Date : 4/15/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* Paul L. Ely (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
1
2
3
4
5
6
7
8
9
10
11
54
55
56
100
101
102
103
104
105
106
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# Duratek Beta Survey Report

**Download File Name:** 00000051

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,453.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 846 |
| ZZZZZ | FD184 | 1 | 1,119.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,016 |
| ZZZZZ | FD184 | 2 | 1,222.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,371 |
| ZZZZZ | FD184 | 3 | 1,289.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,602 |
| ZZZZZ | 10002 | 4 | 33,342.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| ZZZZZ | 10002 | 5 | 35,781.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| ZZZZZ | 10002 | 6 | 33,167.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| A1100 | ZZZZZ | 7 | 182.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 628 |
| A1100 | ZZZZZ | 8 | 176.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 607 |
| A1100 | ZZZZZ | 9 | 167.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 576 |
| A1100 | 01F01 | 10 | 389.0 | 60 | FLDCT | B0003 | ZZZZZ | 7 | 0.0001 | 1,342 |
| A1100 | 01F01 | 11 | 492.0 | 60 | FLDCT | B0003 | ZZZZZ | 8 | 0.0001 | 1,698 |
| B1000 | ZZZZZ | 54 | 221.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 763 |
| B1000 | ZZZZZ | 55 | 210.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 725 |
| B1000 | ZZZZZ | 56 | 214.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 738 |
| ZZZZZ | ZZZZZ | 100 | 2,498.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 862 |
| ZZZZZ | FD184 | 101 | 1,198.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 250 | 3,271 |
| ZZZZZ | FD184 | 102 | 1,254.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 250 | 3,464 |
| ZZZZZ | FD184 | 103 | 1,245.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 250 | 3,433 |
| ZZZZZ | 10002 | 104 | 33,191.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 250 | [redacted] |
| ZZZZZ | 10002 | 105 | 36,154.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 250 | [redacted] |
| ZZZZZ | 10002 | 106 | 31,632.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 250 | [redacted] |

| | |
|---|---|
| **Beta Flag** | 2500 - _____ |
| **Beta Max Flag** | 5000 [redacted] |

*Tuesday, August 26, 2003*

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1100

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by D. R. Kjos (Print) Signature DRK | BSK Date 4-28-03 Time 1600

Counted by Betty S. Kjos (Print) Signature BSK Date 4-29-03 Time 1100

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 105 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 7 | 51 | 0 | <MDA |
| 82 | 58 | 7 | |
| 101 | 49 | 0 | |
| 106 | 46 | 0 | |
| 112 | 48 | 0 | <MDA |

| Circle: | MDA = 14 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 7 | 1 | .70 | <MDA |
| 82 | 1 | .70 | |
| 101 | 0 | 0 | |
| 106 | 0 | 0 | |
| 112 | 0 | 0 | <MDA |

s-

e- BSK Reviewed by- Paul C Eb 4/29/03

of

Duratek, Inc.
Survey Package Worksheet for Package A1200
Bristol-Myers Squibb Building 124 Room 142 Floor

| | |
|---|---|
| Package Identification No.: A1200 | Prepared by: Paul C. Ely |
| Location: Building 124 Room 142 Floor | Date prepared: 4/23/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising the floor in Room 142.

## Historical Information

Room 142 is the south Warehouse area. Used manipulators were stored in this area and sampling of the water in the holdup tanks was performed remotely form this location. All radionuclides used in the caves had the potential to be present.

All wall and ceiling areas had contamination levels <5,000 dpm/100 $cm^2$. Some spots on floors had contamination levels >5,000 dpm/100 $cm^2$ prior to decontamination.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

**Survey Package: A1200 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| Bristol Myers Squibb Building 124 Room 142 Floor | | | | | | | | | | | | |
| A1200 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | 4-18-03 | 4-25-03 | N/A | N/A | N/A 4-25-03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review | |
|---|---|
| Date Package Completed: | 4/29/03 |
| Package Reviewed by and Date: | Paul C Ely 4/29/03 |

| Survey Comments |
|---|
| |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A1200**
**Room 142 Floors**

| | | | |
|---|---|---|---|
| **X (Max):** | 11.4 | meters | |
| **Y (Max):** | 10.7 | meters | |
| **A (Area):** | 121.98 | $m^2$ | |
| **Actual Survey Area:** | 99 | $m^2$ | |
| **COMPASS Survey Points:** | 18 | 19% | percent void area |
| **N (Points):** | 36 | 22 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 2 | meters | (distance between measurement points) |

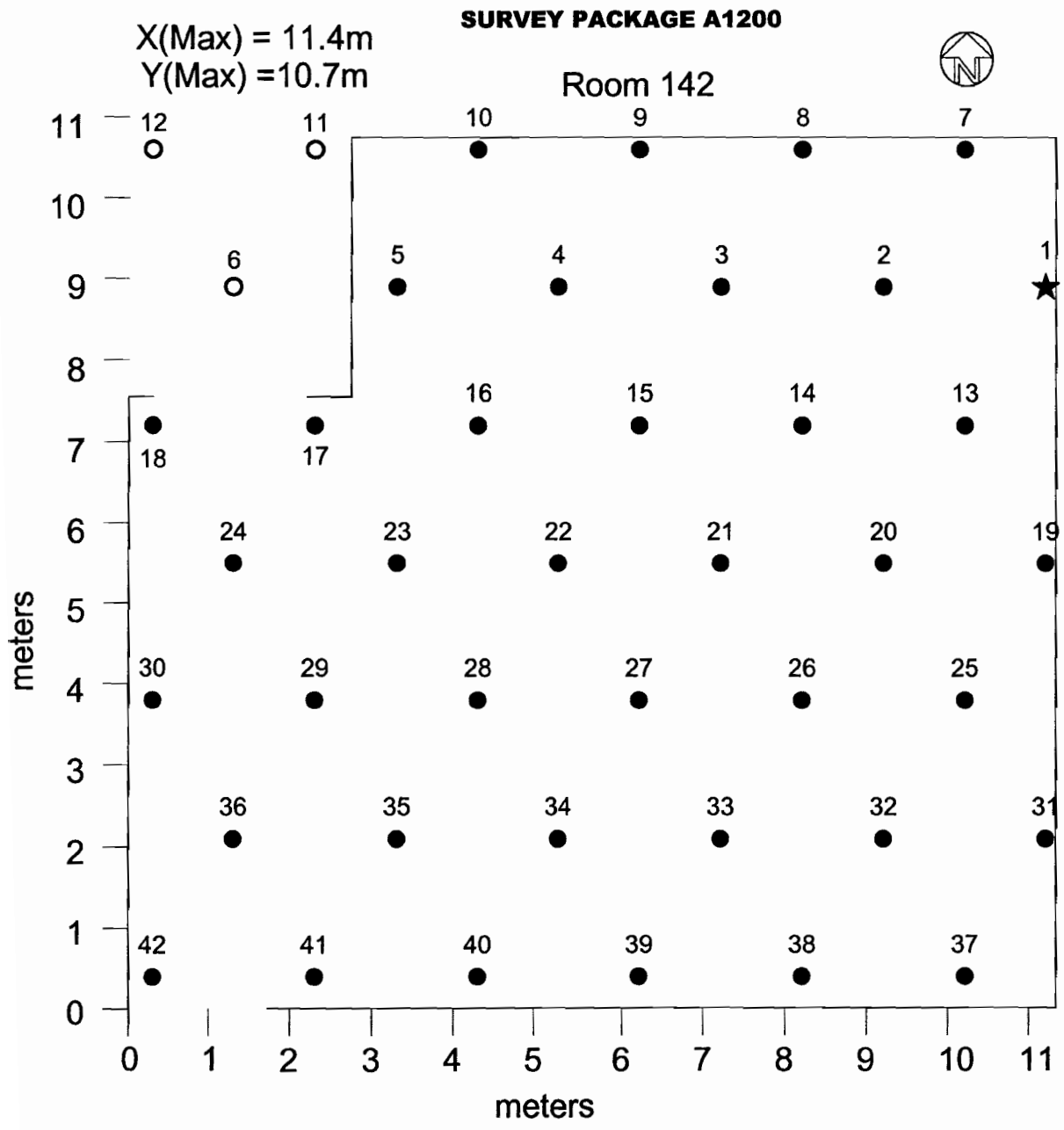
$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.7 | meters | (distance between rows) |
| **L/2=** | 1.0 | meters | (row offset value) |
| **X (Random):** | 3.3 | | random number generator |
| **Y (Random):** | 7.8 | | random number generator |
| **X (Origin):** | 11.3 | | initially generated random number |
| **Y (Origin):** | 8.9 | | initially generated random number |
| **Number of rows:** | 6 | | |
| **Number of columns:** | 6 | | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 11.3 | 8.9 | 5 |
| 2 | 9.3 | 8.9 | |
| 3 | 7.3 | 8.9 | |
| 4 | 5.3 | 8.9 | |
| 5 | 3.3 | 8.9 | |
| 6 | 1.3 | 8.9 | |
| 7 | 10.3 | 10.6 | 6 |
| 8 | 8.3 | 10.6 | |
| 9 | 6.3 | 10.6 | |
| 10 | 4.3 | 10.6 | |
| 11 | 2.3 | 10.6 | |
| 12 | 0.3 | 10.6 | |
| 13 | 10.3 | 7.2 | 4 |
| 14 | 8.3 | 7.2 | |
| 15 | 6.3 | 7.2 | |
| 16 | 4.3 | 7.2 | |
| 17 | 2.3 | 7.2 | |
| 18 | 0.3 | 7.2 | |
| 19 | 11.3 | 5.5 | 3 |
| 20 | 9.3 | 5.5 | |
| 21 | 7.3 | 5.5 | |
| 22 | 5.3 | 5.5 | |
| 23 | 3.3 | 5.5 | |
| 24 | 1.3 | 5.5 | |
| 25 | 10.3 | 3.8 | 2 |
| 26 | 8.3 | 3.8 | |
| 27 | 6.3 | 3.8 | |
| 28 | 4.3 | 3.8 | |
| 29 | 2.3 | 3.8 | |
| 30 | 0.3 | 3.8 | |
| 31 | 11.3 | 2.1 | 1 |
| 32 | 9.3 | 2.1 | |
| 33 | 7.3 | 2.1 | |
| 34 | 5.3 | 2.1 | |
| 35 | 3.3 | 2.1 | |
| 36 | 1.3 | 2.1 | |
| 37 | 10.3 | 0.4 | 0 |
| 38 | 8.3 | 0.4 | |
| 39 | 6.3 | 0.4 | |
| 40 | 4.3 | 0.4 | |
| 41 | 2.3 | 0.4 | |
| 42 | 0.3 | 0.4 | |

**LBGR Determination**

| | | |
|---|---|---|
| $\sigma$ = | 358.6 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 3.0 | **2.99** |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | **3** |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **537** | **cpm** |


SURVEY PACKAGE A1200
X(Max) = 11.4m
Y(Max) =10.7m
Room 142
N
meters
meters
0
1
2
3
4
5
6
7
8
9
10
11
12
11
10
9
8
7
6
5
4
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2
1
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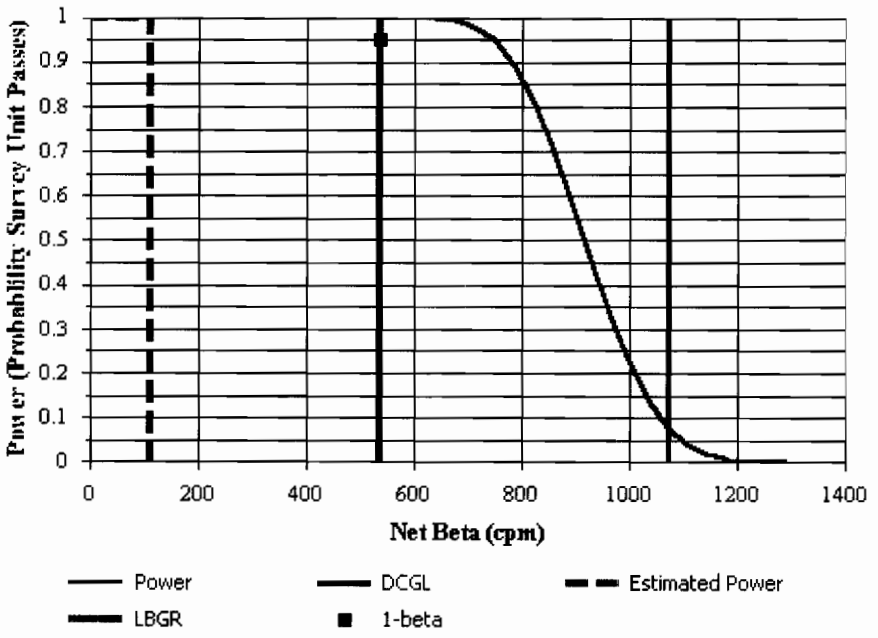
38
37

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1200 FSS Package | | |
| Comments: | B-124 Room 142 Floor | | |
| Area (m²): | 99 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 358.6 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 18 |
| LBGR (cpm): | 537 | Estimated Conc. (cpm): | 113 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 18 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 384 ± 357 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 35 | 270.6 | 36.7 | 526 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0700**
**B-124 South-central Lab Areas (Rooms 142-145, 154, 156 – 160, 162A, 163, 163B, 163C, 164, 165, 167, 168, & 170).**
FSS Packages:A1200, A1300, B0200, B0400, B0500, B0600,B0700, B0800

| Floor | | Wall | | Ceiling | | Structure | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|---|
| Background | Gross | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| 277 | 315 | 322 | 374 | 288 | 366 | 279 | 252 | 232 | 272 |
| 265 | 275 | 305 | 403 | 393 | 358 | 299 | 293 | 267 | 259 |
| 228 | 302 | 325 | 389 | 304 | 382 | 243 | 260 | 321 | 335 |
| 273 | 302 | 338 | 336 | 322 | 364 | 276 | 243 | 307 | 332 |
| 257 | 269 | 320 | 331 | 283 | 350 | 274 | 259 | 334 | 309 |
| 283 | 478 | 310 | 409 | 297 | 300 | 246 | 276 | 305 | 335 |
| 253 | 258 | 269 | 382 | 303 | 312 | 195 | 317 | 307 | 346 |
| 286 | 393 | 358 | 520 | 303 | 343 | 222 | 220 | 311 | 317 |
| 329 | 387 | 289 | 323 | 324 | 355 | 205 | 189 | 357 | 361 |
| 301 | 1,261 | 258 | 266 | 333 | 337 | 191 | 213 | 335 | 336 |
| 395 | 2,169 | 274 | 283 | 260 | 350 | 238 | 252 | | |
| 259 | 350 | 258 | 281 | 249 | 322 | 235 | 224 | | |
| 243 | 267 | 325 | 335 | 331 | 354 | 225 | 263 | | |
| 327 | 285 | 311 | 337 | 319 | 318 | 261 | 252 | | |
| 280 | 276 | 333 | 354 | 326 | 339 | 231 | 244 | | |
| 271 | 242 | 323 | 379 | 339 | 343 | 227 | 224 | | |
| 241 | 245 | 321 | 337 | 323 | 343 | 229 | 243 | | |
| 206 | 218 | 279 | 342 | 364 | 364 | 188 | 180 | | |
| 253 | 264 | 256 | 381 | 371 | 352 | 180 | 156 | | |
| 253 | 252 | 309 | 333 | 335 | 366 | 254 | 230 | | |
| 252 | 281 | 303 | 367 | 328 | 346 | 223 | 277 | | |
| 270 | 240 | 273 | 375 | | | 241 | 227 | | |
| 253 | 260 | 288 | 402 | | | 246 | 235 | | |
| 304 | 321 | 231 | 269 | | | 232 | 254 | | |
| 283 | 419 | 329 | 397 | | | 292 | 291 | | |
| 288 | 481 | 290 | 393 | | | 244 | 263 | | |
| 275 | 334 | 355 | 357 | | | 266 | 267 | | |
| 335 | 433 | 352 | 403 | | | 250 | 265 | | |
| 275 | 265 | 333 | 419 | | | 231 | 237 | | |
| 270 | 240 | 334 | 477 | | | 263 | 249 | | |
| 253 | 277 | 331 | 377 | | | 216 | 222 | | |
| 259 | 247 | 371 | 350 | | | | | | |
| 214 | 249 | 325 | 356 | | | | | | |
| 221 | 324 | 309 | 405 | | | | | | |
| 240 | 260 | 292 | 355 | | | | | | |
| | | 367 | 634 | | | | | | |
| | | 342 | 418 | | | | | | |
| | | 344 | 400 | | | | | | |
| | | 292 | 376 | | | | | | |
| | | 269 | 298 | | | | | | |
| | | 332 | 365 | | | | | | |
| | | 344 | 373 | | | | | | |
| | | 265 | 333 | | | | | | |
| | | 334 | 351 | | | | | | |
| **Average** | **270.6** | **384.0** | **311.1** | **371.5** | **318.8** | **345.9** | **238.8** | **244.4** | **307.6** | **320.2** |
| **Standard Deviation** | **36.7** | **356.7** | **33.2** | **63.3** | **34.1** | **19.9** | **29.5** | **33.1** | **35.7** | **32.3** |
| **No of Measurements** | **35** | **35** | **44** | **44** | **21** | **21** | **31** | **31** | **10** | **10** |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | **284.4** | **340.6** | **Average** | **363.2** |
| **Standard Deviation** | **45.6** | **194.8** | **Standard Deviation** | **54.4** |
| **No of Measurements** | **131** | **131** | **No of Measurements** | **65** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyos **Signature:** [signature] **Date:** 4-25-03

Download Station #: 1 Download File #: 77
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kyos **User ID** 1002986 **Signature:** [signature] **Date:** 4-25-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 95359

Survey Unit Description: Package A1200 Bldg 124 Room 142 Floor
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-12-03 Detector Calibration Due Date: 10-15-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR088917 | 43-68B | .235 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm !

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 243 | 2 240 | 3 263 | 4 N/A | 5 N/A | 6 N/A | 249 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .137

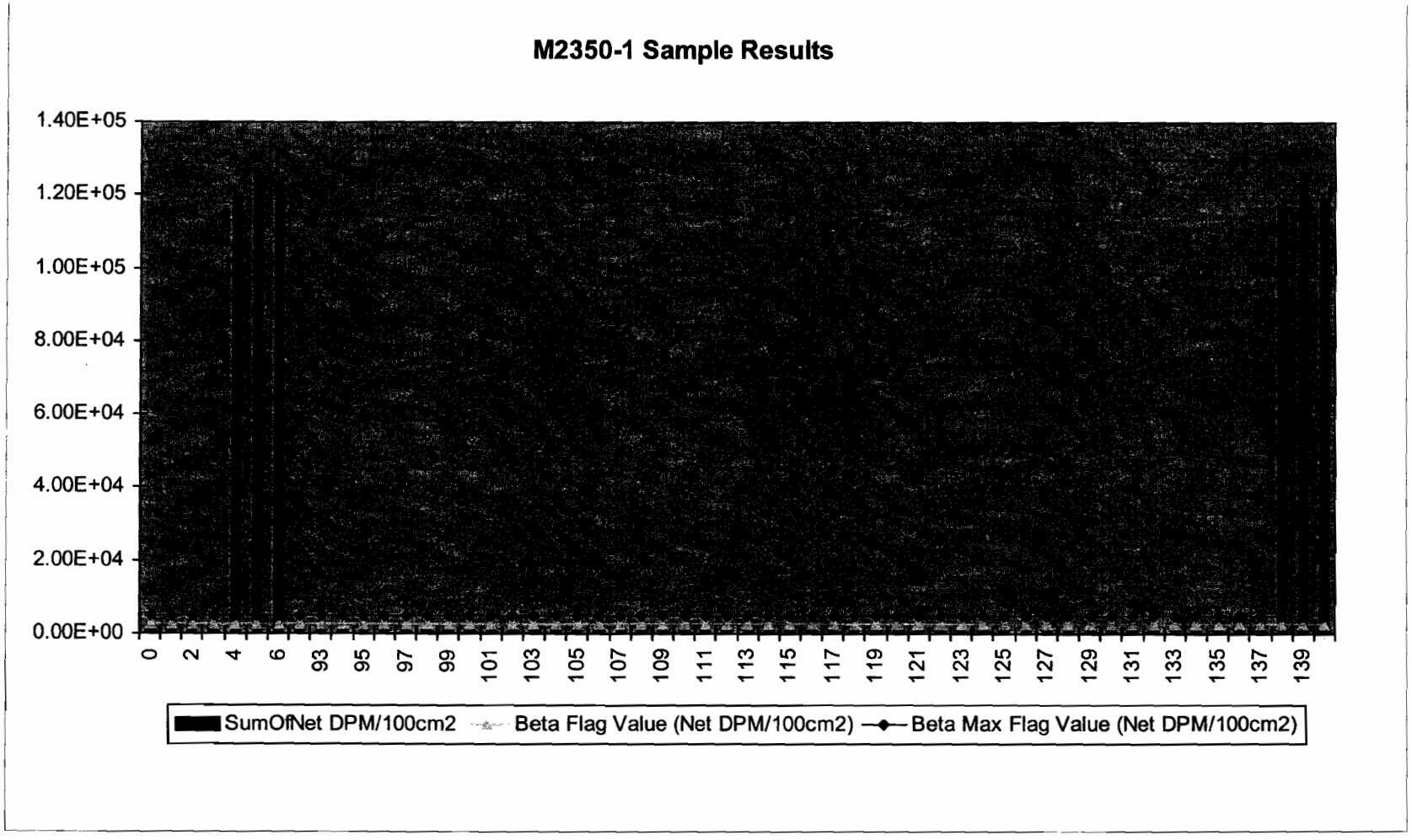
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000077 | Survey Description :Package A1200 B-124 Room 142 (Floor) | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 95359 | Instrument Cal. Due : 6/12/03 |
| Detector Model : 43-68B | Detector S/N : 088917 | Detector Cal. Due : 10/15/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.235 | Survey Date : 4/25/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* Paul L. Ely (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
93
95
97
99
101
103
105
107
109
111
113
115
117
119
121
123
125
127
129
131
133
135
137
139
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000077

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 3,256.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,100 |
| ZZZZZ | FD184 | 1 | 1,377.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 326 | 3,549 |
| ZZZZZ | FD184 | 2 | 1,351.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 326 | 3,462 |
| ZZZZZ | FD184 | 3 | 1,295.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 326 | 3,273 |
| ZZZZZ | 10002 | 4 | 35,903.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 326 | [redacted] |
| ZZZZZ | 10002 | 5 | 37,511.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 326 | [redacted] |
| ZZZZZ | 10002 | 6 | 36,190.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 326 | [redacted] |
| A1200 | ZZZZZ | 92 | 243.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 821 |
| A1200 | ZZZZZ | 93 | 240.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 811 |
| A1200 | ZZZZZ | 94 | 263.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 888 |
| A1200 | 01F01 | 95 | 358.0 | 60 | FLDCT | B0003 | ZZZZZ | 10 | 0.0001 | 1,209 |
| A1200 | 01F01 | 96 | 363.0 | 60 | FLDCT | B0003 | ZZZZZ | 9 | 0.0001 | 1,226 |
| A1200 | 01F01 | 97 | 334.0 | 60 | FLDCT | B0003 | ZZZZZ | 8 | 0.0001 | 1,128 |
| A1200 | 01F01 | 98 | 350.0 | 60 | FLDCT | B0003 | ZZZZZ | 7 | 0.0001 | 1,182 |
| A1200 | 01F01 | 99 | 414.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 0.0001 | 1,398 |
| A1200 | 01F01 | 100 | 363.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 1,226 |
| A1200 | 01F01 | 101 | 358.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,209 |
| A1200 | 01F01 | 102 | 359.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 1,212 |
| A1200 | 01F01 | 103 | 362.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 0.0001 | 1,223 |
| A1200 | 01F01 | 104 | 339.0 | 60 | FLDCT | B0003 | ZZZZZ | 18 | 0.0001 | 1,145 |
| A1200 | 01F01 | 105 | 379.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 1,280 |
| A1200 | 01F01 | 106 | 365.0 | 60 | FLDCT | B0003 | ZZZZZ | 16 | 0.0001 | 1,233 |
| A1200 | 01F01 | 107 | 353.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 1,192 |
| A1200 | 01F01 | 108 | 367.0 | 60 | FLDCT | B0003 | ZZZZZ | 14 | 0.0001 | 1,239 |
| A1200 | 01F01 | 109 | 364.0 | 60 | FLDCT | B0003 | ZZZZZ | 13 | 0.0001 | 1,229 |
| A1200 | 01F01 | 110 | 380.0 | 60 | FLDCT | B0003 | ZZZZZ | 19 | 0.0001 | 1,283 |
| A1200 | 01F01 | 111 | 330.0 | 60 | FLDCT | B0003 | ZZZZZ | 20 | 0.0001 | 1,114 |
| A1200 | 01F01 | 112 | 316.0 | 60 | FLDCT | B0003 | ZZZZZ | 21 | 0.0001 | 1,067 |
| A1200 | 01F01 | 113 | 326.0 | 60 | FLDCT | B0003 | ZZZZZ | 22 | 0.0001 | 1,101 |
| A1200 | 01F01 | 114 | 351.0 | 60 | FLDCT | B0003 | ZZZZZ | 23 | 0.0001 | 1,185 |
| A1200 | 01F01 | 115 | 378.0 | 60 | FLDCT | B0003 | ZZZZZ | 24 | 0.0001 | 1,277 |
| A1200 | 01F01 | 116 | 350.0 | 60 | FLDCT | B0003 | ZZZZZ | 30 | 0.0001 | 1,182 |
| A1200 | 01F01 | 117 | 355.0 | 60 | FLDCT | B0003 | ZZZZZ | 29 | 0.0001 | 1,199 |
| A1200 | 01F01 | 118 | 351.0 | 60 | FLDCT | B0003 | ZZZZZ | 28 | 0.0001 | 1,185 |
| A1200 | 01F01 | 119 | 326.0 | 60 | FLDCT | B0003 | ZZZZZ | 27 | 0.0001 | 1,101 |
| A1200 | 01F01 | 120 | 318.0 | 60 | FLDCT | B0003 | ZZZZZ | 26 | 0.0001 | 1,074 |
| A1200 | 01F01 | 121 | 337.0 | 60 | FLDCT | B0003 | ZZZZZ | 25 | 0.0001 | 1,138 |
| A1200 | 01F01 | 122 | 325.0 | 60 | FLDCT | B0003 | ZZZZZ | 31 | 0.0001 | 1,098 |
| A1200 | 01F01 | 123 | 325.0 | 60 | FLDCT | B0003 | ZZZZZ | 32 | 0.0001 | 1,098 |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| A1200 | 01F01 | 124 | 331.0 | 60 | FLDCT | B0003 | ZZZZZ | 33 | 0.0001 | 1,118 |
| A1200 | 01F01 | 125 | 349.0 | 60 | FLDCT | B0003 | ZZZZZ | 34 | 0.0001 | 1,179 |
| A1200 | 01F01 | 126 | 367.0 | 60 | FLDCT | B0003 | ZZZZZ | 35 | 0.0001 | 1,239 |
| A1200 | 01F01 | 127 | 361.0 | 60 | FLDCT | B0003 | ZZZZZ | 36 | 0.0001 | 1,219 |
| A1200 | 01F01 | 128 | 401.0 | 60 | FLDCT | B0003 | ZZZZZ | 42 | 0.0001 | 1,354 |
| A1200 | 01F01 | 129 | 365.0 | 60 | FLDCT | B0003 | ZZZZZ | 41 | 0.0001 | 1,233 |
| A1200 | 01F01 | 130 | 343.0 | 60 | FLDCT | B0003 | ZZZZZ | 40 | 0.0001 | 1,158 |
| A1200 | 01F01 | 131 | 326.0 | 60 | FLDCT | B0003 | ZZZZZ | 39 | 0.0001 | 1,101 |
| A1200 | 01F01 | 132 | 279.0 | 60 | FLDCT | B9999 | ZZZZZ | 38 | 0.0001 | 942 |
| A1200 | 01S01 | 133 | 404.0 | 60 | FLDCT | B0003 | ZZZZZ | 37 | 0.0001 | 1,364 |
| ZZZZZ | ZZZZZ | 134 | 2,788.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 942 |
| ZZZZZ | FD184 | 135 | 1,293.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 279 | 3,425 |
| ZZZZZ | FD184 | 136 | 1,274.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 279 | 3,360 |
| ZZZZZ | FD184 | 137 | 1,231.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 279 | 3,215 |
| ZZZZZ | 10002 | 138 | 34,598.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 279 | [redacted] |
| ZZZZZ | 10002 | 139 | 37,494.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 279 | [redacted] |
| ZZZZZ | 10002 | 140 | 35,562.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 279 | [redacted] |

| | | |
|---|---|---|
| *Beta Flag* | 2500 | - _____ |
| *Beta Max Flag* | 5000 | [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1200

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by D.R. Kjos (Print) Signature DRK/BSK Date 4-25-03 Time 1530

Counted by BS Kjos (Print) Signature BS Kjos Date 4-28-03 Time 0742

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 108 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 4 | 42 | 0 | <MDA |
| 15 | 39 | 0 | |
| 22 | 38 | 0 | |
| 34 | 58 | 4 | |
| 39 | 65 | 11 | <MDA |
| | | N/A | |

| Circle: | MDA = 12.5 dpm/100cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 4 | 1 | .85 | <MDA |
| 15 | 1 | .85 | |
| 22 | 0 | 0 | |
| 34 | 0 | 0 | |
| 39 | 0 | 0 | <MDA |
| | | N/A | |

Remarks-

Signature- BS Kjos Reviewed by- Paul C Ely 4/29/03

of

Duratek, Inc.
Survey Package Worksheet for Package A1300
Bristol-Myers Squibb Building 124 Room 143 Floor

| | |
|---|---|
| Package Identification No.: A1300 | Prepared by: Paul C. Ely |
| Location: Building 124 Room 143 Floor | Date prepared: 4/23/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 comprising the floor in Room 143.

## Historical Information

Room 143 is the maintenance room where maintenance on manipulators was performed. All radionuclides used in the caves had the potential to be present. All radionuclides used in the caves had the potential to be present.

All wall and ceiling areas had contamination levels <5,000 dpm/100 $cm^2$. Some spots on floors had contamination levels >5,000 dpm/100 $cm^2$ prior to decontamination.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of floor surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears in survey unit at five unspecified survey locations. |

**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| **Bristol Myers Squibb Building 124 Room 143 Floor** | | | | | | | | | | | | |
| A1300 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | DS 7-18-03 | 7-25-03 | N/A | N/A | ASK NA 7-28-03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: 4/29/03 |
| Package Reviewed by and Date: Paul C Ely 4/29/03 |

| Survey Comments |
| --- |
| |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A1300**
**Room 143 Floors**

| | | | |
|---|---|---|---|
| **X (Max):** | 14.2 | meters | |
| **Y (Max):** | 3.4 | meters | |
| **A (Area):** | 48.28 | $m^2$ | |
| **Actual Survey Area:** | 48 | $m^2$ | |
| **COMPASS Survey Points:** | 18 | 1% | percent void area |
| **N (Points):** | 32 | 18 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 1.3 | meters | (distance between measurement points) |

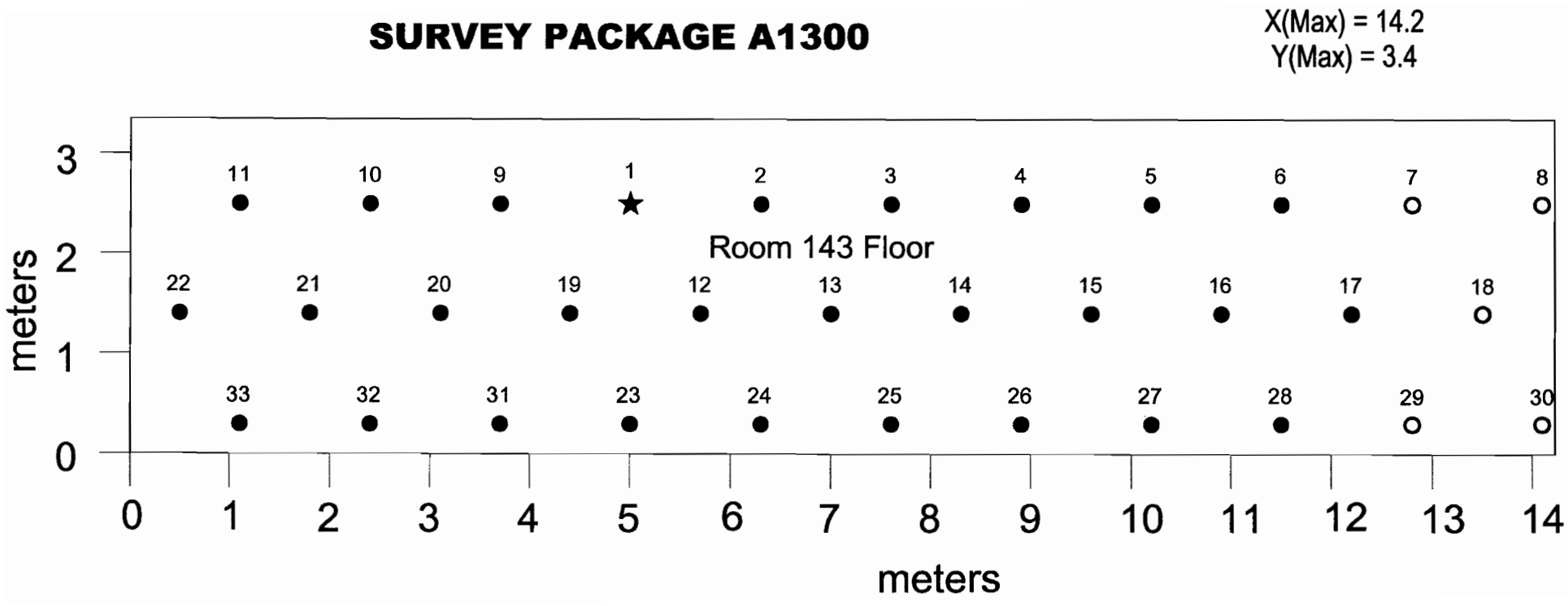
$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.1 | meters | (distance between rows) |
| **L/2=** | 0.7 | meters | (row offset value) |
| **X (Random):** | 2.6 | | random number generator |
| **Y (Random):** | 0.9 | | random number generator |
| **X (Origin):** | 5 | | initially generated random number |
| **Y (Origin):** | 2.5 | | initially generated random number |
| **Number of rows:** | 3 | | |
| **Number of columns:** | 11 | | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 5.0 | 2.5 | 3 |
| 2 | 6.3 | 2.5 | |
| 3 | 7.6 | 2.5 | |
| 4 | 8.9 | 2.5 | |
| 5 | 10.2 | 2.5 | |
| 6 | 11.5 | 2.5 | |
| 7 | 12.8 | 2.5 | |
| 8 | 14.1 | 2.5 | |
| 9 | 3.7 | 2.5 | |
| 10 | 2.4 | 2.5 | |
| 11 | 1.1 | 2.5 | |
| 12 | 5.7 | 1.4 | 2 |
| 13 | 7.0 | 1.4 | |
| 14 | 8.3 | 1.4 | |
| 15 | 9.6 | 1.4 | |
| 16 | 10.9 | 1.4 | |
| 17 | 12.2 | 1.4 | |
| 18 | 13.5 | 1.4 | |
| 19 | 4.4 | 1.4 | |
| 20 | 3.1 | 1.4 | |
| 21 | 1.8 | 1.4 | |
| 22 | 0.5 | 1.4 | |
| 23 | 5.0 | 0.3 | 1 |
| 24 | 6.3 | 0.3 | |
| 25 | 7.6 | 0.3 | |
| 26 | 8.9 | 0.3 | |
| 27 | 10.2 | 0.3 | |
| 28 | 11.5 | 0.3 | |
| 29 | 12.8 | 0.3 | |
| 30 | 14.1 | 0.3 | |
| 31 | 3.7 | 0.3 | |
| 32 | 2.4 | 0.3 | |
| 33 | 1.1 | 0.3 | |

**LBGR Determination**

| | | |
|---|---|---|
| $\sigma$ = | 358.6 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 3.0 | **2.99** |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | **3** |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **537** | **cpm** |

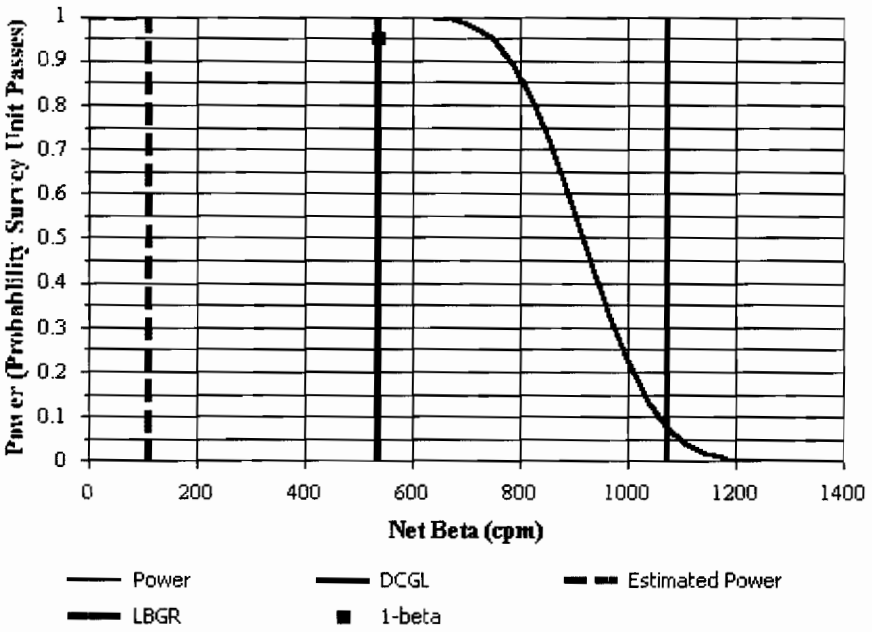

SURVEY PACKAGE A1300
X(Max) = 14.2
Y(Max) = 3.4
Room 143 Floor
11
10
9
1
2
3
4
5
6
7
8
22
21
20
19
12
13
14
15
16
17
18
33
32
31
23
24
25
26
27
28
29
30
meters
0
1
2
3
meters
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1300 | | |
| Comments: | B-124 Room 143 Floor | | |
| Area (m²): | 52 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 358.6 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 18 |
| LBGR (cpm): | 537 | Estimated Conc. (cpm): | 113 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 18 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 384 ± 357 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 35 | 270.6 | 36.7 | 526 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0700**
**B-124 South-central Lab Areas (Rooms 142-145, 154, 156 – 160, 162A, 163, 163B, 163C, 164, 165, 167, 168, & 170).**
FSS Packages:A1200, A1300, B0200, B0400, B0500, B0600,B0700, B0800

| Floor | | Wall | | Ceiling | | Structure | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|---|
| Background | Gross | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| 277 | 315 | 322 | 374 | 288 | 366 | 279 | 252 | 232 | 272 |
| 265 | 275 | 305 | 403 | 393 | 358 | 299 | 293 | 267 | 259 |
| 228 | 302 | 325 | 389 | 304 | 382 | 243 | 260 | 321 | 335 |
| 273 | 302 | 338 | 336 | 322 | 364 | 276 | 243 | 307 | 332 |
| 257 | 269 | 320 | 331 | 283 | 350 | 274 | 259 | 334 | 309 |
| 283 | 478 | 310 | 409 | 297 | 300 | 246 | 276 | 305 | 335 |
| 253 | 258 | 269 | 382 | 303 | 312 | 195 | 317 | 307 | 346 |
| 286 | 393 | 358 | 520 | 303 | 343 | 222 | 220 | 311 | 317 |
| 329 | 387 | 289 | 323 | 324 | 355 | 205 | 189 | 357 | 361 |
| 301 | 1,261 | 258 | 266 | 333 | 337 | 191 | 213 | 335 | 336 |
| 395 | 2,169 | 274 | 283 | 260 | 350 | 238 | 252 | | |
| 259 | 350 | 258 | 281 | 249 | 322 | 235 | 224 | | |
| 243 | 267 | 325 | 335 | 331 | 354 | 225 | 263 | | |
| 327 | 285 | 311 | 337 | 319 | 318 | 261 | 252 | | |
| 280 | 276 | 333 | 354 | 326 | 339 | 231 | 244 | | |
| 271 | 242 | 323 | 379 | 339 | 343 | 227 | 224 | | |
| 241 | 245 | 321 | 337 | 323 | 343 | 229 | 243 | | |
| 206 | 218 | 279 | 342 | 364 | 364 | 188 | 180 | | |
| 253 | 264 | 256 | 381 | 371 | 352 | 180 | 156 | | |
| 253 | 252 | 309 | 333 | 335 | 366 | 254 | 230 | | |
| 252 | 281 | 303 | 367 | 328 | 346 | 223 | 277 | | |
| 270 | 240 | 273 | 375 | | | 241 | 227 | | |
| 253 | 260 | 288 | 402 | | | 246 | 235 | | |
| 304 | 321 | 231 | 269 | | | 232 | 254 | | |
| 283 | 419 | 329 | 397 | | | 292 | 291 | | |
| 288 | 481 | 290 | 393 | | | 244 | 263 | | |
| 275 | 334 | 355 | 357 | | | 266 | 267 | | |
| 335 | 433 | 352 | 403 | | | 250 | 265 | | |
| 275 | 265 | 333 | 419 | | | 231 | 237 | | |
| 270 | 240 | 334 | 477 | | | 263 | 249 | | |
| 253 | 277 | 331 | 377 | | | 216 | 222 | | |
| 259 | 247 | 371 | 350 | | | | | | |
| 214 | 249 | 325 | 356 | | | | | | |
| 221 | 324 | 309 | 405 | | | | | | |
| 240 | 260 | 292 | 355 | | | | | | |
| | | 367 | 634 | | | | | | |
| | | 342 | 418 | | | | | | |
| | | 344 | 400 | | | | | | |
| | | 292 | 376 | | | | | | |
| | | 269 | 298 | | | | | | |
| | | 332 | 365 | | | | | | |
| | | 344 | 373 | | | | | | |
| | | 265 | 333 | | | | | | |
| | | 334 | 351 | | | | | | |
| **Average** | 270.6 | 384.0 | 311.1 | 371.5 | 318.8 | 345.9 | 238.8 | 244.4 | 307.6 | 320.2 |
| **Standard Deviation** | 36.7 | 356.7 | 33.2 | 63.3 | 34.1 | 19.9 | 29.5 | 33.1 | 35.7 | 32.3 |
| **No of Measurements** | 35 | 35 | 44 | 44 | 21 | 21 | 31 | 31 | 10 | 10 |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | 284.4 | 340.6 | **Average** | 363.2 |
| **Standard Deviation** | 45.6 | 194.8 | **Standard Deviation** | 54.4 |
| **No of Measurements** | 131 | 131 | **No of Measurements** | 65 |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kios **Signature:** [signature] **Date:** 4-26-03

Download Station #: 1 Download File #: 82
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Betty S. Kios **User ID** BSK0490 **Signature:** [signature] **Date:** 4-25-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: A1300, Bldg. 124, Room 143
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ■ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☑ Beta β | 092524 | 43-68B | .224 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 278 | 2 282 | 3 246 | 4 n/a | 5 n/a | 6 n/a | 269 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .139 (97-127)
PRBBK - 281 PTBBK - 278

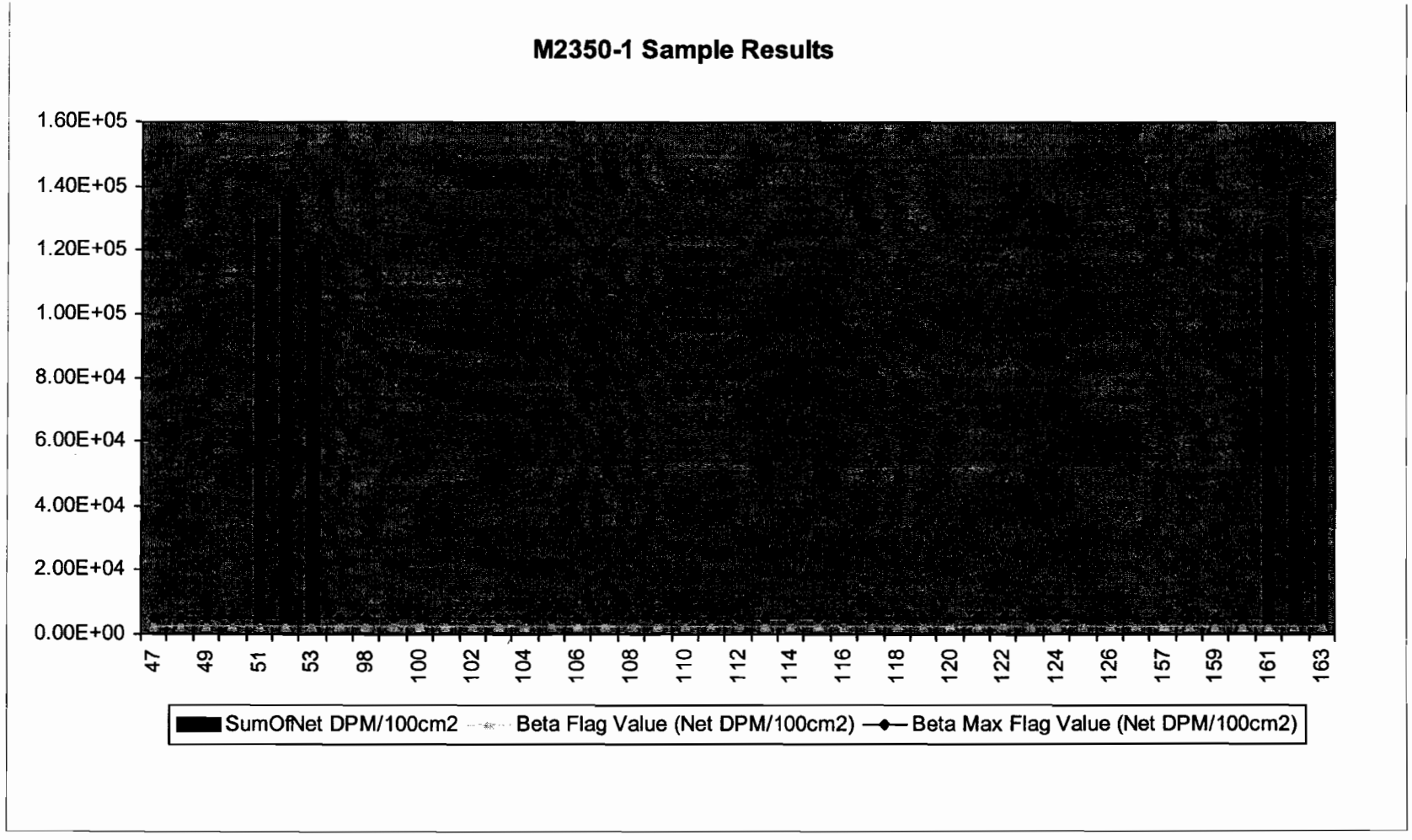
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000082 | Survey Description :Package A1300, B-124, Room 143 | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.224 | Survey Date : 4/25/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSKj | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* PAUL E. ELY (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.60E+05
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
47
49
51
53
98
100
102
104
106
108
110
112
114
116
118
120
122
124
126
157
159
161
163
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000082

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 47 | 2,811.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 996 |
| ZZZZZ | 19655 | 48 | 1,210.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,292 |
| ZZZZZ | 19655 | 49 | 1,257.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,458 |
| ZZZZZ | 19655 | 50 | 1,190.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | 3,221 |
| ZZZZZ | 10002 | 51 | 36,864.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |
| ZZZZZ | 10002 | 52 | 38,458.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |
| ZZZZZ | 10002 | 53 | 33,802.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 281 | [redacted] |
| A1300 | ZZZZZ | 97 | 278.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 985 |
| A1300 | ZZZZZ | 98 | 282.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 999 |
| A1300 | ZZZZZ | 99 | 246.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 872 |
| A1300 | 01F01 | 100 | 373.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 0.0001 | 1,322 |
| A1300 | 01F01 | 101 | 361.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 1,279 |
| A1300 | 01F01 | 102 | 364.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,290 |
| A1300 | 01F01 | 103 | 355.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 1,258 |
| A1300 | 01F01 | 104 | 348.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 0.0001 | 1,233 |
| A1300 | 01F01 | 105 | 358.0 | 60 | FLDCT | B0003 | ZZZZZ | 6 | 0.0001 | 1,268 |
| A1300 | 01F01 | 106 | 325.0 | 60 | FLDCT | B0003 | ZZZZZ | 9 | 0.0001 | 1,152 |
| A1300 | 01F01 | 107 | 321.0 | 60 | FLDCT | B0003 | ZZZZZ | 10 | 0.0001 | 1,137 |
| A1300 | 01F01 | 108 | 318.0 | 60 | FLDCT | B0003 | ZZZZZ | 11 | 0.0001 | 1,127 |
| A1300 | 01F01 | 109 | 354.0 | 60 | FLDCT | B0003 | ZZZZZ | 12 | 0.0001 | 1,254 |
| A1300 | 01F01 | 110 | 367.0 | 60 | FLDCT | B0003 | ZZZZZ | 13 | 0.0001 | 1,300 |
| A1300 | 01F01 | 111 | 364.0 | 60 | FLDCT | B0003 | ZZZZZ | 14 | 0.0001 | 1,290 |
| A1300 | 01F01 | 112 | 350.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 1,240 |
| A1300 | 01F01 | 113 | 329.0 | 60 | FLDCT | B0003 | ZZZZZ | 16 | 0.0001 | 1,166 |
| A1300 | 01F01 | 114 | 393.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 1,392 |
| A1300 | 01F01 | 115 | 351.0 | 60 | FLDCT | B0003 | ZZZZZ | 19 | 0.0001 | 1,244 |
| A1300 | 01F01 | 116 | 359.0 | 60 | FLDCT | B0003 | ZZZZZ | 20 | 0.0001 | 1,272 |
| A1300 | 01F01 | 117 | 389.0 | 60 | FLDCT | B0003 | ZZZZZ | 21 | 0.0001 | 1,378 |
| A1300 | 01F01 | 118 | 355.0 | 60 | FLDCT | B0003 | ZZZZZ | 22 | 0.0001 | 1,258 |
| A1300 | 01F01 | 119 | 361.0 | 60 | FLDCT | B0003 | ZZZZZ | 24 | 0.0001 | 1,279 |
| A1300 | 01F01 | 120 | 385.0 | 60 | FLDCT | B0003 | ZZZZZ | 25 | 0.0001 | 1,364 |
| A1300 | 01F01 | 121 | 335.0 | 60 | FLDCT | B0003 | ZZZZZ | 26 | 0.0001 | 1,187 |
| A1300 | 01F01 | 122 | 315.0 | 60 | FLDCT | B0003 | ZZZZZ | 27 | 0.0001 | 1,116 |
| A1300 | 01F01 | 123 | 375.0 | 60 | FLDCT | B0003 | ZZZZZ | 28 | 0.0001 | 1,329 |
| A1300 | 01F01 | 124 | 353.0 | 60 | FLDCT | B0003 | ZZZZZ | 31 | 0.0001 | 1,251 |
| A1300 | 01F01 | 125 | 369.0 | 60 | FLDCT | B0003 | ZZZZZ | 32 | 0.0001 | 1,307 |
| A1300 | 01F01 | 126 | 361.0 | 60 | FLDCT | B0003 | ZZZZZ | 33 | 0.0001 | 1,279 |
| A1300 | 01F01 | 127 | 292.0 | 60 | FLDCT | B0020 | ZZZZZ | 23 | 0.0001 | 1,035 |
| ZZZZZ | ZZZZZ | 157 | 2,780.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 985 |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | 19655 | 158 | 1,211.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | 3,306 |
| ZZZZZ | 19655 | 159 | 1,248.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | 3,437 |
| ZZZZZ | 19655 | 160 | 1,238.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | 3,401 |
| ZZZZZ | 10002 | 161 | 36,268.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | [redacted] |
| ZZZZZ | 10002 | 162 | 39,095.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | [redacted] |
| ZZZZZ | 10002 | 163 | 34,387.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 278 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

Survey #- A1300

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by Betty S. Kjos (Print) Signature BS Kjos Date 4-28-03 Time 1540

Counted by Betty S. Kjos (Print) Signature BS Kjos Date 4-29-03 Time 0710

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 51 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 105 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 55 | 4 | <MDA |
| 11 | 54 | 3 | |
| 14 | 60 | 9 | |
| 21 | 56 | 5 | |
| 31 | 44 | 0 | <MDA |
| | | N/A | |

| Circle: | MDA = 14 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | <MDA |
| 11 | 0 | 0 | |
| 14 | 2 | 1.70 | |
| 21 | 1 | .70 | |
| 31 | 1 | .70 | <MDA |
| | | N/A | |

Remarks-

Signature- BS Kjos Reviewed by- Paul C Ely 4/29/03

Duratek Inc.
Survey Package Worksheet for Package A1400
Bristol-Myers Squibb Valve Pit Building 124

| | |
|---|---|
| Package Identification No.: A1400 | Prepared by: Douglas R. Kjos |
| Location: Building 124 Valve Pit | Date prepared: 10/2/2002 |
| Area Classification: Class 1 | |

## Area Description

The survey is for the Valve Pit in the Building 124 south yard.

## Historical Information

There is no history of spills to the soil around the Building 124 buried tank area. The Building 124 tanks did have leaks into the tank vault when the inlet pipe to one of the tanks broke. The wastewater was cleaned up and sent to another waste tank. The vault completely surrounds the tanks and contained all spilled liquids. The vault is not totally water tight however as there is in leakage from groundwater that is removed via a sump and sump pump. The characterization report indicates that the soils up to 20 feet deep around the tank vault were not contaminated. However, sediment sample results >DCGL were obtained during the characterization survey. The sediment samples were obtained from the valve pit floor.

## General Survey Instructions

The COMPASS program was utilized to generate a minimum sample requirement for this area, 13 samples (see attached). 13 random sample locations in the vault area were determined and laid out as indicated on the attached survey map.
(Class 1):

1) Perform a minimum of 100% scan of accessible surfaces. Denote on map location of all readings.
2) Obtain 1 smear at each measurement location for gross alpha/beta analysis.

Use only the Package ID, L2, L7 and L8 codes when labeling smears for counting.

Use all location codes provided below when taken fixed beta readings.

**Survey Package Completion.**

1. Note any problems, comments, or other information pertinent to the data or sample collection under the "FIELD NOTES" section.

Use all location codes provided below when taking measurements.

## Survey Package: A1400 continued

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements. Source check meters to Th-230 for alpha measurements. Source Check meters to Cs-137 for gamma.<br><br>Use gas flow proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>The direct alpha and beta measurements and smears should be taken equidistant (where possible) and at the same measurement locations throughout the survey area.<br><br>Perform a minimum of three 1 minute field backgrounds (prior to taking field readings ) |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | Gamma Scan | Direct Gamma | Smear Gross ∀/∃ |
| L1 | L2 | L6 | L7 | L8 | | | | | | | |
| Pittsburgh Instrument Shop Office and Reception Area Floors | | | | | | | | | | | |
| A1400 | 01F01 | ZZZZZ | ZZZZZ | 1-5 | Floor Valve Pit | 100% CCm/10-7-02 | 5 | 10% CCm/10-07-02 | 100% CCm/10-7-02 | 5 CCm/10-7-02 | 5 CCm/10-7-02 |
| A1400 north wall | 01W01 | ZZZZZ | ZZZZZ | 1-2 | Wall 1 Valve Pit | 100% CCm/10-7-02 | 2 | 10% CCm/10-07-02 | N/A | N/A | 2 CCm/10-7-02 |
| A1400 east wall | 01W02 | ZZZZZ | ZZZZZ | 1-2 | Wall 2 Valve Pit | 100% CCm/10-7-02 | 2 | 10% CCm/10-07-02 | N/A | N/A | 2 CCm/10-7-02 |
| A1400 south wall | 01W03 | ZZZZZ | ZZZZZ | 1-2 | Wall 3 Valve Pit | 100% CCm/10-7-02 | 2 | 10% CCm/10-07-02 | N/A | N/A | 2 CCm/10-7-02 |
| A1400 west wall | 01W04 | ZZZZZ | ZZZZZ | 1-2 | Wall 4 Valve Pit | 100% CCm/10-7-02 | 2 | 10% CCm/10-07-02 | N/A | N/A | 2 CCm/10-7-02 |
| | | | | | | | | | | | |
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| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | Gamma Scan | Direct Gamma | Smear Gross ∀/∃ |
| L1 | L2 | L6 | L7 | L8 | | | | | | | |
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| Survey Comments |
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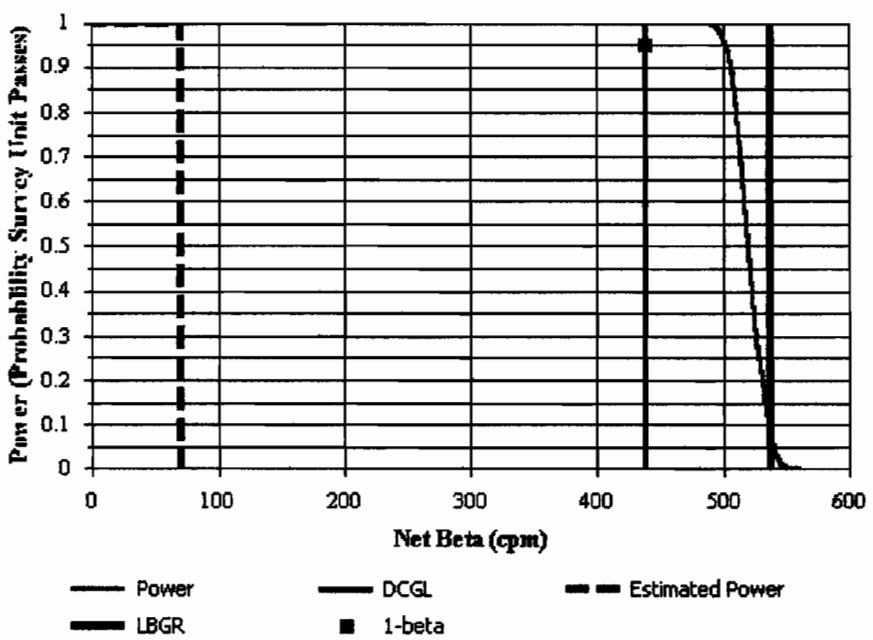
# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | Bristol-Meyers Squibb Decommissioning | | |
| Planner(s): | William R. Hoey | | |
| Survey Unit Name: | BMS B-124 Tank Valve Pit<br>Package No. A1408 | | |
| Comments: | | | |
| Area ($m^2$): | 50 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 32.5 |
| DCGL (cpm): | 537 | Sample Size (N): | 13 |
| LBGR (cpm): | 439 | Estimated Conc. (cpm): | 70.8 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 13 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.06 |
| Gross Beta DCGLw (cpm): | 537 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 & Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.24 | 0.25 | 0.0588 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 368 ± 23 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 13 | 297.2 | 23 | 1,100 |

**SURVEY PACKAGE A1400**
**B-124 VALVE PIT**

**Compass Inputs For MDC Scan Determination**

| Compass Input Request | Input Value |
|---|---|
| *Select True Positive Proportion:* | 0.95 |
| *Select False Positive Proportion* | 0.60 |
| *Observation Interval (sec)* | 2 |
| *Surveyor Efficiency:* | 0.5 |

See MARSSIM 6.7.2.1.

---

**LBGR Determination**

Per MARSSIM, section 8.3.3, if the estimated standard deviation, $\sigma$, is much smaller that the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, $\Delta/\sigma$, is about 3.

Given:

$\Delta/\sigma = (DCGL_W - LBGR)/\sigma = 3$

$\sigma = 32.5$ cpm

$DCGL_W = 537$ cpm (Calculated by COMPASS)

Then:

$LBGR = DCGL_W - 3\sigma$

$= 537 - (3 * 32.5)$

$= 439$ cpm

**SURVEY PACKAGE A1400**
**B-124 VALVE PIT**

**Valve Pit Dimensions & Surface Area Calculation**

Conversion Factor: 1 $ft^2$ = 9.29E-2 $m^2$

North & South Walls:

7' 2.5" H
9' 0" W

A = [7 + 2.5/12] * 9 * 2 * 9.29E-2

= 12 $m^2$

East & West Walls

Note: The east wall has a 3' 3" x 3' 2.5" rectangular opening in it at floor level. The north edge of the opening is 5' 8" south of the north wall.

7' 2.5" H
18' 1" W

A = {[7 + 2.5/12] * [18 + 1/12] * 2} – [3 + 3/12] * [3 + 2.5/12]} * 9.29E-2

= 23 $m^2$

Floor

18' 1" L
9' 0" W

A = [18 + 1/12] * 9 * 9.29E-2

= 15 $m^2$

TOTAL SURFACE AREA

A = 12 + 23 + 15

= 50 $m^2$

# SURVEY PACKAGE A1400
# B-124 VALVE PIT

This table lists the results of the random numbers generated to provide the coordinates for the fixed survey points on the concrete floor and walls as part of the unconditional release survey performed for the B-124 Valve Pit concrete, **Survey Package No. A1400**.

The reference point, 0, 0, for the floor is the southwest corner. The reference point for each wall is the lower left-hand corner as you stand facing the wall.

The COMPASS run for this survey package requires 13 different measurement points. In order to ensure an appropriate number of measurements are taken on the floor and at least two measurements are taken on each wall and at least one of those measurements is on the lower half of each wall, random coordinates were generated for each of the 5 surfaces. Two sets of coordinates were generated for each wall in such a manner the forced one set to be in the lower half of the wall. The other set of coordinates could be anywhere on the wall. Five sets of coordinates were generated for the floor with no bias to any area. The coordinates for the east were generated such that they didn't fall in the 3'x3' opening in the wall.
Below is given the results of using the random number function of Excel to generate each set of coordinates. The actual coordinates to be used are the whole number presented and represent the distance in feet along each axis from the reference point.

| North Wall | | East Wall | | Floor | |
|---|---|---|---|---|---|
| x | y | x | y | x | y |
| 0 | 5 | 1 | 3 | 5 | 5 |
| 7 | 0 | 9 | 2 | 1 | 12 |
| | | | | 4 | 13 |
| South Wall | | West Wall | | 1 | 3 |
| x | y | x | y | 7 | 13 |
| 2 | 6 | 3 | 0 | | |
| 8 | 0 | 17 | 2 | | |

**SURVEY PACKAGE A1400**
**B-124 VALVE PIT**

North Wall

| | x | y |
|---|---|---|
| 1. | 0 | 5 |
| 2. | 7 | 0 |

East Wall

| | x | y |
|---|---|---|
| 1. | 1 | 3 |
| 2. | 9 | 2 |

Floor

| | x | y |
|---|---|---|
| 1. | 5 | 5 |
| 2. | 1 | 12 |
| 3. | 4 | 13 |
| 4. | 1 | 3 |
| 5. | 7 | 13 |

South Wall

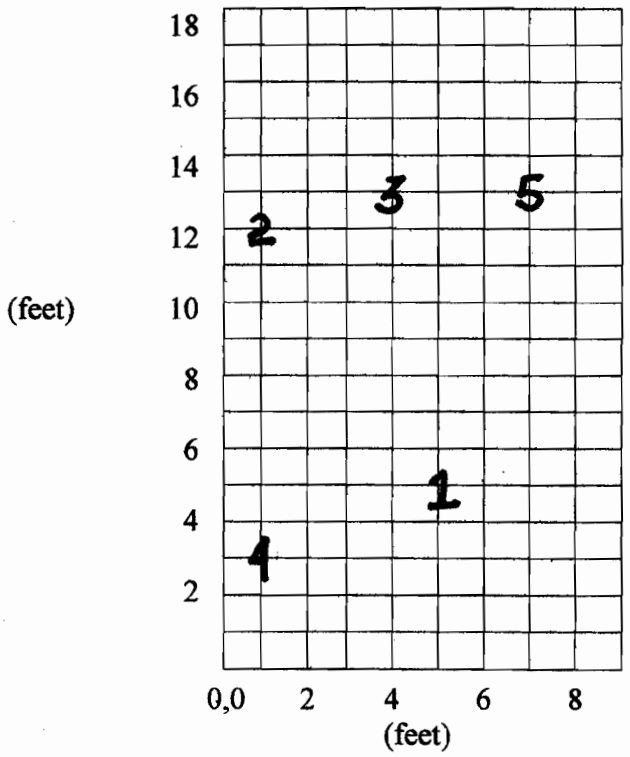
| | x | y |
|---|---|---|
| 1. | 2 | 6 |
| 2. | 8 | 0 |

West Wall

| | x | y |
|---|---|---|
| 1. | 3 | 0 |
| 2. | 17 | 2 |

FLOOR North

↑



**SURVEY PACKAGE A1400**
**B-124 VALVE PIT**

North Wall

| | x | Y |
|---|---|---|
| 1. | 0 | 5 |
| 2. | 7 | 0 |

East Wall

| | x | y |
|---|---|---|
| 1. | 1 | 3 |
| 2. | 9 | 2 |

Floor

| | x | y |
|---|---|---|
| 1. | 5 | 5 |
| 2. | 1 | 12 |
| 3. | 4 | 13 |
| 4. | 1 | 3 |
| 5. | 7 | 13 |

South Wall

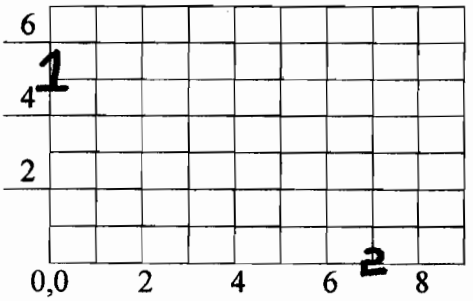
| | x | Y |
|---|---|---|
| 1. | 2 | 6 |
| 2. | 8 | 0 |

West Wall

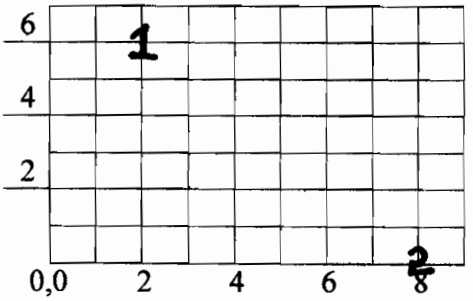
| | x | y |
|---|---|---|
| 1. | 3 | 0 |
| 2. | 17 | 2 |

Coordinates are distance in feet along the respective axis.

North Wall




South Wall



**SURVEY PACKAGE A1400**
**B-124 VALVE PIT**

North Wall

| | x | Y |
|---|---|---|
| 1. | 0 | 5 |
| 2. | 7 | 0 |

East Wall

| | x | y |
|---|---|---|
| 1. | 1 | 3 |
| 2. | 9 | 2 |

Floor

| | x | y |
|---|---|---|
| 1. | 5 | 5 |
| 2. | 1 | 12 |
| 3. | 4 | 13 |
| 4. | 1 | 3 |
| 5. | 7 | 13 |

South Wall

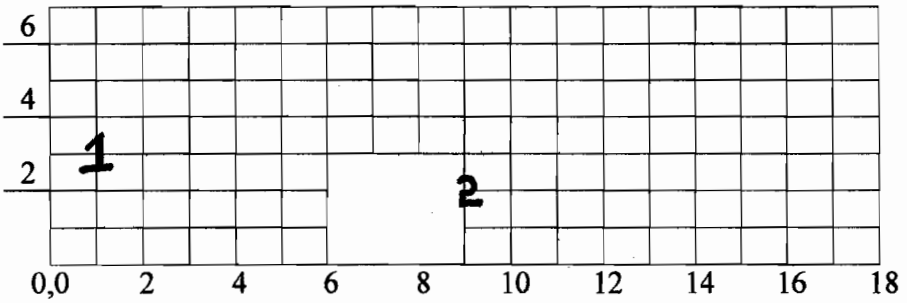
| | x | Y |
|---|---|---|
| 1. | 2 | 6 |
| 2. | 8 | 0 |

West Wall

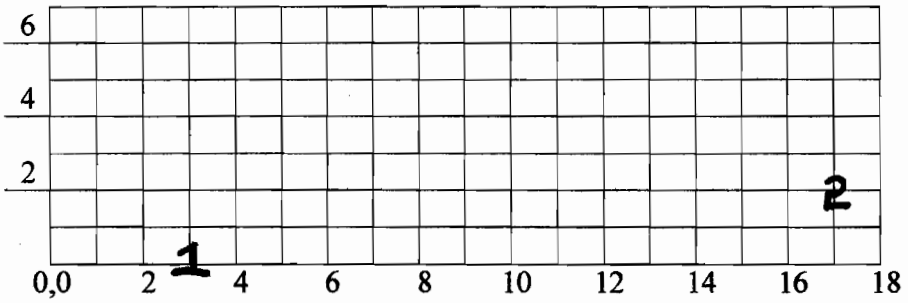
| | x | y |
|---|---|---|
| 1. | 3 | 0 |
| 2. | 17 | 2 |

Coordinates are distance in feet along the respective axis.

East Wall




West Wall



ATTACHMENT 6.14
SURVEY DOWNLOAD DATA SHEET

**Download Technician: Print Name:** Douglas R Kyes **Signature:** [signature] **Date:** 10-7-02

Download Station #: 1 Download File #: 3
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** VC Miles **User ID** VM6298 **Signature:** [signature] **Date:** 10-07-02

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: Package # A1400
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 02-15-03 Detector Calibration Due Date: 02-13-03

Type Of Survey: ☑ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☐ Beta β | | 43-68B | | | | |
| ☑ Alpha α | 092524 | 43-68A | .190 | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm !

| | 1 | 2 | 3 | 4 | 5 | 6 | |
|---|---|---|---|---|---|---|---|
| β Beta | | | | | | | |
| α Alpha | 1 6/1.2 | 2 1/.2 | 3 6/1.2 | 4 N/A | 5 N/A | 6 N/A | 4.3/.9 |

COMMENTS: Delete Samples 0-3, 16-74 ≒ Packages B0100 + D0100 ✓
Change Sample # 71 to PTGBK (LS Code)
Change Sample # 0 to PRGBK (LS Code)

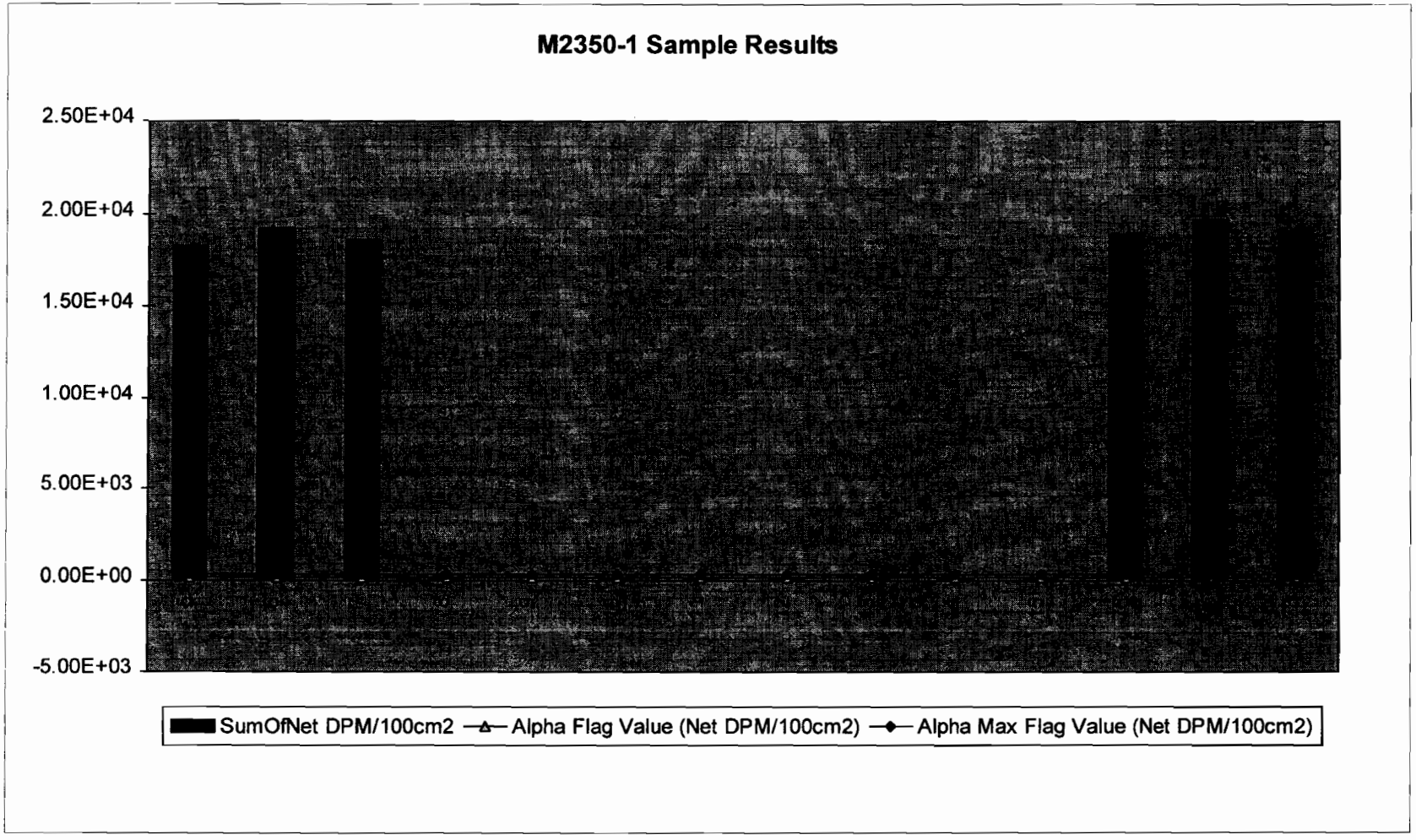
**M2350-1 Download ALPHA Report**

| | | |
|---|---|---|
| File Name : 00000003 | Survey Description :Package A1400 (Valve Pit) | |
| Survey Reason : Termination | | |
| User ID : VCM6298 | Technician Name : Vicki Miles | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 2/15/03 |
| Detector Model : 43-68A | Detector S/N : 092524 | Detector Cal. Due : 2/12/03 |
| Measurement Type : ALPHA | Detector Type : 01200 : 126 cm2 Gas Proportional Detector, Alpha Window | |
| Detector Area : 100 | Efficiency : 0.19 | Survey Date : 10/7/02 |

| Print Name | Signature | Date |
|---|---|---|
| Vicki Miles | VMiles | 10/8/02 |
| | | |

**Comments:**

*Sign-Off* Paul C. Ely (Print Name) Paul C Ely (Signature) 1/23/03 (Date)


M2350-1 Sample Results
2.50E+04
2.00E+04
1.50E+04
1.00E+04
5.00E+03
0.00E+00
-5.00E+03
SumOfNet DPM/100cm2
Alpha Flag Value (Net DPM/100cm2)
Alpha Max Flag Value (Net DPM/100cm2)

# *Duratek Alpha Survey Report*

***Download File Name:*** 00000003

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type (L5)* | *Material Type (L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd* | *Net DPM/100cm2* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 4 | 11.0 | 600 | PRABK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | FS627 | 5 | 3,473.0 | 60 | PRA00 | ZZZZZ | ZZZZZ | 0 | 1.1 | [redacted] |
| ZZZZZ | FS627 | 6 | 3,657.0 | 60 | PRA00 | ZZZZZ | ZZZZZ | 0 | 1.1 | [redacted] |
| ZZZZZ | FS627 | 7 | 3,544.0 | 60 | PRA00 | ZZZZZ | ZZZZZ | 0 | 1.1 | [redacted] |
| A1400 | ZZZZZ | 8 | 6.0 | 300 | FLDBK | B0003 | ZZZZZ | 1 | 1.2 | 0 |
| A1400 | ZZZZZ | 9 | 1.0 | 300 | FLDBK | B0003 | ZZZZZ | 2 | 0.2 | 0 |
| A1400 | ZZZZZ | 10 | 6.0 | 300 | FLDBK | B0003 | ZZZZZ | 3 | 1.2 | 0 |
| A1400 | 01F01 | 11 | 7.0 | 120 | FLDCT | B0003 | ZZZZZ | 3 | 0.9 | 14 |
| A1400 | 01W01 | 12 | 11.0 | 120 | FLDCT | B0003 | ZZZZZ | 1 | 0.9 | 24 |
| A1400 | 01W02 | 13 | 3.0 | 120 | FLDCT | B0003 | ZZZZZ | 1 | 0.9 | 3 |
| A1400 | 01W03 | 14 | 6.0 | 120 | FLDCT | B0003 | ZZZZZ | 2 | 0.9 | 11 |
| A1400 | 01W04 | 15 | 8.0 | 120 | FLDCT | B0003 | ZZZZZ | 1 | 0.9 | 16 |
| ZZZZZ | ZZZZZ | 75 | 9.0 | 600 | PTABK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | FS627 | 76 | 3,589.0 | 60 | PTA00 | ZZZZZ | ZZZZZ | 0 | 0.9 | [redacted] |
| ZZZZZ | FS627 | 77 | 3,740.0 | 60 | PTA00 | ZZZZZ | ZZZZZ | 0 | 0.9 | [redacted] |
| ZZZZZ | FS627 | 78 | 3,616.0 | 60 | PTA00 | ZZZZZ | ZZZZZ | 0 | 0.9 | [redacted] |

| | | |
|---|---|---|
| ***Alpha Flag*** | 100 | - _____ |
| ***Alpha Max Flag*** | 300 | [redacted] |

ATTACHMENT 6.14
SURVEY DOWNLOAD DATA SHEET

Download Technician: Print Name: Douglas R Kiss Signature: [signature] Date: 10-7-02

Download Station #: 1 Download File #: 1
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
Print Name: VC Miles User ID VCM6298 Signature: [signature] Date: 10-07-02

Print Name: _____ User ID _____ Signature: _____ Date: _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A1400
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 02-13-03 Detector Calibration Due Date: 02-13-03

Type Of Survey: ☑ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☑ Beta β | PR119337 | 43-68B | .229 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 272 | 2 212 | 3 271 | 4 N/A | 5 N/A | 6 N/A | 252 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: Delete Sample #'s 7-33 = Package B0100

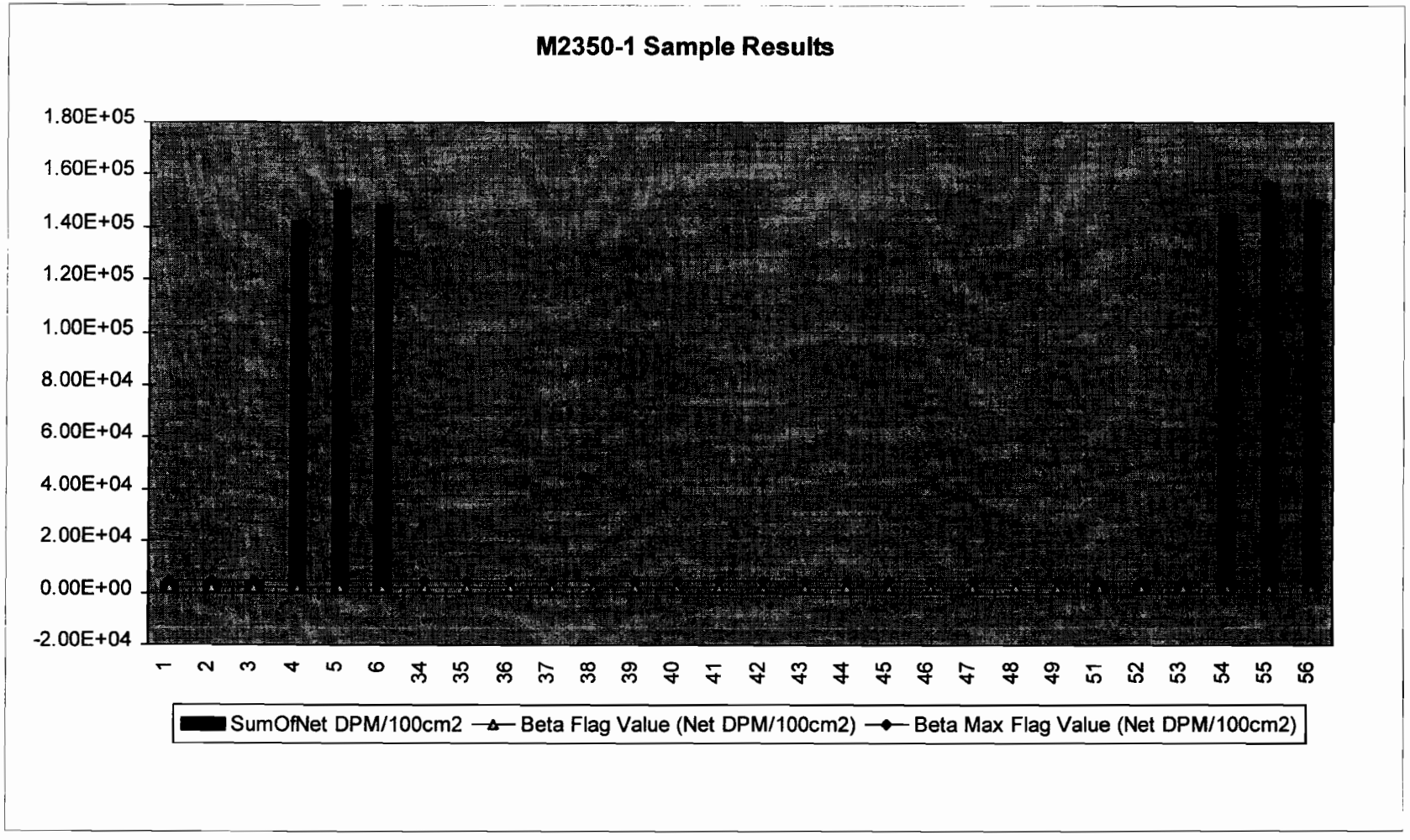
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000001 | Survey Description :Package A1400 (Valve Pit) | |
| Survey Reason : Termination | | |
| User ID : VCM6298 | Technician Name : Vicki Miles | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 2/13/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 2/13/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 100 | Efficiency : 0.229 | Survey Date : 10/7/02 |

| Print Name | Signature | Date |
|---|---|---|
| Vicki Miles | VMiles | 10/8/02 |
| | | |

**Comments:**

*Sign-Off* Paul C. Ely (Print Name) Paul C Ely (Signature) 1/23/03 (Date)


M2350-1 Sample Results
1.80E+05
1.60E+05
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
-2.00E+04
1 2 3 4 5 6 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 51 52 53 54 55 56
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000001

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,962.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | FD184 | 1 | 1,224.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | 4,052 |
| ZZZZZ | FD184 | 2 | 1,239.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | 4,118 |
| ZZZZZ | FD184 | 3 | 1,308.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | 4,419 |
| ZZZZZ | 10002 | 4 | 32,935.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | [redacted] |
| ZZZZZ | 10002 | 5 | 35,648.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | [redacted] |
| ZZZZZ | 10002 | 6 | 34,323.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 296 | [redacted] |
| A1400 | ZZZZZ | 34 | 272.0 | 60 | FLDBK | B0003 | ZZZZZ | 1 | 272 | 0 |
| A1400 | ZZZZZ | 35 | 212.0 | 60 | FLDBK | B0003 | ZZZZZ | 2 | 212 | 0 |
| A1400 | ZZZZZ | 36 | 271.0 | 60 | FLDBK | B0003 | ZZZZZ | 3 | 271 | 0 |
| A1400 | 01F01 | 37 | 317.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 252 | 284 |
| A1400 | 01F01 | 38 | 350.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 252 | 428 |
| A1400 | 01F01 | 39 | 300.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 252 | 210 |
| A1400 | 01F01 | 40 | 327.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 252 | 328 |
| A1400 | 01F01 | 41 | 345.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 252 | 406 |
| A1400 | 01W01 | 42 | 285.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 252 | 144 |
| A1400 | 01W01 | 43 | 360.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 252 | 472 |
| A1400 | 01W02 | 44 | 301.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 252 | 214 |
| A1400 | 01W02 | 45 | 297.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 252 | 197 |
| A1400 | 01W03 | 46 | 269.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 252 | 74 |
| A1400 | 01W03 | 47 | 285.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 252 | 144 |
| A1400 | 01W04 | 48 | 303.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 252 | 223 |
| A1400 | 01W04 | 49 | 307.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 252 | 240 |
| ZZZZZ | ZZZZZ | 50 | 2,981.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | FD184 | 51 | 1,285.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 298 | 4,310 |
| ZZZZZ | FD184 | 52 | 1,323.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 298 | 4,476 |
| ZZZZZ | FD184 | 53 | 1,228.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 298 | 4,061 |
| ZZZZZ | 10002 | 54 | 33,544.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 55 | 36,351.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |
| ZZZZZ | 10002 | 56 | 34,684.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 298 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Fox **Signature:** [signature] **Date:** 10-7-02

Download Station #: 1 Download File #: 5
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** VCMiles **User ID** VCM6298 **Signature:** [signature] **Date:** 10-07-02

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: Package #A14 & Ø
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 02-15-03 Detector Calibration Due Date: 02-12-03

Type Of Survey: ☑ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☐ Beta β | | 43-68B | | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☑ Gamma γ | 095085 | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm !

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 | 2 | 3 N | 4 | 5 | 6 | |
| α Alpha | 1 | 2 | 3 | 4 A | 5 | 6 | |

COMMENTS:
Debris Sampled 4-15, 21-70, 75-78 ÷ Packages B0100 + D0100 +
Alpha source check ✓

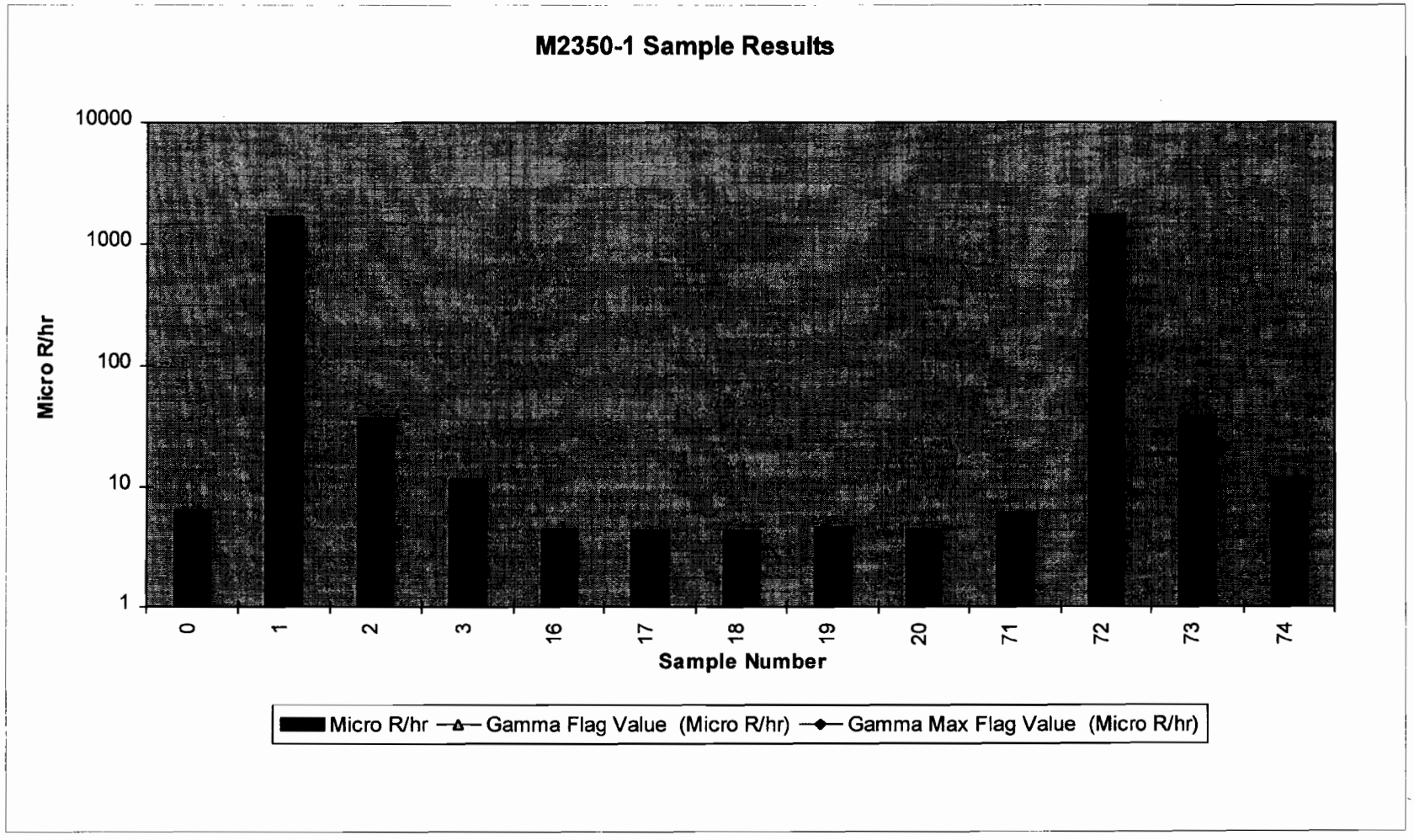
**M2350-1 Download Gamma Report**

| | | |
|---|---|---|
| File Name : 00000005 | Survey Description :Paackage A1400 (Valve Pit) | |
| Survey Reason : Termination | | |
| User ID : VCM6298 | Technician Name : Vicki Miles | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 2/15/03 |
| Detector Model : LMI 44-2 | Detector S/N : 095085 | Detector Cal. Due : 2/12/03 |
| Measurement Type : Gamma | Detector Type : 03100 : Measurement of average dose rate at 1 meter | |
| Cal. Constant : 1 | | Survey Date : 10/7/02 |

| Print Name | Signature | Date |
|---|---|---|
| Vicki Miles | VCMiles | 10/8/02 |
| | | |

**Comments:**

Sign-Off Paul C. Ely (Print Name) Paul C Ely (Signature) 1/23/03 (Date)


M2350-1 Sample Results
Micro R/hr
10000
1000
100
10
1
0
1
2
3
16
17
18
19
20
71
72
73
74
Sample Number
Micro R/hr
Gamma Flag Value (Micro R/hr)
Gamma Max Flag Value (Micro R/hr)

# Duratek Gamma Survey Report

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | μ R/hr: |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 9,261.0 | 300 | PRGBK | ZZZZZ | ZZZZZ | 0 | | 6.47E+00 |
| ZZZZZ | 19453 | 1 | 476,873.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 1.67E-88 |
| ZZZZZ | 19453 | 2 | 10,809.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 3.78E+01 |
| ZZZZZ | 19453 | 3 | 3,321.0 | 60 | PRG00 | ZZZZZ | ZZZZZ | 0 | | 1.16E+01 |
| A1400 | 01F01 | 16 | 637.0 | 30 | FLDCT | B0003 | ZZZZZ | 1 | | 4.45E+00 |
| A1400 | 01F01 | 17 | 630.0 | 30 | FLDCT | B0003 | ZZZZZ | 2 | | 4.40E+00 |
| A1400 | 01F01 | 18 | 621.0 | 30 | FLDCT | B0003 | ZZZZZ | 3 | | 4.34E+00 |
| A1400 | 01F01 | 19 | 655.0 | 30 | FLDCT | B0003 | ZZZZZ | 4 | | 4.58E+00 |
| A1400 | 01F01 | 20 | 636.0 | 30 | FLDCT | B0003 | ZZZZZ | 5 | | 4.44E+00 |
| ZZZZZ | ZZZZZ | 71 | 8,761.0 | 300 | PTGBK | ZZZZZ | ZZZZZ | 0 | | 6.12E+00 |
| ZZZZZ | 19453 | 72 | 489,973.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 1.71E+03 |
| ZZZZZ | 19453 | 73 | 10,995.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 3.84E+01 |
| ZZZZZ | 19453 | 74 | 3,376.0 | 60 | PTG00 | ZZZZZ | ZZZZZ | 0 | | 1.18E+01 |

*Gamma Flag* - _____

*Gamma Max Flag* [redacted]

*Tuesday, October 15, 2002*

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #-_____
Package #A1400

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by VCMiles (Print) Signature VCMiles Date 10-07-02 Time 1400

Counted by VCMiles (Print) Signature VCMiles Date 10-07-02 Time 1620

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 52 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .2 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 106 dpm/100 cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 01F01 | | | |
| 1 | 45 | 0 | <MDA |
| 2 | 65 | 13 | <MDA |
| 3 | 38 | 0 | <MDA |
| 4 | 54 | 2 | <MDA |
| 5 | 49 | 0 | <MDA |
| | | | |
| | | | 01W01 |
| 1 | 55 | 3 | <MDA |
| 2 | 59 | 7 | <MDA |
| | | | |
| | | | 01W02 |
| 1 | 62 | 10 | <MDA |
| 2 | 54 | 2 | <MDA |
| | | | |
| | | | 01W03 |
| 1 | 55 | 3 | <MDA |
| 2 | 52 | 0 | <MDA |
| | | | 01W04 |
| 1 | 69 | 17 | <MDA |
| 2 | 55 | 3 | <MDA |

| Circle: | MDA = 13 dpm/100 cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 01F01 | | | |
| 1 | 0 | 0 | <MDA |
| 2 | 0 | 0 | <MDA |
| 3 | 1 | .8 | <MDA |
| 4 | 0 | 0 | <MDA |
| 5 | 0 | 0 | <MDA |
| | | | |
| | | | 01W01 |
| 1 | 1 | .8 | <MDA |
| 2 | 0 | 0 | <MDA |
| | | | |
| | | | 01W02 |
| 1 | 0 | 0 | <MDA |
| 2 | 0 | 0 | <MDA |
| | | | |
| | | | 01W03 |
| 1 | 1 | .8 | <MDA |
| 2 | 0 | 0 | <MDA |
| | | | 01W04 |
| 1 | 1 | .8 | <MDA |
| 2 | 0 | 0 | <MDA |

**Remarks-**

**Signature-** VCMiles **Reviewed by-** W. R. Hoy

of

Duratek, Inc.
Survey Package Worksheet for Package A1500
Bristol-Myers Squibb Building 124 Room 190 Floor

| | |
|---|---|
| Package Identification No.: A1500 | Prepared by: Paul C. Ely |
| Location: Building 124 Room 190 Floor | Date prepared: 4/14/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124 Room 190 floor.

## Historical Information

In Room 190 there were four fume hoods and one glove box. The operations in the room included custom filled gold (moved here from Room #174) and custom filling iodotope therapeutic capsules. The radionuclides included Au-198 and I-131.

Contamination levels >5,000 dpm/100 $cm^2$ were identified on equipment that was removed during the D&D phase and on floor areas under the fume hoods. All other areas surveyed during the characterization had contamination levels <5,000 dpm/100 $cm^2$.

## General Survey Instructions

(Class 1):

1. Perform a minimum of 100% scan of accessible surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A1500 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br>Take five smears on floor in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| Bristol Myers Squibb Building 124 Room 190 Floor | | | | | | | | | | | | |
| A1500 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | NRK 4-16-03 | NRK 4-16-03 | N/A | N/A | 5 NRK / 4-16-03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: 4/29/03 |
| Package Reviewed by and Date: Paul C Ely 4/29/03 |

| Survey Comments |
| --- |
| |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A1500**
**Room 190 Floors**

| | | | |
|---|---|---|---|
| **X (Max):** | 8.3 | meters | |
| **Y (Max):** | 9.7 | meters | |
| **A (Area):** | 80.51 | $m^2$ | |
| **Actual Survey Area:** | 52 | $m^2$ | |
| **COMPASS Survey Points:** | 14 | 35% | percent void area |
| **N (Points):** | 36 | 22 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 1.6 | meters | (distance between measurement points) |

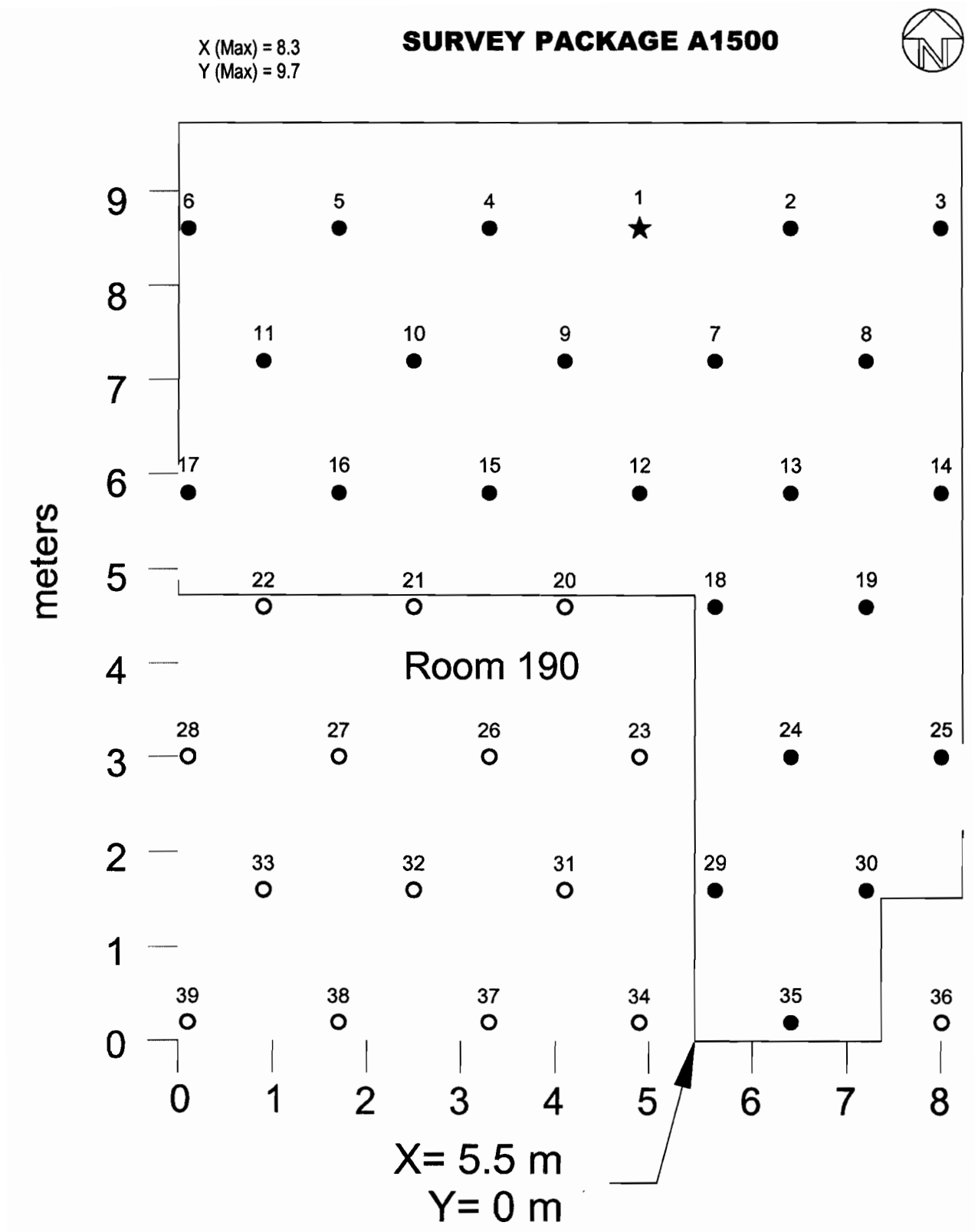
$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.4 | meters | (distance between rows) |
| **L/2=** | 0.8 | meters | (row offset value) |
| **X (Random):** | 4.7 | | random number generator |
| **Y (Random):** | 6.3 | | random number generator |
| **X (Origin):** | 4.9 | | initially generated random number |
| **Y (Origin):** | 8.6 | | initially generated random number |
| **Number of rows:** | 7 | | |
| **Number of columns:** | 5 | | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 4.9 | 8.6 | 7 |
| 2 | 6.5 | 8.6 | |
| 3 | 8.1 | 8.6 | |
| 4 | 3.3 | 8.6 | |
| 5 | 1.7 | 8.6 | |
| 6 | 0.1 | 8.6 | |
| 7 | 5.7 | 7.2 | 6 |
| 8 | 7.3 | 7.2 | |
| 9 | 4.1 | 7.2 | |
| 10 | 2.5 | 7.2 | |
| 11 | 0.9 | 7.2 | |
| 12 | 4.9 | 5.8 | 5 |
| 13 | 6.5 | 5.8 | |
| 14 | 8.1 | 5.8 | |
| 15 | 3.3 | 5.8 | |
| 16 | 1.7 | 5.8 | |
| 17 | 0.1 | 5.8 | |
| 18 | 5.7 | 4.4 | 4 |
| 19 | 7.3 | 4.4 | |
| 20 | 4.1 | 4.4 | |
| 21 | 2.5 | 4.4 | |
| 22 | 0.9 | 4.4 | |
| 23 | 4.9 | 3.0 | 3 |
| 24 | 6.5 | 3.0 | |
| 25 | 8.1 | 3.0 | |
| 26 | 3.3 | 3.0 | |
| 27 | 1.7 | 3.0 | |
| 28 | 0.1 | 3.0 | |
| 29 | 5.7 | 1.6 | 2 |
| 30 | 7.3 | 1.6 | |
| 31 | 4.1 | 1.6 | |
| 32 | 2.5 | 1.6 | |
| 33 | 0.9 | 1.6 | |
| 34 | 4.9 | 0.2 | 1 |
| 35 | 6.5 | 0.2 | |
| 36 | 8.1 | 0.2 | |
| 37 | 3.3 | 0.2 | |
| 38 | 1.7 | 0.2 | |
| 39 | 0.1 | 0.2 | |

**LBGR Determination**
**Package A1500**

| | | |
|---|---|---|
| $\sigma$ = | 301.1 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 3.6 | >3 |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **171** | **cpm** |

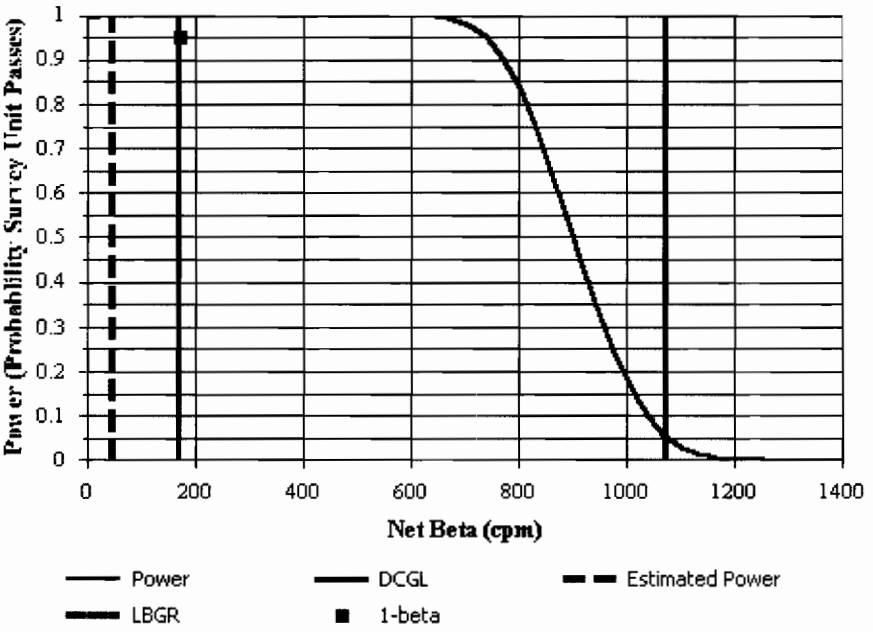

SURVEY PACKAGE A1500
X (Max) = 8.3
Y (Max) = 9.7
meters
Room 190
X= 5.5 m
Y= 0 m

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1500 FSS Package | | |
| Comments: | B-124 Room 190 Floor | | |
| Area (m²): | 52 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 301.1 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 171 | Estimated Conc. (cpm): | 47.9 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

| | |
|---|---|
| Gross Beta DCGLw (dpm/100 cm²): | 7,100 |
| Total Efficiency: | 0.12 |
| Gross Beta DCGLw (cpm): | 1,074 |

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 293 ± 300 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Linoleum | 46 | 244.9 | 21.7 | 501 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0800,Rooms 179, 182, 183, 184, 190-213 and 217**
**Building 124**

| | Floor | | Wall | | Ceiling | | Above False Ceiling (Not Used in Average) | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 253 | 242 | 340 | 388 | 350 | 442 | 300 | 341 |
| | 214 | 220 | 358 | 421 | 386 | 359 | 331 | 360 |
| | 199 | 223 | 360 | 450 | 455 | 451 | 299 | 365 |
| | 237 | 271 | 364 | 420 | 380 | 409 | 359 | 372 |
| | 292 | 290 | 362 | 456 | 371 | 453 | 349 | 346 |
| | 258 | 241 | 438 | 442 | 410 | 462 | 372 | 368 |
| | 249 | 258 | 339 | 449 | 384 | 424 | 341 | 372 |
| | 242 | 257 | 382 | 440 | 352 | 424 | 350 | 368 |
| | 243 | 209 | 365 | 436 | 369 | 410 | 342 | 340 |
| | 209 | 223 | 353 | 426 | 414 | 508 | 346 | 438 |
| | 211 | 244 | 341 | 392 | 409 | 429 | 385 | 421 |
| | 238 | 217 | 371 | 470 | 458 | 498 | 411 | 426 |
| | 216 | 236 | 309 | 420 | 407 | 463 | 328 | 336 |
| | 241 | 267 | 354 | 494 | 419 | 474 | 330 | 357 |
| | 273 | 305 | 331 | 391 | 322 | 367 | 311 | 353 |
| | 288 | 296 | 377 | 449 | 333 | 369 | 365 | 366 |
| | 260 | 285 | 390 | 376 | 393 | 381 | 369 | 368 |
| | 287 | 273 | 388 | 458 | 405 | 574 | 294 | 338 |
| | 257 | 257 | 403 | 481 | 393 | 400 | 362 | 412 |
| | 233 | 242 | 414 | 487 | 390 | 559 | 333 | 386 |
| | 224 | 198 | 379 | 474 | 343 | 448 | 368 | 383 |
| | 217 | 235 | 340 | 430 | 393 | 414 | 329 | 357 |
| | 252 | 220 | 324 | 415 | 336 | 402 | 354 | 395 |
| | 243 | 248 | 365 | 481 | 414 | 410 | 347 | 377 |
| | 224 | 198 | 340 | 408 | 417 | 412 | 364 | 385 |
| | 238 | 248 | 358 | 397 | 349 | 412 | | |
| | 235 | 257 | 383 | 437 | 359 | 397 | | |
| | 246 | 246 | 384 | 438 | 376 | 415 | | |
| | 256 | 254 | 315 | 346 | 339 | 372 | | |
| | 274 | 272 | 388 | 341 | 392 | 411 | | |
| | 255 | 222 | 356 | 444 | | | | |
| | 222 | 225 | 315 | 426 | | | | |
| | 248 | 246 | 500 | 662 | | | | |
| | 275 | 279 | 414 | 460 | | | | |
| | 256 | 241 | 346 | 448 | | | | |
| | 248 | 258 | 375 | 426 | | | | |
| | 229 | 236 | 485 | 962 | | | | |
| | 228 | 221 | 373 | 491 | | | | |
| | 239 | 228 | 330 | 424 | | | | |
| | 239 | 254 | 407 | 497 | | | | |
| | 232 | 210 | 427 | 475 | | | | |
| | 252 | 418 | 354 | 415 | | | | |
| | 231 | 212 | 369 | 479 | | | | |
| | 267 | 263 | 366 | 405 | | | | |
| | 261 | 255 | 327 | 423 | | | | |
| | 276 | 2271 | | | | | | |
| **Average** | **244.9** | **292.8** | **370.2** | **452.2** | **383.9** | **431.6** | **345.6** | **373.2** |
| **Standard Deviation** | **21.7** | **300.3** | **39.8** | **92.1** | **34.3** | **51.7** | **27.5** | **27.7** |
| **No of Measurements** | **46** | **46** | **45** | **45** | **30** | **30** | **25** | **25** |
| **All Measurement** | | | | | | | | |
| **Average** | **326.0** | **386.5** | | | | | | |
| **Standard Deviation** | **71.6** | **207.5** | | | | | | |
| **No of Measurements** | **121** | **121** | | | | | | |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Fox **Signature:** [signature] **Date:** 4-16-03

Download Station #: 1 Download File #: 62
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Fox **User ID** DRF2986 **Signature:** [signature] **Date:** 4-16-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A1500 B-124 Room 190 (Floor)
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR119337 | 43-68B | .228 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 199 | 2 231 | 3 219 | 4 N/A | 5 N/A | 6 N/A | 216 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .129

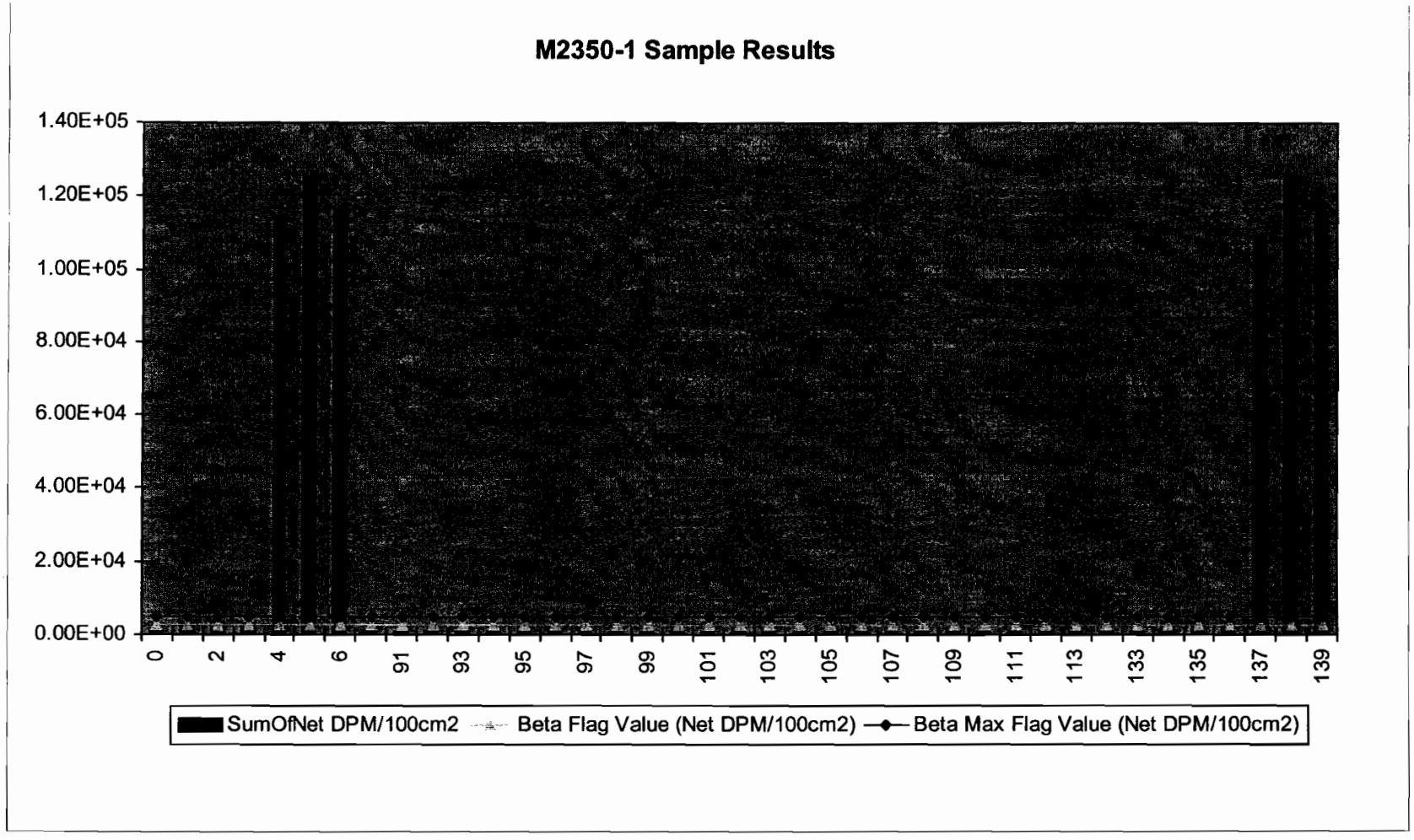
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000062 | Survey Description :Package A1500 B124 Room 190 (floor) | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.228 | Survey Date : 4/16/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* PAUL C. ELY (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
91
93
95
97
99
101
103
105
107
109
111
113
133
135
137
139
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000062

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,579.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 898 |
| ZZZZZ | FD184 | 1 | 1,195.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 258 | 3,262 |
| ZZZZZ | FD184 | 2 | 1,256.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 258 | 3,474 |
| ZZZZZ | FD184 | 3 | 1,188.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 258 | 3,237 |
| ZZZZZ | 10002 | 4 | 33,119.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 258 | [redacted] |
| ZZZZZ | 10002 | 5 | 36,265.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 258 | [redacted] |
| ZZZZZ | 10002 | 6 | 33,523.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 258 | [redacted] |
| A1500 | ZZZZZ | 90 | 199.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 693 |
| A1500 | ZZZZZ | 91 | 231.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 804 |
| A1500 | ZZZZZ | 92 | 219.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 762 |
| A1500 | 01F01 | 93 | 302.0 | 60 | FLDCT | B9999 | ZZZZZ | 35 | 0.0001 | 1,051 |
| A1500 | 01F01 | 94 | 284.0 | 60 | FLDCT | B9999 | ZZZZZ | 29 | 0.0001 | 989 |
| A1500 | 01F01 | 95 | 285.0 | 60 | FLDCT | B9999 | ZZZZZ | 30 | 0.0001 | 992 |
| A1500 | 01F01 | 96 | 262.0 | 60 | FLDCT | B9999 | ZZZZZ | 25 | 0.0001 | 912 |
| A1500 | 01F01 | 97 | 257.0 | 60 | FLDCT | B9999 | ZZZZZ | 24 | 0.0001 | 895 |
| A1500 | 01F01 | 98 | 283.0 | 60 | FLDCT | B9999 | ZZZZZ | 18 | 0.0001 | 985 |
| A1500 | 01F01 | 99 | 253.0 | 60 | FLDCT | B9999 | ZZZZZ | 19 | 0.0001 | 881 |
| A1500 | 01F01 | 100 | 281.0 | 60 | FLDCT | B9999 | ZZZZZ | 14 | 0.0001 | 978 |
| A1500 | 01F01 | 101 | 291.0 | 60 | FLDCT | B9999 | ZZZZZ | 13 | 0.0001 | 1,013 |
| A1500 | 01F01 | 102 | 273.0 | 60 | FLDCT | B9999 | ZZZZZ | 12 | 0.0001 | 950 |
| A1500 | 01F01 | 103 | 257.0 | 60 | FLDCT | B9999 | ZZZZZ | 15 | 0.0001 | 895 |
| A1500 | 01F01 | 104 | 269.0 | 60 | FLDCT | B9999 | ZZZZZ | 9 | 0.0001 | 936 |
| A1500 | 01F01 | 105 | 307.0 | 60 | FLDCT | B9999 | ZZZZZ | 7 | 0.0001 | 1,069 |
| A1500 | 01F01 | 106 | 284.0 | 60 | FLDCT | B9999 | ZZZZZ | 8 | 0.0001 | 989 |
| A1500 | 01F01 | 107 | 249.0 | 60 | FLDCT | B9999 | ZZZZZ | 3 | 0.0001 | 867 |
| A1500 | 01F01 | 108 | 282.0 | 60 | FLDCT | B9999 | ZZZZZ | 2 | 0.0001 | 982 |
| A1500 | 01F01 | 109 | 270.0 | 60 | FLDCT | B9999 | ZZZZZ | 1 | 0.0001 | 940 |
| A1500 | 01F01 | 110 | 292.0 | 60 | FLDCT | B9999 | ZZZZZ | 5 | 0.0001 | 1,016 |
| A1500 | 01F01 | 111 | 267.0 | 60 | FLDCT | B9999 | ZZZZZ | 6 | 0.0001 | 929 |
| A1500 | 01F01 | 112 | 309.0 | 60 | FLDCT | B9999 | ZZZZZ | 11 | 0.0001 | 1,076 |
| A1500 | 01F01 | 113 | 264.0 | 60 | FLDCT | B9999 | ZZZZZ | 16 | 0.0001 | 919 |
| A1500 | 01F01 | 114 | 256.0 | 60 | FLDCT | B9999 | ZZZZZ | 17 | 0.0001 | 891 |
| ZZZZZ | ZZZZZ | 133 | 2,476.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 862 |
| ZZZZZ | FD184 | 134 | 1,220.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 248 | 3,383 |
| ZZZZZ | FD184 | 135 | 1,233.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 248 | 3,429 |
| ZZZZZ | FD184 | 136 | 1,241.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 248 | 3,457 |
| ZZZZZ | 10002 | 137 | 31,244.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 248 | [redacted] |
| ZZZZZ | 10002 | 138 | 36,200.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 248 | [redacted] |
| ZZZZZ | 10002 | 139 | 33,447.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 248 | [redacted] |

| | |
|---|---|
| ***Beta Flag*** | 2500 - _____ |
| ***Beta Max Flag*** | 5000 [redacted] |

***Tuesday, August 26, 2003***

ATTACHMENT 6.14
SURVEY DOWNLOAD DATA SHEET

**Download Technician: Print Name:** Douglas R Kjos **Signature:** [signature] **Date:** 4-30-03

Download Station #: 1 Download File #: 112
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kjos **User ID** DRK2986 **Signature:** [signature] **Date:** 4-30-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 129401

Survey Unit Description: Package A1500, B-124, Point 4
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR119337 | 43-68B | .226 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements MEAN Value in cpm !

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 | 2 | 3 | 4 u/a | 5 u/a | 6 u/a | |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .130

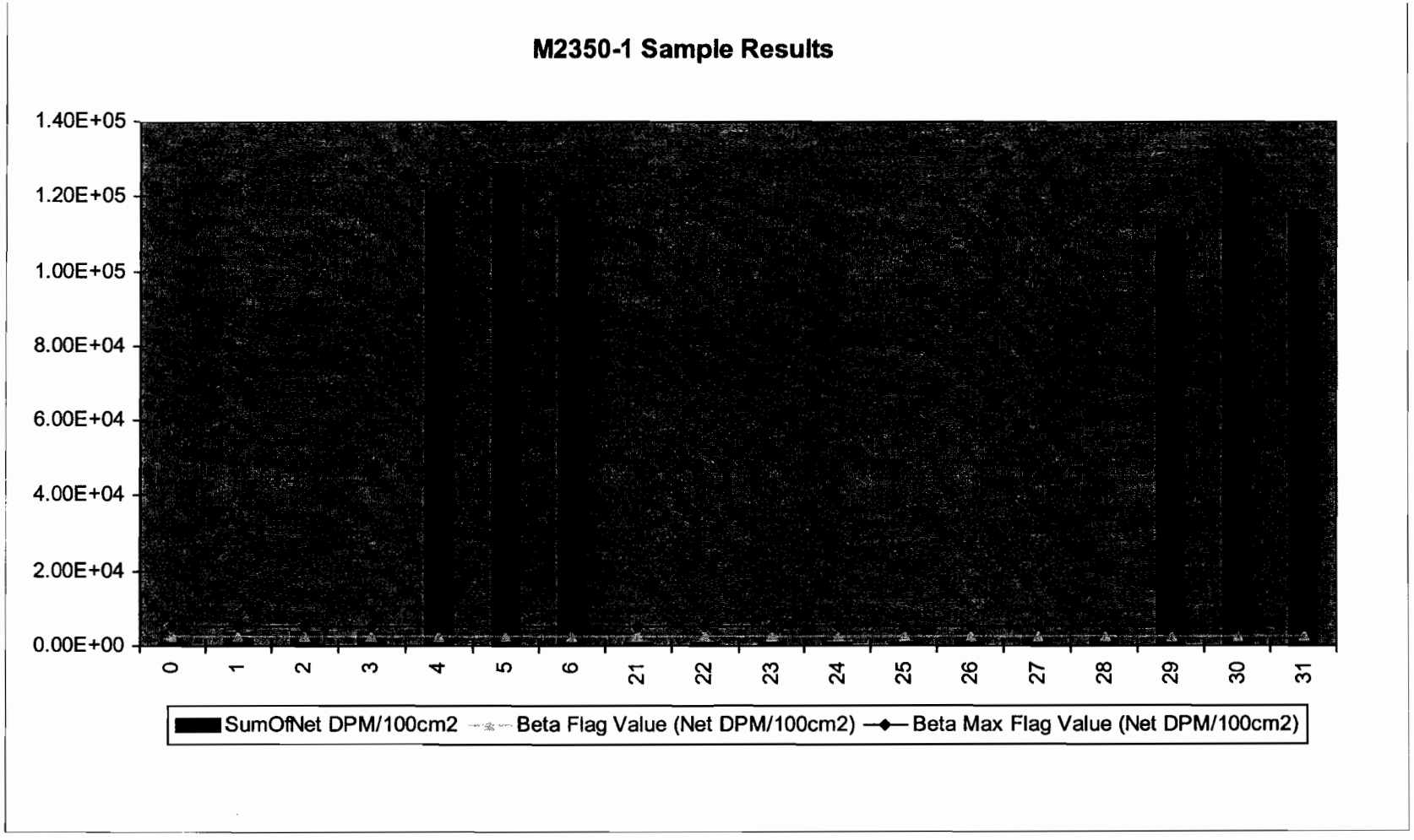
**M2350-1 Download Beta Report**

| | | |
|---|---|---|
| File Name : 00000112 | Survey Description :Package A1500, B-124, Point #4 | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 129401 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 119337 | Detector Cal. Due : 6/30/03 |
| Measurement Type : Beta | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.226 | Survey Date : 4/30/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* Paul E. Ely (Print Name) Paul E Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
1
2
3
4
5
6
21
22
23
24
25
26
27
28
29
30
31
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000112

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,454.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 862 |
| ZZZZZ | FD184 | 1 | 1,252.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,536 |
| ZZZZZ | FD184 | 2 | 1,299.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,701 |
| ZZZZZ | FD184 | 3 | 1,248.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | 3,522 |
| ZZZZZ | 10002 | 4 | 34,775.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| ZZZZZ | 10002 | 5 | 36,935.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| ZZZZZ | 10002 | 6 | 33,946.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 245 | [redacted] |
| A1500 | ZZZZZ | 21 | 253.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 888 |
| A1500 | ZZZZZ | 22 | 247.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 867 |
| A1500 | ZZZZZ | 23 | 227.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 797 |
| A1500 | 01F01 | 24 | 279.0 | 60 | FLDCT | B9999 | ZZZZZ | 4 | 0.0001 | 980 |
| ZZZZZ | ZZZZZ | 25 | 2,586.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 908 |
| ZZZZZ | FD184 | 26 | 1,182.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | 3,241 |
| ZZZZZ | FD184 | 27 | 1,231.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | 3,413 |
| ZZZZZ | FD184 | 28 | 1,202.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | 3,312 |
| ZZZZZ | 10002 | 29 | 32,008.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | [redacted] |
| ZZZZZ | 10002 | 30 | 36,813.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | [redacted] |
| ZZZZZ | 10002 | 31 | 33,314.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 259 | [redacted] |

| | |
|---|---|
| ***Beta Flag*** | 2500 - _____ |
| ***Beta Max Flag*** | 5000 [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1500

**ATTACHMENT 6.2**
**SMEAR SURVEY RESULTS FORM**
**(example)**

Performed by Doug Kjos (Print) Signature D. Kjos/BK Date 4/16/03 Time 1400

Counted by D. Schumaker (Print) Signature DS Date 4/16/03 Time 1545

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 57 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .30 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 41 | 0 | <MDA |
| 9 | 48 | 0 | |
| 11 | 50 | 0 | |
| 14 | 38 | 0 | |
| 24 | 56 | 0 | |
| | | A | |
| | N | | |

| Circle: | α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | <MDA |
| 9 | 0 | 0 | |
| 11 | 1 | .7 | |
| 14 | 0 | 0 | |
| 24 | 0 | 0 | |
| | | A | |
| | N | | |

Remarks- MDA: β'S = 110 dpm/100cm², α 14 ~~4.6~~ dpm/100cm² BK 4-28-03

Signature- DS Reviewed by- Paul C Eley 4/29/03

of

Duratek, Inc.
Survey Package Worksheet for Package A1600
Bristol-Myers Squibb Building 122 Hot Barn Floor

| | |
|---|---|
| Package Identification No.: A1600 | Prepared by: Paul C. Ely |
| Location: Building 122 Hot Barn Floor | Date prepared: 4/14/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 122 Hot Barn Floor.

## Historical Information

Building 122 was a radiopharmaceutical storage facility. Radioactive waste from R&D and manufacturing was stored and processed by compaction in Building 122. Waste was also held for decay. The compactor was in room 222. The floors in the Hot Barn and Rooms 221 and 222 had activity levels >5,000 dpm/100 $cm^2$. One elevated Tritium measurement of about 17,000 dpm was obtained from the Hot Barn floor. All other areas had contamination levels <5,000 dpm/100 $cm^2$ as identified during the characterization survey.

## General Survey Instructions

(Class 1):

1. Perform a minimum of 100% scan of accessible surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$ (100% of the DCGL).
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A1600 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears on floor in survey unit at five unspecified survey locations.<br><br>Take liquid scintillation smears on floor in survey unit at all 15 unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | 15 | |
| Bristol Myers Squibb Building 122 Hot Barn Floor | | | | | | | | | | | | |
| A1600 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | NRL/4-15-03 | NRL/4-17-03 | N/A | N/A | NRL/4-17-03 | DS 4-30-03 | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review |
| --- |
| Date Package Completed: 4/30/03 |
| Package Reviewed by and Date: Paul C Ely 4/30/03 |

| Survey Comments |
| --- |
| |
| |
| |
| |
| |
| |
| |
| |

**Survey Package A1600**
**Building 122, Room 222 Floor**

| | | | |
|---|---|---|---|
| **X (Max):** | 5 | meters | |
| **Y (Max):** | 17.5 | meters | |
| **A (Area):** | 87.5 | $m^2$ | |
| **Actual Survey Area:** | 88 | $m^2$ | |
| **COMPASS Survey Points:** | 14 | 0% | percent void area |
| **N (Points):** | 20 | 14 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

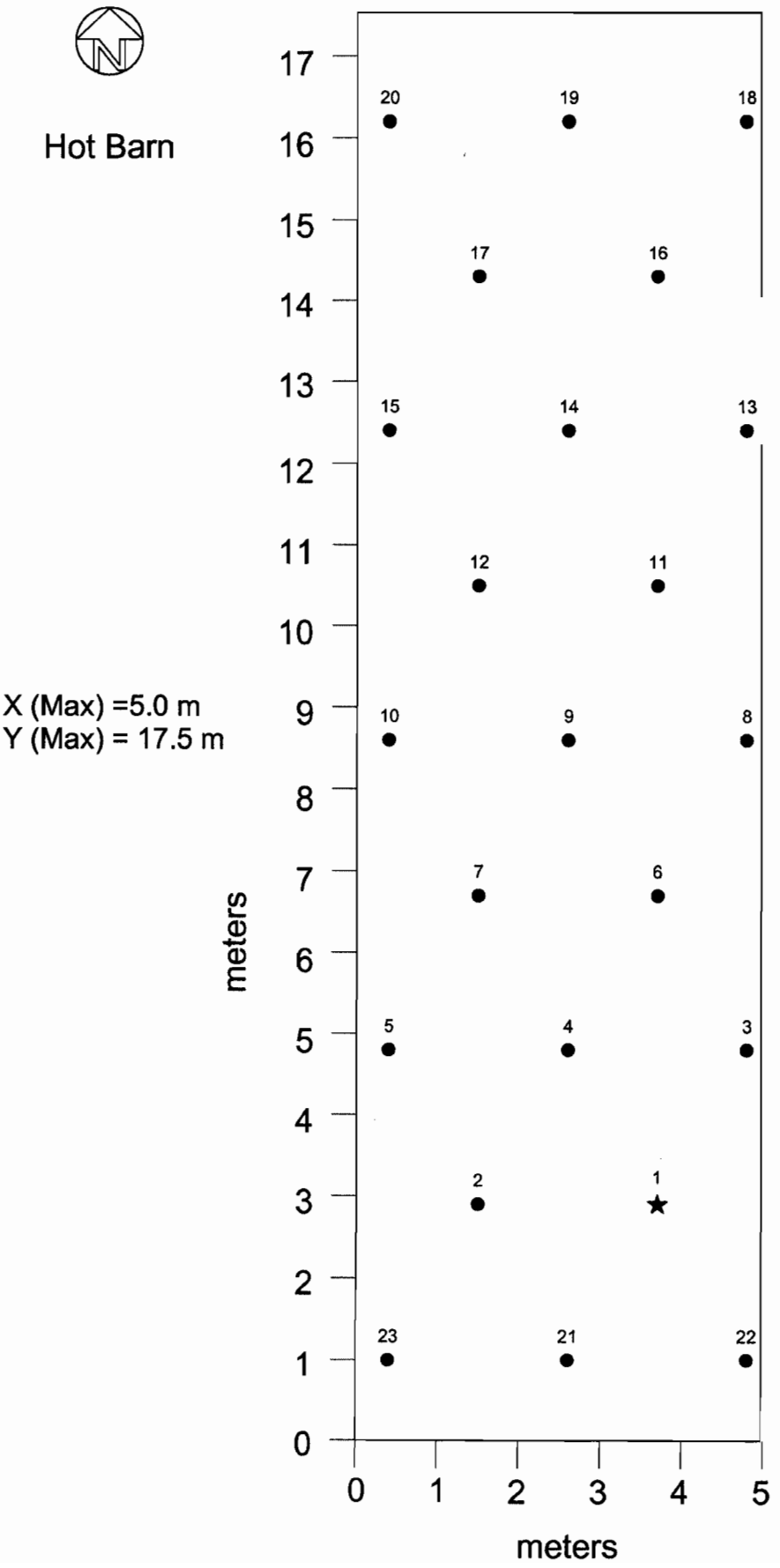
| | | | |
|---|---|---|---|
| **L=** | 2.2 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.9 | meters | (distance between rows) |
| **L/2=** | 1.1 | meters | (row offset value) |
| **X (Random):** | 4.9 | | random number generator |
| **Y (Random):** | 5.1 | | random number generator |
| **X (Origin):** | 3.7 | | initially generated random number |
| **Y (Origin):** | 2.9 | | initially generated random number |
| **Number of rows:** | 9 | | |
| **Number of columns:** | 2 | | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 3.7 | 2.9 | 2 |
| 2 | 1.5 | 2.9 | |
| 3 | 4.8 | 4.8 | 3 |
| 4 | 2.6 | 4.8 | |
| 5 | 0.4 | 4.8 | |
| 6 | 3.7 | 6.7 | 4 |
| 7 | 1.5 | 6.7 | |
| 8 | 4.8 | 8.6 | 5 |
| 9 | 2.6 | 8.6 | |
| 10 | 0.4 | 8.6 | |
| 11 | 3.7 | 10.5 | 6 |
| 12 | 1.5 | 10.5 | |
| 13 | 4.8 | 12.4 | 7 |
| 14 | 2.6 | 12.4 | |
| 15 | 0.4 | 12.4 | |
| 16 | 3.7 | 14.3 | 8 |
| 17 | 1.5 | 14.3 | |
| 18 | 4.8 | 16.2 | 9 |
| 19 | 2.6 | 16.2 | |
| 20 | 0.4 | 16.2 | |
| 21 | 3.7 | 1.0 | 1 |
| 22 | 1.5 | 1.0 | |
| 23 | 4.8 | 1.0 | |

**SURVEY PACKAGE A1600**

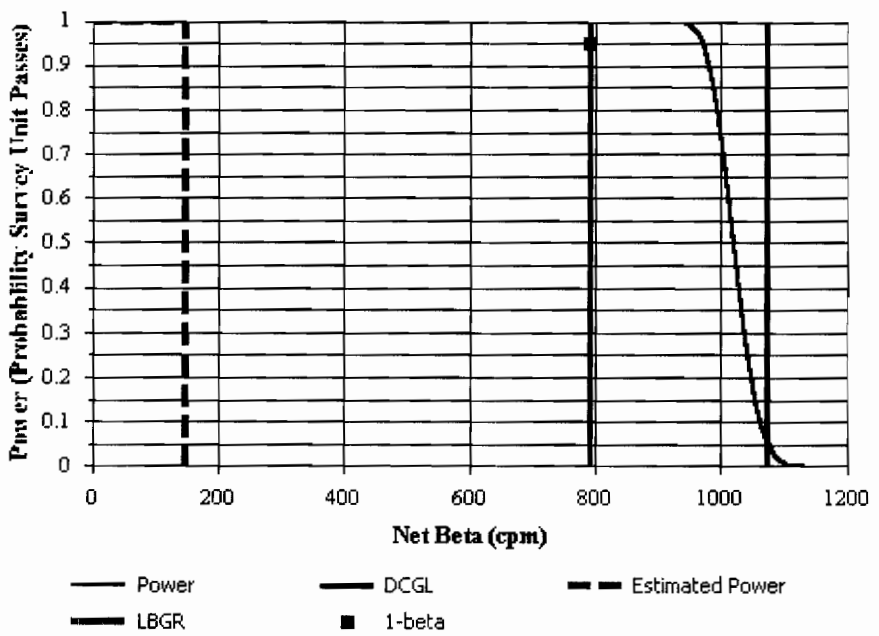


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1600 FSS Package | | |
| Comments: | B-122 Room 222 Floor | | |
| Area (m²): | 88 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 94 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 792 | Estimated Conc. (cpm): | 147 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 388 ± 33 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0900 Rooms 219 to 222**
**Building 122**

| | Floor | | Wall | | Ceiling | |
|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 320 | 380 | 312 | 429 | 295 | 278 |
| | 294 | 372 | 316 | 388 | 333 | 277 |
| | 320 | 360 | 315 | 324 | 260 | 293 |
| | 327 | 389 | 323 | 388 | | |
| | 301 | 358 | 283 | 373 | | |
| | 291 | 361 | 313 | 386 | | |
| | 284 | 420 | 288 | 373 | | |
| | 283 | 380 | 325 | 361 | | |
| | 345 | 399 | 321 | 344 | | |
| | 307 | 463 | 345 | 365 | | |
| | | | 324 | 323 | | |
| | | | 349 | 387 | | |
| | | | 257 | 291 | | |
| | | | 342 | 419 | | |
| | | | 357 | 411 | | |
| **Average** | **307.2** | **388.2** | **318.0** | **370.8** | **296.0** | **282.7** |
| **Standard Deviation** | **20.4** | **32.6** | **26.5** | **37.9** | **36.5** | **9.0** |
| **No of Measurements** | **10** | **10** | **15** | **15** | **3** | **3** |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | **311.8** | **367.6** | **Average** | **356.1** |
| **Standard Deviation** | **25.7** | **45.5** | **Standard Deviation** | **48.3** |
| **No of Measurements** | **28** | **28** | **No of Measurements** | **18** |

**LBGR Determination**

Per MARSSIM, section 5.5.2.3, if the estimated standard deviation, $\sigma$, is much smaller than the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, $\Delta/\sigma$, is about 3.

**Package A1600, A1610 & A1620**

| | | |
|---|---|---|
| $\sigma$ = | 94.0 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 11.4 | **>3** |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **792** | **cpm** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kjos **Signature:** [signature] **Date:** 4-17-03

Download Station #: 1 Download File #: 68
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kjos **User ID** NRK2986 **Signature:** [signature] **Date:** 4-17-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 95359

Survey Unit Description: Package A1600 B-122 Room 222 Floor
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-12-03 Detector Calibration Due Date: 10-15-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR086917 | 43-68B | .228 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 184 | 2 198 | 3 224 | 4 N/A | 5 N/A | 6 N/A | 202 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .136

**M2350-1 Download BETA Report**

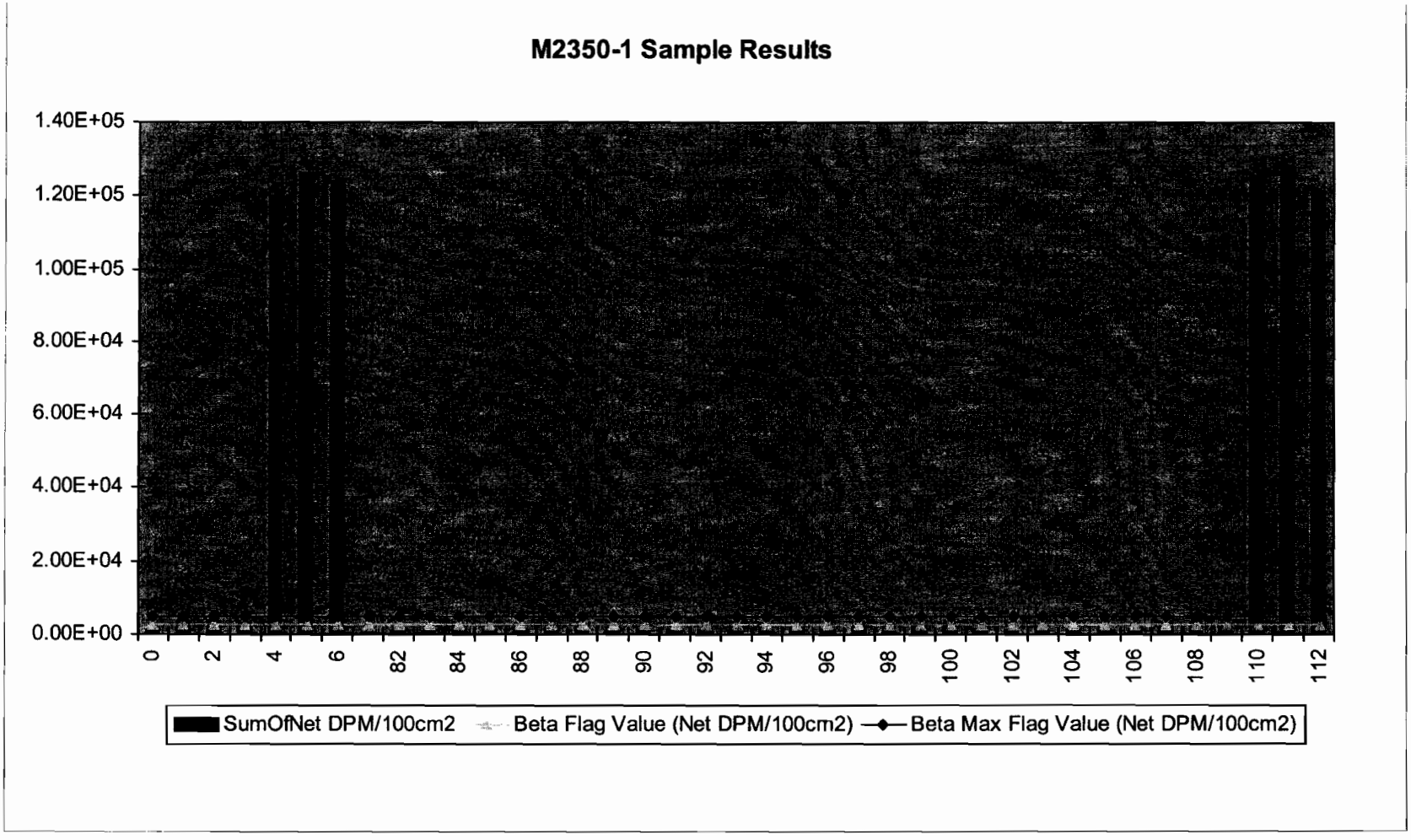
| | | |
|---|---|---|
| File Name : 00000068 | Survey Description :Package A1600 B-122 Room 222 Floor | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 95359 | Instrument Cal. Due : 6/12/03 |
| Detector Model : 43-68B | Detector S/N : 088917 | Detector Cal. Due : 10/15/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.228 | Survey Date : 4/17/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | | 8/26/03 |
| | | |

**Comments:**

Sign-Off

| Print Name | Signature | Date |
|---|---|---|
| PAUL C. ELY | | 8/26/03 |


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
82
84
86
88
90
92
94
96
98
100
102
104
106
108
110
112
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# Duratek Beta Survey Report

**Download File Name:** 00000068

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,328.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 810 |
| ZZZZZ | FD184 | 1 | 1,190.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,331 |
| ZZZZZ | FD184 | 2 | 1,257.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,564 |
| ZZZZZ | FD184 | 3 | 1,141.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | 3,161 |
| ZZZZZ | 10002 | 4 | 34,710.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 5 | 36,464.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,640.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 233 | [redacted] |
| A1600 | ZZZZZ | 81 | 184.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 1 | 0.0001 | 640 |
| A1600 | ZZZZZ | 82 | 198.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 2 | 0.0001 | 689 |
| A1600 | ZZZZZ | 83 | 224.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 3 | 0.0001 | 780 |
| A1600 | 01F01 | 84 | 347.0 | 60 | FLDCT | B0003 | ZZZZZ | 21 | 0.0001 | 1,208 |
| A1600 | 01F01 | 85 | 378.0 | 60 | FLDCT | B0003 | ZZZZZ | 22 | 0.0001 | 1,316 |
| A1600 | 01F01 | 86 | 350.0 | 60 | FLDCT | B0003 | ZZZZZ | 23 | 0.0001 | 1,218 |
| A1600 | 01F01 | 87 | 341.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 0.0001 | 1,187 |
| A1600 | 01F01 | 88 | 331.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 1,152 |
| A1600 | 01F01 | 89 | 305.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,062 |
| A1600 | 01F01 | 90 | 388.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 1,351 |
| A1600 | 01F01 | 91 | 320.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 0.0001 | 1,114 |
| A1600 | 01F01 | 92 | 432.0 | 60 | FLDCT | B0003 | ZZZZZ | 6 | 0.0001 | 1,504 |
| A1600 | 01F01 | 93 | 332.0 | 60 | FLDCT | B0003 | ZZZZZ | 7 | 0.0001 | 1,156 |
| A1600 | 01F01 | 94 | 343.0 | 60 | FLDCT | B0003 | ZZZZZ | 8 | 0.0001 | 1,194 |
| A1600 | 01F01 | 95 | 547.0 | 60 | FLDCT | B0003 | ZZZZZ | 9 | 0.0001 | 1,904 |
| A1600 | 01F01 | 96 | 397.0 | 60 | FLDCT | B0003 | ZZZZZ | 10 | 0.0001 | 1,382 |
| A1600 | 01F01 | 97 | 675.0 | 60 | FLDCT | B0003 | ZZZZZ | 11 | 0.0001 | 2,350 |
| A1600 | 01F01 | 98 | 599.0 | 60 | FLDCT | B0003 | ZZZZZ | 12 | 0.0001 | 2,085 |
| A1600 | 01F01 | 99 | 680.0 | 60 | FLDCT | B0003 | ZZZZZ | 13 | 0.0001 | 2,367 |
| A1600 | 01F01 | 100 | 652.0 | 60 | FLDCT | B0003 | ZZZZZ | 14 | 0.0001 | 2,270 |
| A1600 | 01F01 | 101 | 315.0 | 60 | FLDCT | B0003 | ZZZZZ | 16 | 0.0001 | 1,096 |
| A1600 | 01F01 | 102 | 423.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 1,472 |
| A1600 | 01F01 | 103 | 401.0 | 60 | FLDCT | B0003 | ZZZZZ | 18 | 0.0001 | 1,396 |
| A1600 | 01F01 | 104 | 330.0 | 60 | FLDCT | B0003 | ZZZZZ | 19 | 0.0001 | 1,149 |
| A1600 | 01F01 | 105 | 355.0 | 60 | FLDCT | B0003 | ZZZZZ | 20 | 0.0001 | 1,236 |
| ZZZZZ | ZZZZZ | 106 | 2,391.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 832 |
| ZZZZZ | FD184 | 107 | 1,189.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,307 |
| ZZZZZ | FD184 | 108 | 1,207.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,370 |
| ZZZZZ | FD184 | 109 | 1,186.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | 3,296 |
| ZZZZZ | 10002 | 110 | 35,672.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |
| ZZZZZ | 10002 | 111 | 36,738.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |
| ZZZZZ | 10002 | 112 | 35,114.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 239 | [redacted] |

| | | |
|---|---|---|
| **Beta Flag** | 2500 - | _____ |
| **Beta Max Flag** | 5000 | [redacted] |

*Tuesday, August 26, 2003*

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1600

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by DR Kjos (Print) Signature [illegible] Date 4-17-03 Time 1636

Counted by BS Kjos (Print) Signature BSK Date 4-28-03 Time 0935

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 108 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 4 | 59 | 5 | < MDA |
| 9 | 42 | 0 | |
| 14 | 61 | 7 | |
| 20 | 40 | 0 | |
| 22 | 55 | 1 | < MDA |
| | | N/A | |

| Circle: | MDA = 12.5 dpm/100cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 4 | 0 | 0 | < MDA |
| 9 | 0 | 0 | |
| 14 | 1 | .85 | |
| 20 | 0 | 0 | |
| 22 | 0 | 0 | < MDA |
| | | N/A | |

Remarks-

Signature- BSK Reviewed by- Paul C Eg 4/30/03

of

Duratek, Inc.
Survey Package Worksheet for Package A1610
Bristol-Myers Squibb Building 122 Room 221 Floor

| | |
|---|---|
| Package Identification No.: A1610 | Prepared by: Paul C. Ely |
| Location: Building 122 Room 221 Floor | Date prepared: 4/14/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 122 Room 221 Floor.

## Historical Information

Building 122 was a radiopharmaceutical storage facility. Radioactive waste from R&D and manufacturing was stored and processed by compaction in Building 122. Waste was also held for decay. The compactor was in room 222. The floors in the Hot Barn and Rooms 221 and 222 had activity levels >5,000 dpm/100 $cm^2$. One elevated Tritium measurement of about 17,000 dpm was obtained from the Hot Barn floor. All other areas had contamination levels <5,000 dpm/100 $cm^2$ as identified during the characterization survey.

## General Survey Instructions

(Class 1):

1. Perform a minimum of 100% scan of accessible surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$ (100% of the DCGL).
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A1610 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears on floor in survey unit at five unspecified survey locations. |

**Survey performance (Initial and date as each survey is complete)**

| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| **Bristol Myers Squibb Building 122 Room 221 Floor** | | | | | | | | | | | | |
| A1610 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | BSK 4-7-03 | BSK 4-17-03 | N/A | N/A | BSK 4-17-03 | N/A | N/A |
| | | | | | | | | | | | | |
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| Package Review | |
|---|---|
| Date Package Completed: | 4/28/03 |
| Package Reviewed by and Date: | Paul C Ely 4/28/03 |

| Survey Comments |
|---|
| |
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| |

**Survey Package A1610**
**Building 122, Room 221 Floor**

| | | | |
|---|---|---|---|
| **X (Max):** | 5.0 | meters | |
| **Y (Max):** | 14.2 | meters | |
| **A (Area):** | 71 | $m^2$ | |
| **Actual Survey Area:** | 71 | $m^2$ | |
| **COMPASS Survey Points:** | 14 | 0% | percent void area |
| **N (Points):** | 20 | 14 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 2 | meters | (distance between measurement points) |

$$D = 0.866 * L$$

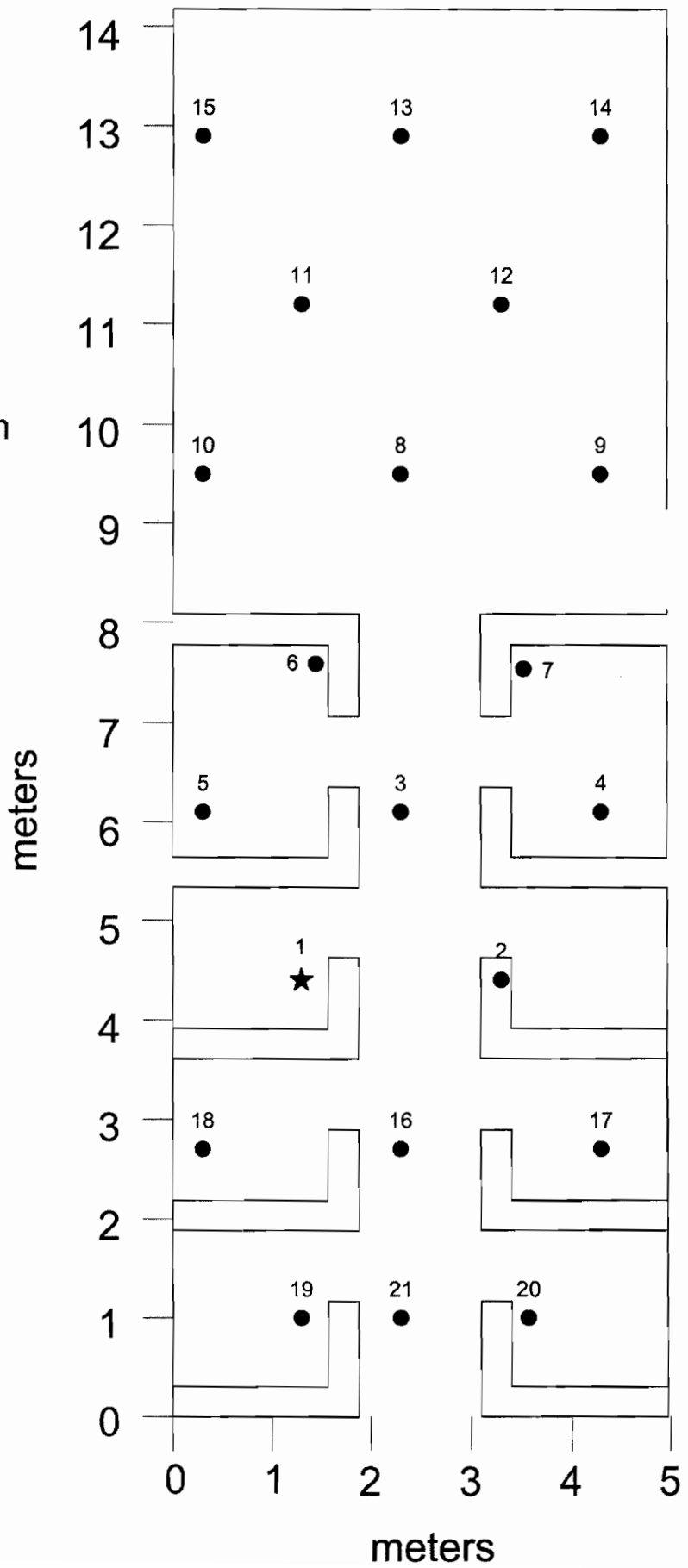
| | | | |
|---|---|---|---|
| **D=** | 1.7 | meters | (distance between rows) |
| **L/2=** | 1.0 | meters | (row offset value) |
| **X (Random):** | 2 | | random number generator |
| **Y (Random):** | 11.5 | | random number generator |
| **X (Origin):** | 1.3 | | initially generated random number |
| **Y (Origin):** | 4.4 | | initially generated random number |
| **Number of rows:** | 8 | | |
| **Number of columns:** | 3 | | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 1.3 | 4.4 | 3 |
| 2 | 3.3 | 4.4 | |
| 3 | 2.3 | 6.1 | 4 |
| 4 | 4.3 | 6.1 | |
| 5 | 0.3 | 6.1 | |
| 6 | 1.3 | 7.8 | 5 |
| 7 | 3.3 | 7.8 | |
| 8 | 2.3 | 9.5 | 6 |
| 9 | 4.3 | 9.5 | |
| 10 | 0.3 | 9.5 | |
| 11 | 1.3 | 11.2 | 7 |
| 12 | 3.3 | 11.2 | |
| 13 | 2.3 | 12.9 | 8 |
| 14 | 4.3 | 12.9 | |
| 15 | 0.3 | 12.9 | |
| 16 | 2.3 | 2.7 | 2 |
| 17 | 4.3 | 2.7 | |
| 18 | 0.3 | 2.7 | |
| 19 | 1.3 | 1.0 | 1 |
| 20 | 3.3 | 1.0 | |
| 21 | 2.3 | 1.0 | |

**SURVEY PACKAGE A1610**

Room 221

X (Max) =5.0 m
Y (Max) = 14.2 m

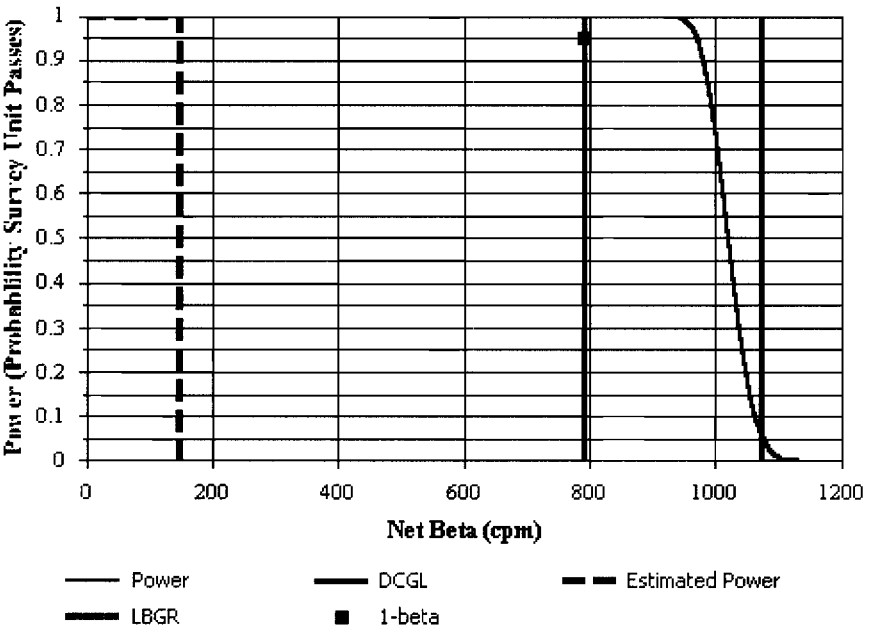


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1610 FSS Package | | |
| Comments: | B-122 Room 221 Floor | | |
| Area (m²): | 71 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 94 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 792 | Estimated Conc. (cpm): | 147 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 388 ± 33 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0900 Rooms 219 to 222**
**Building 122**

| | Floor | | Wall | | Ceiling | |
|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 320 | 380 | 312 | 429 | 295 | 278 |
| | 294 | 372 | 316 | 388 | 333 | 277 |
| | 320 | 360 | 315 | 324 | 260 | 293 |
| | 327 | 389 | 323 | 388 | | |
| | 301 | 358 | 283 | 373 | | |
| | 291 | 361 | 313 | 386 | | |
| | 284 | 420 | 288 | 373 | | |
| | 283 | 380 | 325 | 361 | | |
| | 345 | 399 | 321 | 344 | | |
| | 307 | 463 | 345 | 365 | | |
| | | | 324 | 323 | | |
| | | | 349 | 387 | | |
| | | | 257 | 291 | | |
| | | | 342 | 419 | | |
| | | | 357 | 411 | | |
| **Average** | **307.2** | **388.2** | **318.0** | **370.8** | **296.0** | **282.7** |
| **Standard Deviation** | **20.4** | **32.6** | **26.5** | **37.9** | **36.5** | **9.0** |
| **No of Measurements** | **10** | **10** | **15** | **15** | **3** | **3** |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | **311.8** | **367.6** | **Average** | **356.1** |
| **Standard Deviation** | **25.7** | **45.5** | **Standard Deviation** | **48.3** |
| **No of Measurements** | **28** | **28** | **No of Measurements** | **18** |

**LBGR Determination**

Per MARSSIM, section 5.5.2.3, if the estimated standard deviation, $\sigma$, is much smaller than the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, $\Delta/\sigma$, is about 3.

**Package A1600, A1610 & A1620**

| | | |
|---|---|---|
| $\sigma$ = | 94.0 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 11.4 | >3 |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **792** | **cpm** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyos **Signature:** [signature] **Date:** 4-17-03

Download Station #: 1 Download File #: 71
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Betty S. Kyos **User ID** BSK0490 **Signature:** BSK **Date:** 4-17-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: Bldg. 122, Room 221, Floors A 1610

(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR092524 | 43-68B | .230 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 269 | 2 269 | 3 259 | 4 N/A | 5 N/A | 6 N/A | 266 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .138 PLBBK - 257 PTBBK - 255

SD-73

**M2350-1 Download Beta Report**

| | | |
|---|---|---|
| File Name : 00000071 | Survey Description :Package A1610 B-122 Room 221, Floors | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : Beta | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.23 | Survey Date : 4/17/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSKjos | 8/26/03 |
| | | |

**Comments:**

Sign-Off

| Print Name | Signature | Date |
|---|---|---|
| Paul L. Ely | Paul C Ely | 8/26/03 |

Blank Page

# *Duratek Beta Survey Report*

***Download File Name:*** 00000071

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,566.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 885 |
| ZZZZZ | 10002 | 1 | 33,922.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | [redacted] |
| ZZZZZ | 10002 | 2 | 39,141.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | [redacted] |
| ZZZZZ | 10002 | 3 | 37,036.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | [redacted] |
| ZZZZZ | 19655 | 4 | 1,283.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | 3,540 |
| ZZZZZ | 19655 | 5 | 1,272.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | 3,502 |
| ZZZZZ | 19655 | 6 | 1,273.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | 3,506 |
| A1610 | ZZZZZ | 51 | 269.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 928 |
| A1610 | ZZZZZ | 52 | 259.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 894 |
| A1610 | 01F01 | 53 | 376.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 0.0001 | 1,297 |
| A1610 | 01F01 | 54 | 349.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 1,204 |
| A1610 | 01F01 | 55 | 462.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,594 |
| A1610 | 01F01 | 56 | 361.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 1,246 |
| A1610 | 01F01 | 57 | 391.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 0.0001 | 1,349 |
| A1610 | 01F01 | 58 | 356.0 | 60 | FLDCT | B0003 | ZZZZZ | 6 | 0.0001 | 1,228 |
| A1610 | 01F01 | 59 | 381.0 | 60 | FLDCT | B0003 | ZZZZZ | 7 | 0.0001 | 1,315 |
| A1610 | 01F01 | 60 | 396.0 | 60 | FLDCT | B0003 | ZZZZZ | 8 | 0.0001 | 1,366 |
| A1610 | 01F01 | 61 | 362.0 | 60 | FLDCT | B0003 | ZZZZZ | 9 | 0.0001 | 1,249 |
| A1610 | 01F01 | 62 | 430.0 | 60 | FLDCT | B0003 | ZZZZZ | 10 | 0.0001 | 1,484 |
| A1610 | 01F01 | 63 | 384.0 | 60 | FLDCT | B0003 | ZZZZZ | 11 | 0.0001 | 1,325 |
| A1610 | 01F01 | 64 | 392.0 | 60 | FLDCT | B0003 | ZZZZZ | 12 | 0.0001 | 1,353 |
| A1610 | 01F01 | 65 | 379.0 | 60 | FLDCT | B0003 | ZZZZZ | 13 | 0.0001 | 1,308 |
| A1610 | 01F01 | 66 | 387.0 | 60 | FLDCT | B0003 | ZZZZZ | 14 | 0.0001 | 1,335 |
| A1610 | 01F01 | 67 | 409.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 1,411 |
| A1610 | 01F01 | 68 | 512.0 | 60 | FLDCT | B0003 | ZZZZZ | 16 | 0.0001 | 1,767 |
| A1610 | 01F01 | 69 | 352.0 | 60 | FLDCT | B0002 | ZZZZZ | 17 | 0.0001 | 1,215 |
| A1610 | 01F01 | 70 | 400.0 | 60 | FLDCT | B0003 | ZZZZZ | 18 | 0.0001 | 1,380 |
| A1610 | 01F01 | 71 | 463.0 | 60 | FLDCT | B0003 | ZZZZZ | 19 | 0.0001 | 1,598 |
| A1610 | 01F01 | 72 | 349.0 | 60 | FLDCT | B0003 | ZZZZZ | 20 | 0.0001 | 1,204 |
| A1610 | 01F01 | 73 | 405.0 | 60 | FLDCT | B0003 | ZZZZZ | 21 | 0.0001 | 1,398 |
| ZZZZZ | ZZZZZ | 95 | 2,548.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 879 |
| ZZZZZ | 19655 | 96 | 1,304.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | 3,620 |
| ZZZZZ | 19655 | 97 | 1,201.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | 3,264 |
| ZZZZZ | 19655 | 98 | 1,158.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | 3,116 |
| ZZZZZ | 10002 | 99 | 36,051.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | [redacted] |
| ZZZZZ | 10002 | 100 | 38,825.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | [redacted] |
| ZZZZZ | 10002 | 101 | 33,184.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1610

**ATTACHMENT 6.2**
**SMEAR SURVEY RESULTS FORM**
**(example)**

Performed by BS Kjos (Print) Signature BS Kjos Date 4-17-03 Time 14-00

Counted by BS Kjos (Print) Signature BS Kjos Date 4-28-03 Time 0818

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 108 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 58 | 4 | < MDA |
| 3 | 47 | 0 | |
| 8 | 47 | 0 | |
| 13 | 55 | 1 | |
| 21 | 52 | 0 | < MDA |
| | | | |
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N A

| Circle: | MDA = 12.5 dpm/100cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | < MDA |
| 3 | 0 | 0 | |
| 8 | 0 | 0 | |
| 13 | 1 | .85 | |
| 21 | 0 | 0 | < MDA |
| | | | |
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N A

Remarks-

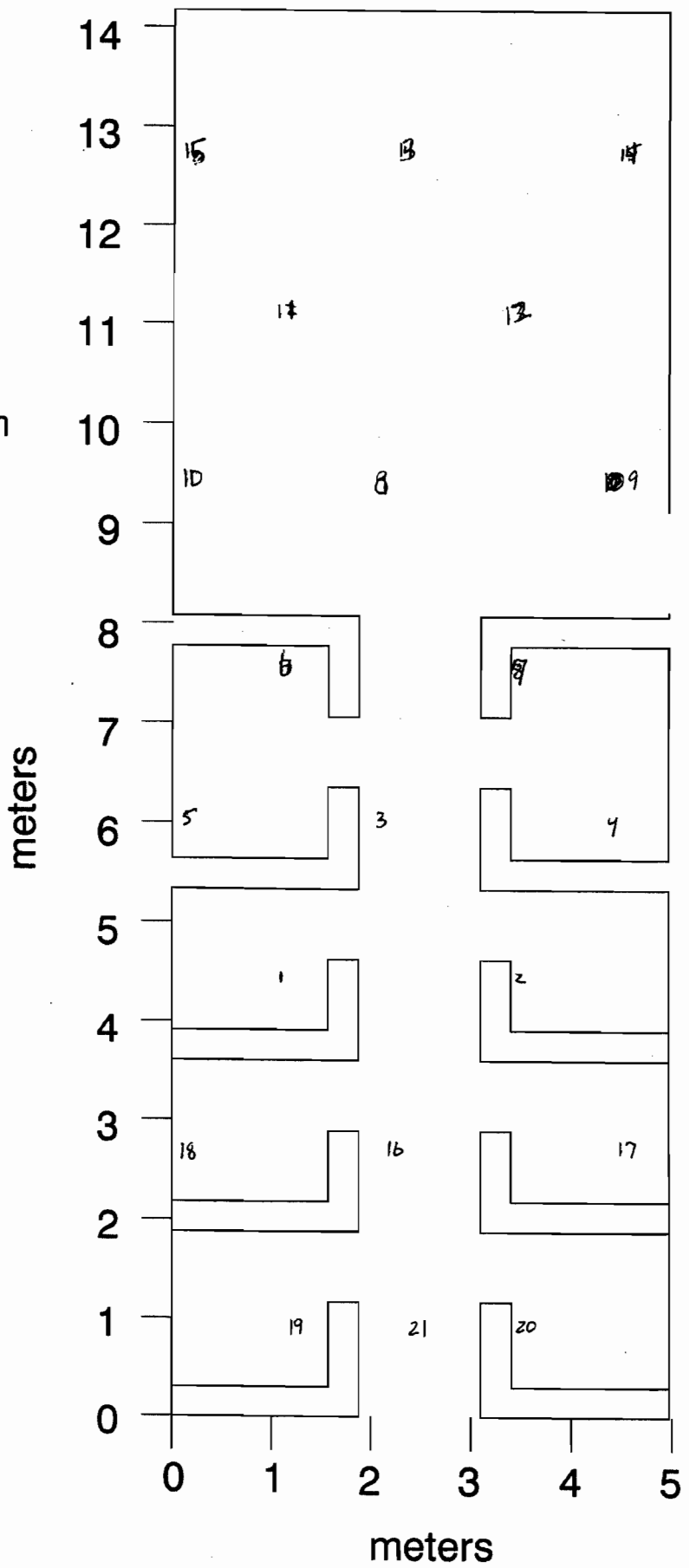
Signature- BS Kjos Reviewed by- Paul C Eg 4/28/03

of

## SURVEY PACKAGE A1610

Room 221

X (Max) =5.0 m
Y (Max) = 14.2 m



Duratek, Inc.
Survey Package Worksheet for Package A1620
Bristol-Myers Squibb Building 122 Room 222 Floor

| | |
|---|---|
| Package Identification No.: A1620 | Prepared by: Paul C. Ely |
| Location: Building 122 Room 222 Floor | Date prepared: 4/14/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 122 Room 222 Floor.

## Historical Information

Building 122 was a radiopharmaceutical storage facility. Radioactive waste from R&D and manufacturing was stored and processed by compaction in Building 122. Waste was also held for decay. The compactor was in room 222. The floors in the Hot Barn and Rooms 221 and 222 had activity levels >5,000 dpm/100 $cm^2$. One elevated Tritium measurement of about 17,000 dpm was obtained from the Hot Barn floor. All other areas had contamination levels <5,000 dpm/100 $cm^2$ as identified during the characterization survey.

## General Survey Instructions

(Class 1):

1. Perform a minimum of 100% scan of accessible surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$ (100% of the DCGL).
3. Perform direct beta measurements at the points given on the survey map that is part of this package.

**Survey Package: A1620 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears on floor in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | 5 | | |
| Bristol Myers Squibb Building 122 Room 222 Floor | | | | | | | | | | | | |
| A1620 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | BSK 4-7-03 | BSK 4-18-03 | N/A | N/A | BSK 4-18-03 | N/A | N/A |
| | | | | | | | | | | | | |
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| Package Review | |
|---|---|
| Date Package Completed: | 4/28/03 |
| Package Reviewed by and Date: | Paul C Elg 4/28/03 |

| Survey Comments |
|---|
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| |

**Survey Package A1620**
**Building 122, Room 222 Floor**

| | | | |
|---|---|---|---|
| **X (Max):** | 5.0 | meters | |
| **Y (Max):** | 12.6 | meters | |
| **A (Area):** | 63 | $m^2$ | |
| **Actual Survey Area:** | 63 | $m^2$ | |
| **COMPASS Survey Points:** | 14 | 0% | percent void area |
| **N (Points):** | 20 | 14 | Estimated Minimum Points |

$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

| | | | |
|---|---|---|---|
| **L=** | 1.9 | meters | (distance between measurement points) |

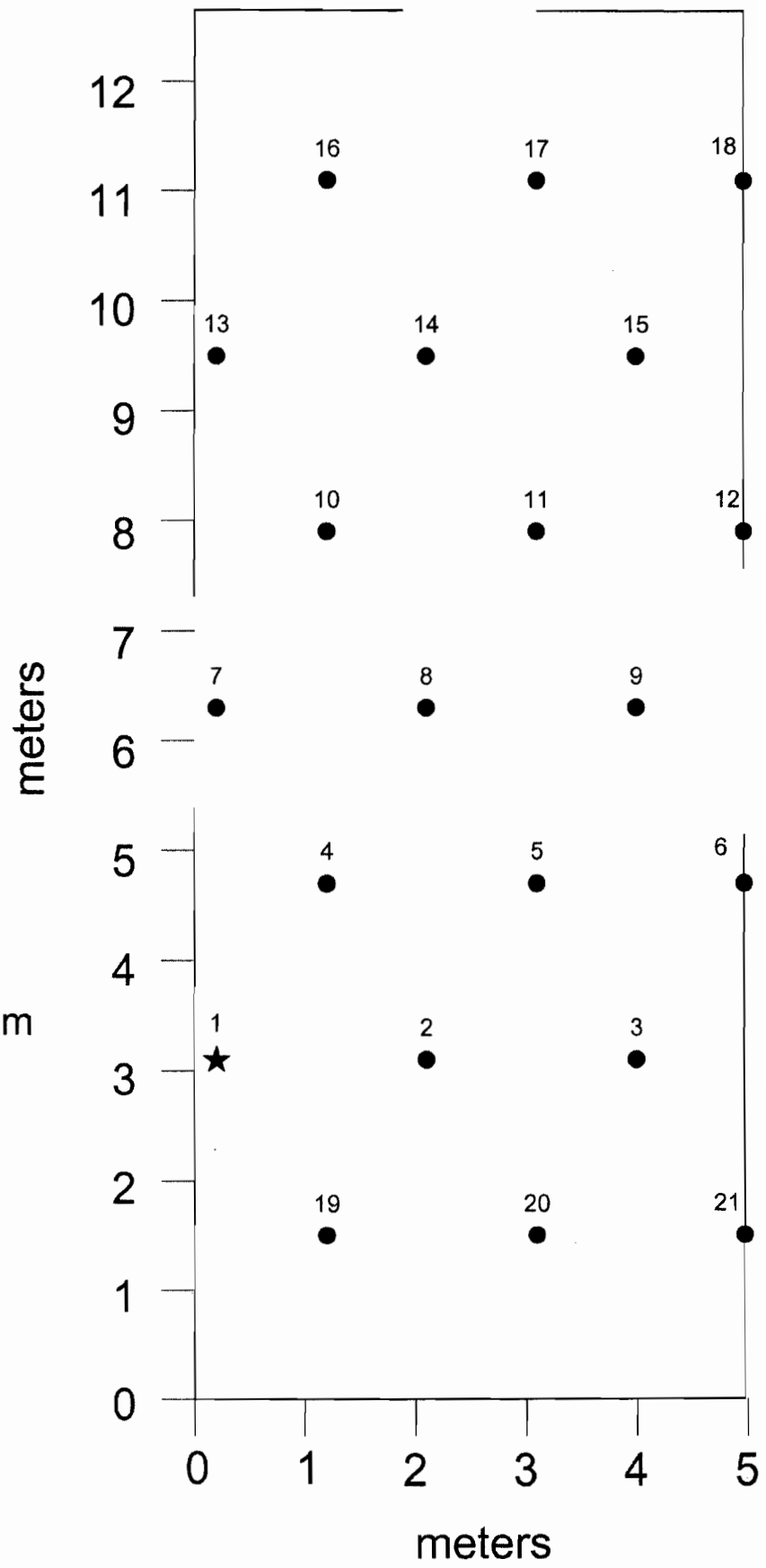
$$D = 0.866 * L$$

| | | | |
|---|---|---|---|
| **D=** | 1.6 | meters | (distance between rows) |
| **L/2=** | 1.0 | meters | (row offset value) |
| **X (Random):** | 3 | | random number generator |
| **Y (Random):** | 6.5 | | random number generator |
| **X (Origin):** | 0.2 | | initially generated random number |
| **Y (Origin):** | 3.1 | | initially generated random number |
| **Number of rows:** | 8 | | |
| **Number of columns:** | 3 | | |

| **Survey Point** | **Survey Location X** | **Y** | **Row** |
|---|---|---|---|
| Starting Point (1) | 0.2 | 3.1 | 2 |
| 2 | 2.1 | 3.1 | |
| 3 | 4.0 | 3.1 | |
| 4 | 1.2 | 4.7 | 3 |
| 5 | 3.1 | 4.7 | |
| 6 | 5.0 | 4.7 | |
| 7 | 0.2 | 6.3 | 4 |
| 8 | 2.1 | 6.3 | |
| 9 | 4.0 | 6.3 | |
| 10 | 1.2 | 7.9 | 5 |
| 11 | 3.1 | 7.9 | |
| 12 | 5.0 | 7.9 | |
| 13 | 0.2 | 9.5 | 6 |
| 14 | 2.1 | 9.5 | |
| 15 | 4.0 | 9.5 | |
| 16 | 1.2 | 11.1 | 7 |
| 17 | 3.1 | 11.1 | |
| 18 | 5.0 | 11.1 | |
| 19 | 1.2 | 1.5 | 1 |
| 20 | 3.1 | 1.5 | |
| 21 | 5.0 | 1.5 | |

**SURVEY PACKAGE A1620**

Room 222



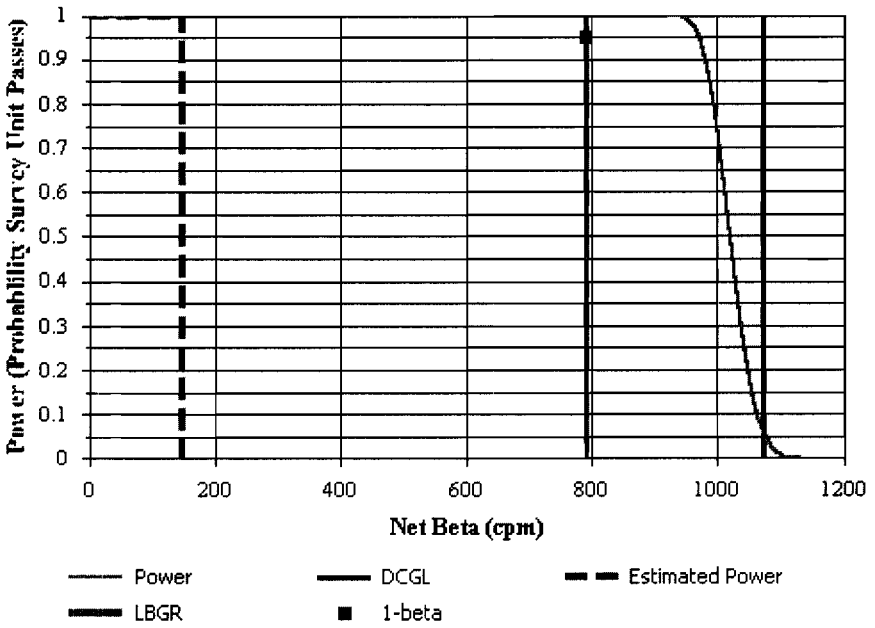

X (Max) =5.0 m
Y (Max) = 12.6 m

# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1620 FSS Package | | |
| Comments: | B-122 Room 222 Floor | | |
| Area (m²): | 63 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 94 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 792 | Estimated Conc. (cpm): | 147 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 388 ± 33 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Concrete | 30 | 240.9 | 88.2 | 497 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0900 Rooms 219 to 222**
**Building 122**

| | Floor | | Wall | | Ceiling | |
|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 320 | 380 | 312 | 429 | 295 | 278 |
| | 294 | 372 | 316 | 388 | 333 | 277 |
| | 320 | 360 | 315 | 324 | 260 | 293 |
| | 327 | 389 | 323 | 388 | | |
| | 301 | 358 | 283 | 373 | | |
| | 291 | 361 | 313 | 386 | | |
| | 284 | 420 | 288 | 373 | | |
| | 283 | 380 | 325 | 361 | | |
| | 345 | 399 | 321 | 344 | | |
| | 307 | 463 | 345 | 365 | | |
| | | | 324 | 323 | | |
| | | | 349 | 387 | | |
| | | | 257 | 291 | | |
| | | | 342 | 419 | | |
| | | | 357 | 411 | | |
| **Average** | **307.2** | **388.2** | **318.0** | **370.8** | **296.0** | **282.7** |
| **Standard Deviation** | **20.4** | **32.6** | **26.5** | **37.9** | **36.5** | **9.0** |
| **No of Measurements** | **10** | **10** | **15** | **15** | **3** | **3** |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | **311.8** | **367.6** | **Average** | **356.1** |
| **Standard Deviation** | **25.7** | **45.5** | **Standard Deviation** | **48.3** |
| **No of Measurements** | **28** | **28** | **No of Measurements** | **18** |

**LBGR Determination**

Per MARSSIM, section 5.5.2.3, if the estimated standard deviation, $\sigma$, is much smaller than the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, $\Delta/\sigma$, is about 3.

**Package A1600, A1610 & A1620**

| | | |
|---|---|---|
| $\sigma$ = | 94.0 | cpm (Calculated by COMPASS) |
| DCGLW = | 1,074 | cpm (Calculated by COMPASS) |
| $DCGL_W/\sigma$ = | 11.4 | >3 |
| $\Delta/\sigma$ = | $(DCGL_W - LBGR) / \sigma$ = | 3 |
| LBGR = | $DCGL_W - 3\sigma$ | |
| **LBGR =** | **792** | **cpm** |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kyos **Signature:** [signature] **Date:** 4-17-03

Download Station #: 1 Download File #: 69
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Betty S. Kyos **User ID** BSK0490 **Signature:** [signature] **Date:** 4-17-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: A1630, Bldg. 122, Room 222, Floors
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ■ Beta β | PR092524 | 43-68B | .230 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 319 | 2 273 | 3 294 | 4 N/A | 5 N/A | 6 N/A | 295 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff = .138 PRBBK - 257 PT BBK - 255

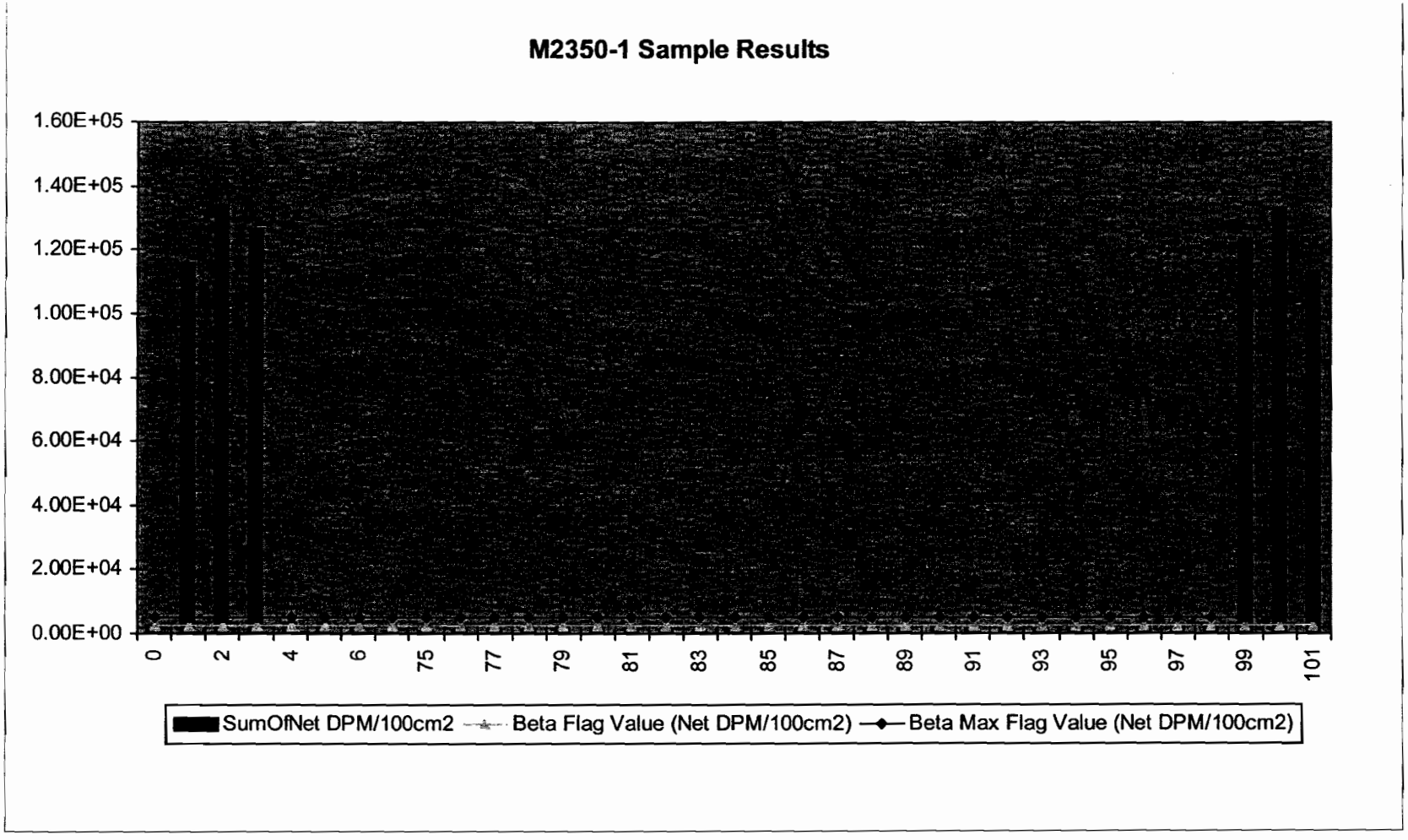
**M2350-1 Download Beta Report**

| | | |
|---|---|---|
| File Name : 00000069 | Survey Description :Package A1620 B-122 Room 222 (Floor) | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : Beta | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.23 | Survey Date : 4/17/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSKjos | 8/26/03 |
| | | |

**Comments:**

Sign-Off Paul C. Ely (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.60E+05
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
2
4
6
75
77
79
81
83
85
87
89
91
93
95
97
99
101
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# Duratek Beta Survey Report

**Download File Name:** 00000069

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd (cpm) | Net (DPM/100cm2) |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,566.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 885 |
| ZZZZZ | 10002 | 1 | 33,922.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | [redacted] |
| ZZZZZ | 10002 | 2 | 39,141.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | [redacted] |
| ZZZZZ | 10002 | 3 | 37,036.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | [redacted] |
| ZZZZZ | 19655 | 4 | 1,283.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | 3,540 |
| ZZZZZ | 19655 | 5 | 1,272.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | 3,502 |
| ZZZZZ | 19655 | 6 | 1,273.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 257 | 3,506 |
| A1620 | ZZZZZ | 74 | 319.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,101 |
| A1620 | ZZZZZ | 75 | 273.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 942 |
| A1620 | ZZZZZ | 76 | 294.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,014 |
| A1620 | 01F01 | 77 | 381.0 | 60 | FLDCT | B0003 | ZZZZZ | 1 | 0.0001 | 1,315 |
| A1620 | 01F01 | 78 | 407.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 1,404 |
| A1620 | 01F01 | 79 | 619.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 2,136 |
| A1620 | 01F01 | 80 | 542.0 | 60 | FLDCT | B0003 | ZZZZZ | 4 | 0.0001 | 1,870 |
| A1620 | 01F01 | 81 | 440.0 | 60 | FLDCT | B0003 | ZZZZZ | 5 | 0.0001 | 1,518 |
| A1620 | 01F01 | 82 | 434.0 | 60 | FLDCT | B0003 | ZZZZZ | 6 | 0.0001 | 1,498 |
| A1620 | 01F01 | 83 | 332.0 | 60 | FLDCT | B0003 | ZZZZZ | 7 | 0.0001 | 1,146 |
| A1620 | 01F01 | 84 | 368.0 | 60 | FLDCT | B0003 | ZZZZZ | 8 | 0.0001 | 1,270 |
| A1620 | 01F01 | 85 | 408.0 | 60 | FLDCT | B0003 | ZZZZZ | 9 | 0.0001 | 1,408 |
| A1620 | 01F01 | 86 | 386.0 | 60 | FLDCT | B0003 | ZZZZZ | 10 | 0.0001 | 1,332 |
| A1620 | 01F01 | 87 | 392.0 | 60 | FLDCT | B0003 | ZZZZZ | 11 | 0.0001 | 1,353 |
| A1620 | 01F01 | 88 | 437.0 | 60 | FLDCT | B0003 | ZZZZZ | 12 | 0.0001 | 1,508 |
| A1620 | 01F01 | 89 | 448.0 | 60 | FLDCT | B0003 | ZZZZZ | 13 | 0.0001 | 1,546 |
| A1620 | 01F01 | 90 | 527.0 | 60 | FLDCT | B0003 | ZZZZZ | 14 | 0.0001 | 1,818 |
| A1620 | 01F01 | 91 | 390.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 1,346 |
| A1620 | 01F01 | 92 | 467.0 | 60 | FLDCT | B0003 | ZZZZZ | 16 | 0.0001 | 1,611 |
| A1620 | 01F01 | 93 | 445.0 | 60 | FLDCT | B0003 | ZZZZZ | 17 | 0.0001 | 1,536 |
| A1620 | 01F01 | 94 | 365.0 | 60 | FLDCT | B0003 | ZZZZZ | 18 | 0.0001 | 1,259 |
| ZZZZZ | ZZZZZ | 95 | 2,548.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 879 |
| ZZZZZ | 19655 | 96 | 1,304.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | 3,620 |
| ZZZZZ | 19655 | 97 | 1,201.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | 3,264 |
| ZZZZZ | 19655 | 98 | 1,158.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | 3,116 |
| ZZZZZ | 10002 | 99 | 36,051.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | [redacted] |
| ZZZZZ | 10002 | 100 | 38,825.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | [redacted] |
| ZZZZZ | 10002 | 101 | 33,184.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 255 | [redacted] |

| | | |
|---|---|---|
| **Beta Flag** | 2500 | - _____ |
| **Beta Max Flag** | 5000 | [redacted] |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kios **Signature:** [signature] **Date:** 4-18-03

Download Station #: 1 Download File #: 74
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Betty S. Kios **User ID** BSK0490 **Signature:** [signature] **Date:** 4-18-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 126197

Survey Unit Description: A1620, Room 222, PTS. 19, 20 + 21
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-30-03 Detector Calibration Due Date: 6-30-03

Type Of Survey: ■ Term Survey ■ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ☐ Beta β | | 43-106B | | | | |
| ☑ Beta β | 092524 | 43-68B | .225 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 280 | 2 275 | 3 295 | 4 n/a | 5 n/a | 6 n/a | 283 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 EFF = .135 PRBK - 253 PT BK - 229
(34-39)

**M2350-1 Download BETA Report**

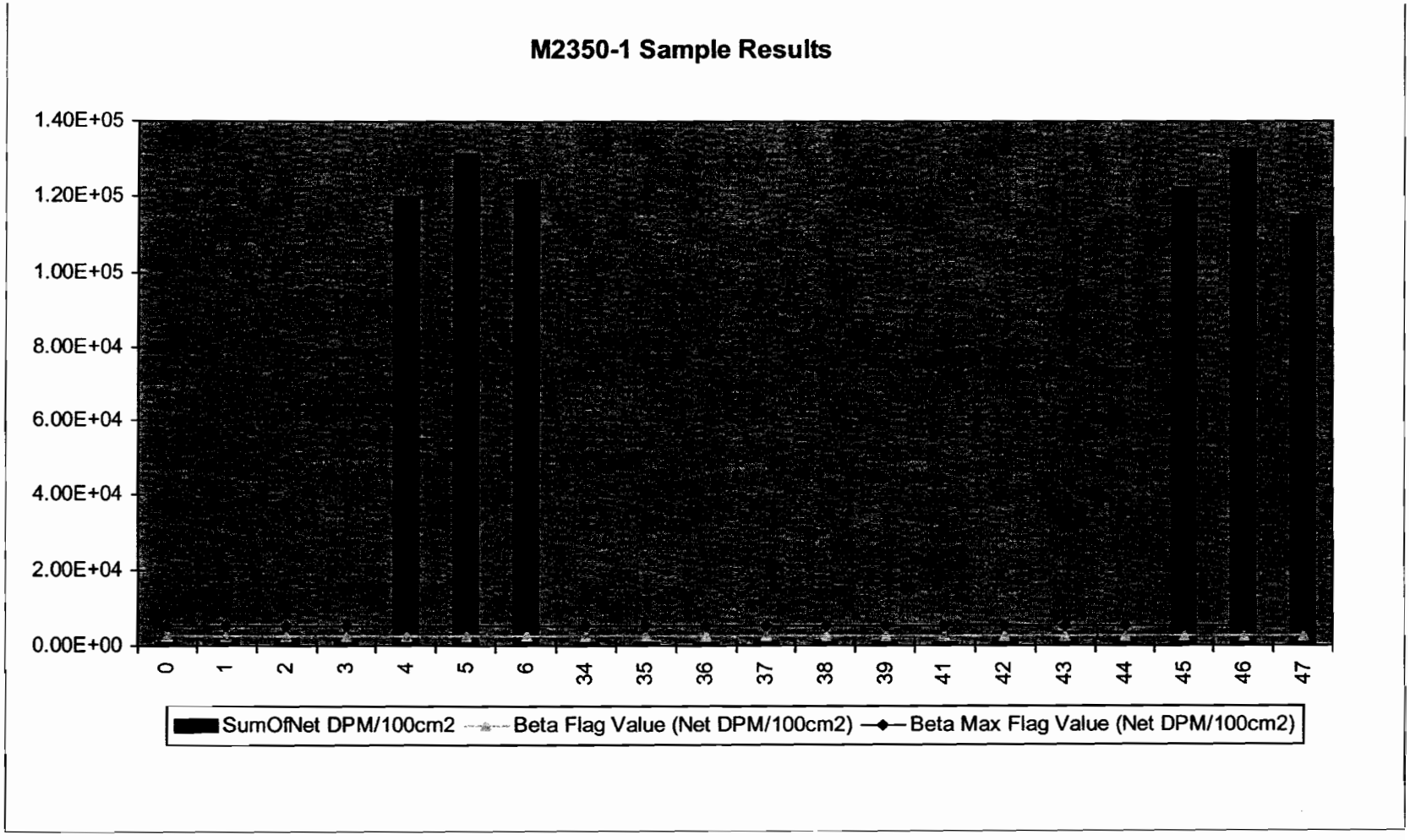
| | | |
|---|---|---|
| File Name : 00000074 | Survey Description :Package A1620, Room 222, Points 19,20 and 21 | |
| Survey Reason : Termination | | |
| User ID : BSK0490 | Technician Name : Betty Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 126197 | Instrument Cal. Due : 6/30/03 |
| Detector Model : 43-68B | Detector S/N : 092524 | Detector Cal. Due : 6/30/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.225 | Survey Date : 4/18/03 |

| Print Name | Signature | Date |
|---|---|---|
| Betty Kjos | BSKjos | 8/26/03 |
| | | |

**Comments:**

Sign-Off

| Print Name | Signature | Date |
|---|---|---|
| PAUL E. ELY | Paul C Ely | 8/26/03 |


M2350-1 Sample Results
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0
1
2
3
4
5
6
34
35
36
37
38
39
41
42
43
44
45
46
47
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000074

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,527.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 891 |
| ZZZZZ | 19655 | 1 | 1,237.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 253 | 3,471 |
| ZZZZZ | 19655 | 2 | 1,254.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 253 | 3,531 |
| ZZZZZ | 19655 | 3 | 1,242.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 253 | 3,489 |
| ZZZZZ | 10002 | 4 | 34,266.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 253 | [redacted] |
| ZZZZZ | 10002 | 5 | 37,531.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 253 | [redacted] |
| ZZZZZ | 10002 | 6 | 35,523.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 253 | [redacted] |
| A1620 | ZZZZZ | 34 | 280.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 988 |
| A1620 | ZZZZZ | 35 | 275.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 970 |
| A1620 | ZZZZZ | 36 | 295.0 | 60 | FLDBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 1,041 |
| A1620 | 01F01 | 37 | 414.0 | 60 | FLDCT | B0003 | ZZZZZ | 19 | 0.0001 | 1,460 |
| A1620 | 01F01 | 38 | 347.0 | 60 | FLDCT | B0003 | ZZZZZ | 20 | 0.0001 | 1,224 |
| A1620 | 01F01 | 39 | 383.0 | 60 | FLDCT | B0003 | ZZZZZ | 21 | 0.0001 | 1,351 |
| ZZZZZ | ZZZZZ | 41 | 2,293.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 809 |
| ZZZZZ | 19655 | 42 | 1,148.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 229 | 3,242 |
| ZZZZZ | 19655 | 43 | 1,210.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 229 | 3,460 |
| ZZZZZ | 19655 | 44 | 1,165.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 229 | 3,302 |
| ZZZZZ | 10002 | 45 | 34,897.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 229 | [redacted] |
| ZZZZZ | 10002 | 46 | 37,801.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 229 | [redacted] |
| ZZZZZ | 10002 | 47 | 32,841.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 229 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 | - _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1620

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by BS Kjos (Print) Signature BS Kjos Date 4-17-03 Time 1430

Counted by BS Kjos (Print) Signature BS Kjos Date 4-18-03 Time 0848

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = .15 Count Time = 1 CPM Eff. Factor = .375

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | MDA = 108 dpm/100cm² β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 3 | 56 | 2 | < MDA |
| 4 | 60 | 6 | |
| 9 | 47 | 0 | |
| 15 | 54 | 0 | |
| 16 | 50 | 0 | < MDA |

N A

| Circle: | MDA = 12.5 dpm/100cm² α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 3 | 0 | 0 | < MDA |
| 4 | 0 | 0 | |
| 9 | 0 | 0 | |
| 15 | 0 | 0 | |
| 16 | 0 | 0 | < MDA |

N A

Remarks-

Signature- BS Kjos Reviewed by- Paul C. Ely 4/28/03

of

Duratek, Inc.
Survey Package Worksheet for Package A1700
Bristol-Myers Squibb Building 83 Tank Vault

| | |
|---|---|
| Package Identification No.: A1700 | Prepared by: Paul C. Ely |
| Location: Building 83 Tank Vault | Date prepared: 4/24/2003 |
| Area Classification: NUREG 1.86 Release Survey | |

## Area Description

The survey area in Building 83 Tank Vault. Note: a separate survey package was generated for the soils under the tank vault, Package E0200.

## Historical Information

The Building 83 Tanks previously received radiopharmaceutical wastewater from Building 83 and other locations. All areas had contamination levels <5,000 dpm/100 $cm^2$ as identified during the characterization survey except for one equipment survey point at 7,293 dpm/100 $cm^2$.

## General Survey Instructions

(NUREG 1.86):

1. Perform a minimum of 100% scan of accessible surfaces. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 2,500 dpm/100 $cm^2$.
3. Obtain 1 smear at each measurement location for gross alpha/beta analysis.

**Survey Package: A1700 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears on floor in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| Bristol Myers Squibb Building 83 Tank Vault | | | | | | | | | | | | |
| ZZZZZ | ZZZZZ | ZZZZZ | ZZZZZ | ZZZZZ | Floors 100% | MOK / 4-25-03 | N/A | N/A | N/A | MOK 6 4-25-03 | N/A | N/A |
| ZZZZZ | ZZZZZ | ZZZZZ | ZZZZZ | ZZZZZ | Walls 100% | MOK / 4-25-03 | N/A | N/A | N/A | MOK 13 4-25-03 | N/A | N/A |
| ZZZZZ | ZZZZZ | ZZZZZ | ZZZZZ | ZZZZZ | Ceiling 100% | MOK / 4-25-03 | N/A | N/A | N/A | MOK 6 4-25-03 | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review | |
|---|---|
| Date Package Completed: | 4/25/03 |
| Package Reviewed by and Date: | Paul C Ely 4/25/03 |

| Survey Comments |
|---|
| |
| |
| |
| |
| |
| |
| |
| |

**ATTACHMENT 6.1**
**SURVEY DATA FORM**
**(example)**

Survey # 02-00~~23~~ 24 10-7-02

RHWP#: ~~02-0002~~ 10-11-02

Performed by: VaMiles Date: 10-08-02 Time: 1600 Elevation: N/A
Location: Tank 83 Vault Lid Job/Task
Meter Type/Model #: 2350-1/43-68B Serial # 126197/092524 Cal Due Date: 02-15-03/02-13-03
Survey Type: (circle) rad Contam A/S Other: LAS Results:
Survey Purpose: (circle) PreRHWP Coverage Verification Decon Other:

Performed a 100% scan of all accessible areas of lid in Vault of TANK 83 with 2350-1 # 126197. All areas of lid Surveyed were < 2500 dpm/fixed. Smears 1-6 were taken on lid. See attached survey sheets for smear results.

Unless otherwise noted: Dose Rates are General Area, * = Contact, = Smear, = Air Sample
Smears = 100 cm², Dose Rate Units are = mrem/hr & = mrad/hr, and = Direct Frisk in cpm
Highest GA N/A Highest Contact * N/A Highest dpm/100 cm² 10-11-02 ~~N/A~~ <MDA

Appropriate box:
RHWP Copy Posted ✓ Signs & Postings Updated ✓ Air Sample Taken & Logged ✓ N/A ✓
Smear Survey Results Form Attached ✓
Information

Page ____ of ____ Signature VaMiles Reviewed by: [signature]

**SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302**

**REVISION 4**

**Survey #-** 02-0024

**ATTACHMENT 6.2**
**SMEAR SURVEY RESULTS FORM**
**(example)**

Performed by (Print) VCMiles Signature VCMiles Date 10-08-02 Time 1600

Counted by (Print) R.SZARO Signature RSzaro Date 10-9-02 Time 0655

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54.5cpm Count Time = 1min. CPM Eff. Factor = 0.255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = 0.25cpm Count Time = 1min. CPM Eff. Factor = 0.325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm / 100 cm² |
| 1 - o/s | 47 | <MDA | <MDA |
| 2 - o/s | 50 | | |
| 3 - o/s | 58 | | |
| 4 - I/s | 51 | | |
| 5 - I/s | 69 | | |
| 6 - I/s | 71 | <MDA | <MDA |
| | | N/A | |

| Circle: | α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm / 100cm² |
| 1 - o/s | 0 | <MDA | <MDA |
| 2 o/s | 0 | | |
| 3 o/s | 0 | | |
| 4 - I/s | 1 | | |
| 5 I/s | 0 | | |
| 6 I/s | 0 | <MDA | <MDA |
| | | N/A | |

**Remarks-** α MDA = 4.4cpm / 13.5 dpm. βγ MDA = ~~12.7~~ 27.7 cpm @ 109 / 109 dpm

**Signature-** RSzaro **Reviewed by-** Paul C Ely

Survey # 02-0025

**ATTACHMENT 6.1**
**SURVEY DATA FORM**
**(example)**

RHWP#: N/A

Performed by: VCMiles Date: 10-10-02 Time: 1500 Elevation: N/A
Location: Tank 83 Vault Inner Walls Job/Task
Meter Type/Model #: 2350-1/43-68B Serial # 129401/PR119837 Cal Due Date: 02-13-03
Survey Type: (circle) rad [Contam] A/S Other: LAS Results
Survey Purpose: (circle) PreRHWP Coverage [Verification] Decon Other:

Performed a 100% scan of all accessible areas of inner walls in vault of TANK 83 with 2350-1 # 129401. All areas Surveyed were < 2500 dpm/fixed. Smears 1-13 were taken on walls. See attached survey sheet for Smear results.

Unless otherwise noted: Dose Rates are General Area, * =Contact, = Smear, = Air Sample
Smears = 100 cm², Dose Rate Units are = mrem/hr & = mrad/hr, and = Direct Frisk in cpm
Highest GA N/A Highest Contact * N/A Highest dpm/100 cm² <MDA
Appropriate box:
RHWP Copy Posted ✓ Signs & Postings Updated ✓ Air Sample Taken & Logged ✓ N/A ✓
Smear Survey Results Form Attached ✓
Information

ge _____ of _____ Signature VCMiles Reviewed by:

Survey #- 02-0025

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by (Print) VC Miles Signature VCMiles Date 10.10-02 Time ~~1500~~ 1200 10-11-02

Counted by (Print) R. Szazo Signature RSzazo Date 10-10-02 Time 1355

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 53.1 Count Time = 1 min. CPM Eff. Factor = 0.255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = 0.15 Count Time = 1 min. CPM Eff. Factor = 0.325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 1 | 58 | <MDA | <MDA |
| 2 | 55 | | |
| 3 | 59 | | |
| 4 | 54 | | |
| 5 | 43 | | |
| 6 | 44 | | |
| 7 | 49 | | |
| 8 | 58 | | |
| 9 | 56 | | |
| 10 | 66 | | |
| 11 | 46 | | |
| 12 | 46 | | |
| 13 | 61 | <MDA | <MDA |
| | | N/A | |

| Circle: | α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 1 | 0 | <MDA | <MDA |
| 2 | 0 | | |
| 3 | 1 | | |
| 4 | 0 | | |
| 5 | 2 | | |
| 6 | 0 | | |
| 7 | 0 | | |
| 8 | 0 | | |
| 9 | 0 | | |
| 10 | 0 | | |
| 11 | 0 | | |
| 12 | 0 | | |
| 13 | 1 | <MDA | <MDA |
| | | N/A | |

Remarks- ~~β/γ~~ MDA = 27.2 cpm / 107 dpm ; α MDA = 4.0 cpm / 12.5 dpm B83 Tank Vault - Walls

Signature- RSzazo Reviewed by- [illegible]

**ATTACHMENT 6.1**
**SURVEY DATA FORM**
**(example)**

Survey #- 02-0027

RHWP#: N/A

Performed by: Douglas R Kiss Date: 10-17-02 Time: 1400 Elevation: ____
Location: Bldg 83 Tank Pit (Concrete Floor under Tanks) Job/Task ____
Meter Type/Model #: 2350 Serial # 129401 / 126197 Cal Due Date: 2-13-03 / 2-15-03
Survey Type: (circle) rad Contam A/S Other: ____ LAS Results ____
Survey Purpose: (circle) PreRHWP Coverage Verification Decon Other: Release

Performed a 100% scan of all accessible areas on concrete floor in Bldg. 83 Tank Pit. All areas on concrete floor were <2500 dpm. See attached survey sheet for smear results.

Unless otherwise noted: Dose Rates are General Area, * = Contact, = Smear, = Air Sample
Smears = 100 cm², Dose Rate Units are = mrem/hr & = mrad/hr, and = Direct Frisk in cpm
Highest GA N/A Highest Contact * N/A Highest dpm/100 cm² <MDA
Appropriate box:
RHWP Copy Posted ✓ Signs & Postings Updated ✓ Air Sample Taken & Logged ✓ N/A ✓
Smear Survey Results Form Attached ✓
Information

Page ____ of ____ Signature [signature] Reviewed by: [signature]

Survey #- 02-0027

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by DR Kjos (Print) Signature [signature] Date 10-16-02 Time 0900

Counted by VCMiles (Print) Signature [signature] Date 10-16-02 Time 1155

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 54.7 Count Time = 1 CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = 0.25 Count Time = 1 CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 1 | 51 | 0 | <MDA |
| 2 | 53 | 0 | <MDA |
| 3 | 42 | 0 | <MDA |
| 4 | 54 | 0 | <MDA |
| 5 | 60 | 5.3 | <MDA |
| 6 | 58 | 3.3 | <MDA |

| Circle: | α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 1 | 0 | 0 | <MDA |
| 2 | 0 | 0 | <MDA |
| 3 | 1 | .75 | <MDA |
| 4 | 2 | 1.75 | <MDA |
| 5 | 0 | 0 | <MDA |
| 6 | 0 | 0 | <MDA |

Remarks- MDA: α 13.5 dpm/100cm²; βγ = 109 dpm/100cm²

Signature- VCMiles Reviewed by- Paul C Ely

Included for Information Only

**BMS Download Survey Report Data Summary**
**Characterization Package A0400**
**Building 83 Tank Vault**
**FSS Package: A1700**

| | Floor | | Wall | | Ceiling | | Equipment | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| 1 | 332 | 494 | 255 | 351 | 306 | 223 | 291 | 399 |
| 2 | 143 | 339 | 262 | 371 | 294 | 213 | 257 | 414 |
| 3 | | | 251 | 327 | 309 | 281 | 255 | 356 |
| 4 | | | 249 | 442 | 262 | 314 | 306 | 1666 |
| 5 | | | 256 | 375 | | | 324 | 374 |
| 6 | | | 246 | 347 | | | 241 | 389 |
| 7 | | | 309 | 402 | | | 273 | 303 |
| 8 | | | 274 | 339 | | | 294 | 321 |
| 9 | | | 280 | 388 | | | | |
| 10 | | | 256 | 410 | | | | |
| 11 | | | 262 | 379 | | | | |
| 12 | | | 287 | 337 | | | | |
| 13 | | | 278 | 344 | | | | |
| 14 | | | 255 | 364 | | | | |
| 15 | | | 255 | 347 | | | | |
| 16 | | | 283 | 323 | | | | |
| **Average** | **237.5** | **416.5** | **266.1** | **365.4** | **292.8** | **257.8** | **280.1** | **527.8** |
| **Standard Deviation** | **133.6** | **109.6** | **17.3** | **32.8** | **21.5** | **48.0** | **28.4** | **461.5** |
| **No of Measurements** | **2** | **2** | **16** | **16** | **4** | **4** | **8** | **8** |

| | | | | |
|---|---|---|---|---|
| **All Measurement** | | | **Walls & Ceiling Measurement** | |
| **Average** | **268.4** | **350.5** | **Average** | **343.9** |
| **Standard Deviation** | **36.6** | **62.4** | **Standard Deviation** | **56.2** |
| **No of Measurements** | **22** | **22** | **No of Measurements** | **20** |

Characterization Fixed Point Readings Included for Information Only

# Duratek Download Survey Report

| | | | | | |
|---|---|---|---|---|---|
| ***Technician Name:*** | Douglas R. Kjos | ***Download File Name:*** | 00000036 | ***User ID*** | ***Det Type (L4)*** |
| ***M2350 SN*** | 95358 | ***Detector Area:*** | 126 | DRK2986 | 02200 |
| ***Detector SN*** | 092522 | ***Efficiency*** | 0.148 | ***File #*** | 36 |
| ***Survey Start Date:*** | 1/28/02 | ***MeasurementType:*** | Beta | ***Det Setup*** | 4 |

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd* | *Net DPM/100cm2* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 3,831.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | 10002 | 1 | 37,853.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 383 | 200,933.1 |
| ZZZZZ | 10002 | 2 | 41,042.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 383 | 218,034.1 |
| ZZZZZ | 10002 | 3 | 37,937.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 383 | 201,383.6 |
| ZZZZZ | 99608 | 4 | 5,542.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 383 | 27,885.2 |
| ZZZZZ | 99608 | 5 | 5,985.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 383 | 30,040.8 |
| ZZZZZ | 99608 | 6 | 5,641.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 383 | 28,196.1 |
| A0400 | 01W01 | 7 | 255.0 | 60 | FLDBK | B0001 | 00PIT | 1 | 255 | 0.0 |
| A0400 | 01W01 | 8 | 351.0 | 60 | FLDCT | B0001 | 00PIT | 1 | 255 | 514.8 |
| A0400 | 01W01 | 9 | 262.0 | 60 | FLDBK | B0001 | 00PIT | 2 | 262 | 0.0 |
| A0400 | 01W01 | 10 | 371.0 | 60 | FLDCT | B0001 | 00PIT | 2 | 262 | 584.5 |
| A0400 | 01W01 | 11 | 251.0 | 60 | FLDBK | B0001 | 00PIT | 3 | 251 | 0.0 |
| A0400 | 01W01 | 12 | 327.0 | 60 | FLDCT | B0001 | 00PIT | 3 | 251 | 407.6 |
| A0400 | 01W01 | 13 | 249.0 | 60 | FLDBK | B0001 | 00PIT | 4 | 249 | 0.0 |
| A0400 | 01W01 | 14 | 442.0 | 60 | FLDCT | B0001 | 00PIT | 4 | 249 | 1,035.0 |
| A0400 | 01W01 | 15 | 256.0 | 60 | FLDBK | B0001 | 00PIT | 5 | 256 | 0.0 |
| A0400 | 01W01 | 16 | 375.0 | 60 | FLDCT | B0001 | 00PIT | 5 | 256 | 638.1 |
| A0400 | 01W01 | 17 | 246.0 | 60 | FLDBK | B0001 | 00PIT | 6 | 246 | 0.0 |
| A0400 | 01W01 | 18 | 347.0 | 60 | FLDCT | B0001 | 00PIT | 6 | 246 | 541.6 |
| A0400 | 01W01 | 19 | 309.0 | 60 | FLDBK | B0001 | 00PIT | 7 | 309 | 0.0 |
| A0400 | 01W01 | 20 | 274.0 | 60 | FLDBK | B0001 | 00PIT | 8 | 274 | 0.0 |
| A0400 | 01W01 | 21 | 280.0 | 60 | FLDBK | B0001 | 00PIT | 9 | 280 | 0.0 |
| A0400 | 01W01 | 22 | 256.0 | 60 | FLDBK | B0001 | 00PIT | 10 | 256 | 0.0 |
| A0400 | 01W01 | 23 | 262.0 | 60 | FLDBK | B0001 | 00PIT | 11 | 262 | 0.0 |
| A0400 | 01W01 | 24 | 287.0 | 60 | FLDBK | B0001 | 00PIT | 12 | 287 | 0.0 |
| A0400 | 01W01 | 25 | 278.0 | 60 | FLDBK | B0001 | 00PIT | 13 | 278 | 0.0 |
| A0400 | 01W01 | 26 | 255.0 | 60 | FLDBK | B0001 | 00PIT | 14 | 255 | 0.0 |
| A0400 | 01W01 | 27 | 255.0 | 60 | FLDBK | B0001 | 00PIT | 15 | 255 | 0.0 |
| A0400 | 01W01 | 28 | 283.0 | 60 | FLDBK | B0001 | 00PIT | 16 | 283 | 0.0 |
| A0400 | 01C01 | 29 | 306.0 | 60 | FLDBK | B0001 | 00PIT | 1 | 306 | 0.0 |
| A0400 | 01C01 | 30 | 294.0 | 60 | FLDBK | B0001 | 00PIT | 2 | 294 | 0.0 |
| A0400 | 01C01 | 31 | 309.0 | 60 | FLDBK | B0001 | 00PIT | 3 | 309 | 0.0 |
| A0400 | 01C01 | 32 | 262.0 | 60 | FLDBK | B0001 | 00PIT | 4 | 262 | 0.0 |
| A0400 | 01F01 | 33 | 332.0 | 60 | FLDBK | B0001 | 00PIT | 1 | 332 | 0.0 |

| | | |
|---|---|---|
| ***Beta Flag*** | - | |
| ***Beta Max Flag*** | 5000 | |

| Package ID(L1) | Surface (L2) | Sample # | Counts | Time (sec) | Count Type(L5) | Material Type(L6) | Grid ID(L7) | Location # (L8) | Bkgd | Net DPM/100cm2 |
|---|---|---|---|---|---|---|---|---|---|---|
| A0400 | 01F01 | 34 | 143.0 | 60 | FLDBK | B0001 | 00PIT | 2 | 143 | 0.0 |
| A0400 | 01F01 | 35 | 494.0 | 60 | FLDCT | B0001 | 00PIT | 1 | 332 | 868.7 |
| A0400 | 01F01 | 36 | 339.0 | 60 | FLDCT | B0001 | 00PIT | 2 | 143 | 1,051.1 |
| A0400 | 01C01 | 37 | 223.0 | 60 | FLDCT | B0001 | 00PIT | 1 | 306 | -445.1 |
| A0400 | 01C01 | 38 | 213.0 | 60 | FLDCT | B0001 | 00PIT | 2 | 294 | -434.4 |
| A0400 | 01C01 | 39 | 281.0 | 60 | FLDCT | B0001 | 00PIT | 3 | 309 | -150.2 |
| A0400 | 01C01 | 40 | 314.0 | 60 | FLDCT | B0001 | 00PIT | 4 | 262 | 278.9 |
| A0400 | 01W01 | 41 | 323.0 | 60 | FLDCT | B0001 | 00PIT | 16 | 283 | 214.5 |
| A0400 | 01W01 | 42 | 347.0 | 60 | FLDCT | B0001 | 00PIT | 15 | 255 | 493.4 |
| A0400 | 01W01 | 43 | 364.0 | 60 | FLDCT | B0001 | 00PIT | 14 | 255 | 584.5 |
| A0400 | 01W01 | 44 | 344.0 | 60 | FLDCT | B0001 | 00PIT | 13 | 278 | 353.9 |
| A0400 | 01W01 | 45 | 337.0 | 60 | FLDCT | B0001 | 00PIT | 12 | 287 | 268.1 |
| A0400 | 01W01 | 46 | 379.0 | 60 | FLDCT | B0001 | 00PIT | 11 | 262 | 627.4 |
| A0400 | 01W01 | 47 | 410.0 | 60 | FLDCT | B0001 | 00PIT | 10 | 256 | 825.8 |
| A0400 | 01W01 | 48 | 388.0 | 60 | FLDCT | B0001 | 00PIT | 9 | 280 | 579.2 |
| A0400 | 01W01 | 49 | 339.0 | 60 | FLDCT | B0001 | 00PIT | 8 | 274 | 348.6 |
| A0400 | 01W01 | 50 | 402.0 | 60 | FLDCT | B0001 | 00PIT | 7 | 309 | 498.7 |
| A0400 | 01EQ1 | 51 | 291.0 | 60 | FLDBK | B9999 | 00PIT | 1 | 291 | 0.0 |
| A0400 | 01EQ1 | 52 | 257.0 | 60 | FLDBK | B9999 | 00PIT | 2 | 257 | 0.0 |
| A0400 | 01EQ1 | 53 | 255.0 | 60 | FLDBK | B9999 | 00PIT | 3 | 255 | 0.0 |
| A0400 | 01EQ1 | 54 | 306.0 | 60 | FLDBK | B9999 | 00PIT | 4 | 306 | 0.0 |
| A0400 | 01EQ1 | 55 | 324.0 | 60 | FLDBK | B9999 | 00PIT | 5 | 324 | 0.0 |
| A0400 | 01EQ1 | 56 | 241.0 | 60 | FLDBK | B9999 | 00PIT | 6 | 241 | 0.0 |
| A0400 | 01EQ1 | 57 | 273.0 | 60 | FLDBK | B9999 | 00PIT | 7 | 273 | 0.0 |
| A0400 | 01EQ1 | 58 | 294.0 | 60 | FLDBK | B9999 | 00PIT | 8 | 294 | 0.0 |
| A0400 | 01EQ1 | 59 | 321.0 | 60 | FLDCT | B9999 | 00PIT | 8 | 294 | 144.8 |
| A0400 | 01EQ1 | 60 | 303.0 | 60 | FLDCT | B9999 | 00PIT | 7 | 273 | 160.9 |
| A0400 | 01EQ1 | 61 | 389.0 | 60 | FLDCT | B9999 | 00PIT | 6 | 241 | 793.7 |
| A0400 | 01EQ1 | 62 | 374.0 | 60 | FLDCT | B9999 | 00PIT | 5 | 324 | 268.1 |
| A0400 | 01EQ1 | 63 | 1,666.0 | 60 | FLDCT | B9999 | 00PIT | 4 | 306 | 7,293.0 |
| A0400 | 01EQ1 | 64 | 356.0 | 60 | FLDCT | B9999 | 00PIT | 3 | 255 | 541.6 |
| A0400 | 01EQ1 | 65 | 414.0 | 60 | FLDCT | B9999 | 00PIT | 2 | 257 | 841.9 |
| A0400 | 01EQ1 | 66 | 399.0 | 60 | FLDCT | B9999 | 00PIT | 1 | 291 | 579.2 |
| ZZZZZ | ZZZZZ | 67 | 3,799.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | | |
| ZZZZZ | 10002 | 68 | 36,956.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 380 | 198,139.0 |
| ZZZZZ | 10002 | 69 | 41,078.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 380 | 218,243.2 |
| ZZZZZ | 10002 | 70 | 38,643.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 380 | 205,185.5 |
| ZZZZZ | 99608 | 71 | 5,661.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 380 | 26,319.4 |
| ZZZZZ | 99608 | 72 | 5,850.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 380 | 29,332.9 |
| ZZZZZ | 99608 | 73 | 5,631.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 380 | 28,158.5 |

***Beta Flag*** - _____

***Beta Max Flag*** 5000

Duratek, Inc.
Survey Package Worksheet for Package A1910
Bristol-Myers Squibb Building 124, Second Floor, Old Section HEPA Housing Interior

| | |
|---|---|
| Package Identification No.: A1910 | Prepared by: Paul C. Ely |
| Location: Building 124, Second Floor, Old Section HEPA Housing Interior | Date prepared: 1/16/2003 |
| Area Classification: Class 1 | |

## Area Description

The survey area in Building 124, Second Floor Old Section HEPA Housing Interior.

## Historical Information

Several independent and redundant ventilation systems were used to exhaust the caves, glove boxes and hoods to the stack. These systems were contaminated to various levels at one time or another with short-lived radionuclides. Most HEPA filter systems were removed during the D&D phase of this project. The large HEPA housing at the southern end of the Old Section of B-124 was left in place. Contamination levels in excess of 5,000 dpm/100 $cm^2$ were found inside this housing prior to decontamination.

## General Survey Instructions

(Class 1):

1. Perform a 100% scan of accessible surfaces inside HEPA Housing. Scan speed should not exceed 2" per second.
2. Immediately notify the Project Manager if any reading greater than the equivalent of 7,100 dpm/100 $cm^2$.
3. Perform direct beta measurements at the points given on the survey map that is part of this package.
4. Take a 1-minute count at each survey location.

**Survey Package: A1910 continued**

| Special Instructions |
|---|
| Source check meters to Tc-99 and C-14 for beta measurements.<br><br>Use gas proportional detector model numbers 43-68 or 43-106 for surveys.<br><br>Perform a minimum of three one minute field backgrounds in air prior to survey.<br><br>Take five smears in survey unit at five unspecified survey locations. |

| Survey performance (Initial and date as each survey is complete) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location Code | | | | | General Description | Beta Scan | Direct Beta | Direct Alpha | 1 meter Gamma | Smear Gross | LS Smear | Media Sample |
| L1 | L2 | L6 | L7 | L8 | | | | | | | | |
| Bristol Myers Squibb Building 124, Second Floor, Old Section HEPA Housing Interior | | | | | | | | | | | | |
| A1910 | 01F01 | ZZZZZ | ZZZZZ | See map | Floors 100% | MDL/3-23-03 | MDL/3-25-03 | N/A | N/A | 5 MDL/3-25-03 | N/A | N/A |
| A1910 | 01F01 | ZZZZZ | ZZZZZ | See map | Walls 100% | MDL/3-23-03 | MDL/3-25-03 | N/A | N/A | N/A | N/A | N/A |
| A1910 | 01F01 | ZZZZZ | ZZZZZ | See map | Ceilings 100% | MDL/3-23-03 | MDL/3-25-03 | N/A | N/A | N/A | N/A | N/A |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Package Review | |
|---|---|
| Date Package Completed: | 3-25-03 |
| Package Reviewed by and Date: | Paul C Ely 4/28/03 |

| Survey Comments |
|---|
| |
| |
| |
| |
| |
| |
| |
| |

survey unit. But by using the 117 $m^2$ area, the survey point spacing meets the requirements of MARSSIM.

For Filter Plenum No. :

$$L = [117/[0.866*15]]^{1/2}$$
$$= (9.01)^{1/2} \text{ m}$$
$$= 3 \text{ m}$$

The distance between measurement rows is given by:

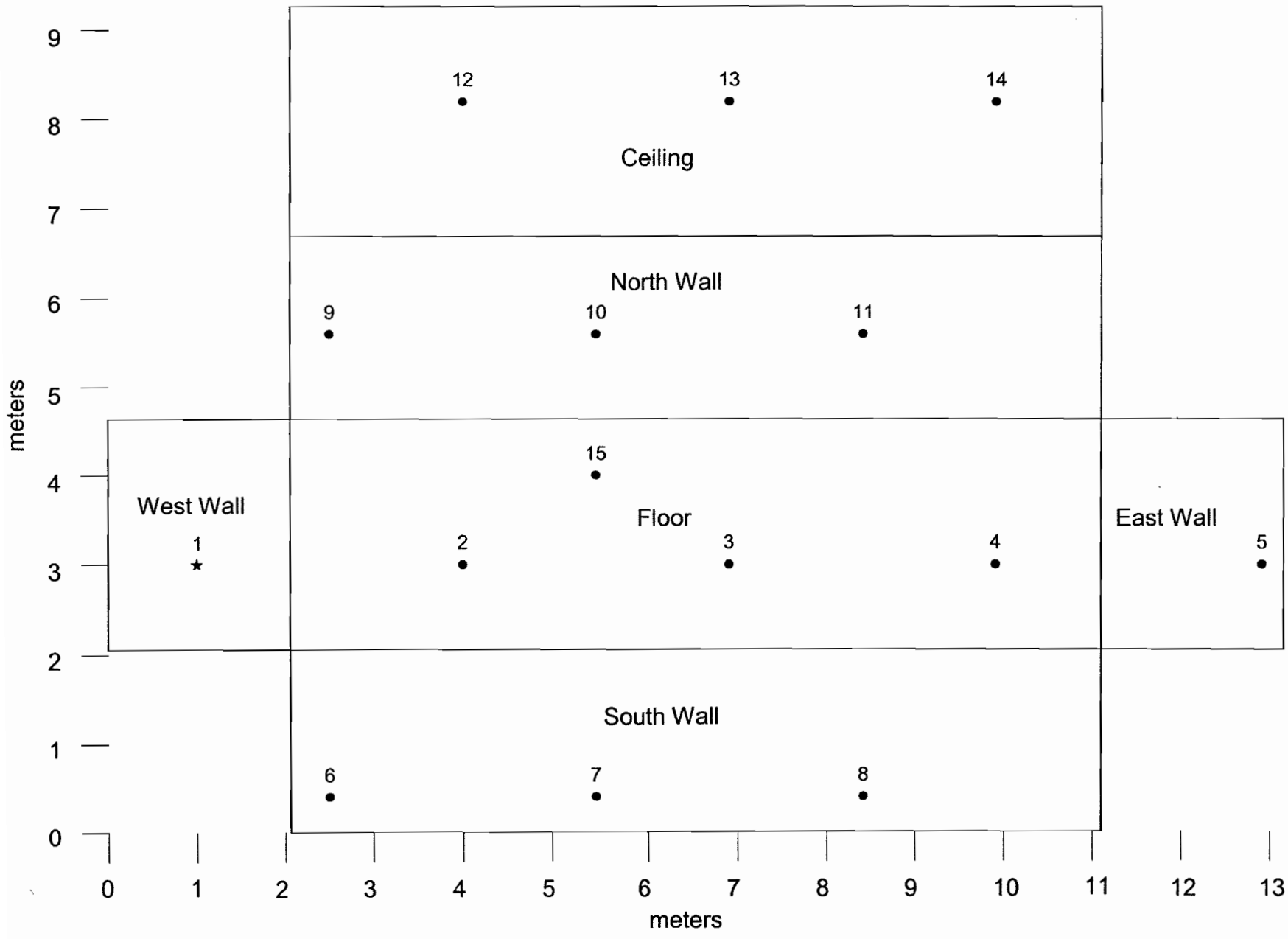
$$D = 0.866 * L$$
$$= 2.6 \text{ m}$$

The measurement points for successive rows shall be offset from the previous row by L/2 or 1.5 m.

Below is given the coordinates of the survey points determined using the information above. This table only includes those points that actually fall in the survey unit. Fourteen points actually fell in the survey unit. The coordinates for a fifteenth point were selected such that the point was on the floor.

| | X | Y |
|---|---|---|
| 1 | 1 | 3 |
| 2 | 4 | 3 |
| 3 | 7 | 3 |
| 4 | 10 | 3 |
| 5 | 13 | 3 |
| 6 | 2.5 | 0.4 |
| 7 | 5.5 | 0.4 |
| 8 | 8.5 | 0.4 |
| 9 | 2.5 | 5.6 |
| 10 | 5.5 | 5.6 |
| 11 | 8.5 | 5.6 |
| 12 | 4 | 8.2 |
| 13 | 7 | 8.2 |
| 14 | 10 | 8.2 |
| 15 | 5.5 | 4 |

# SURVEY PACKAGE A1910

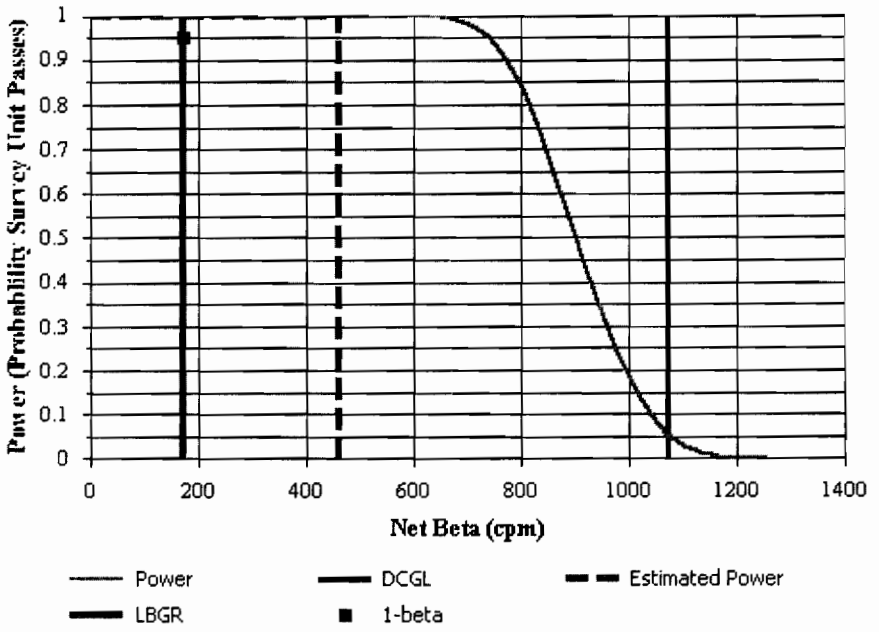


# Building Surface Survey Plan

## Survey Plan Summary

| | | | |
|---|---|---|---|
| Site: | E.R. Squibb & Sons Decommissioning | | |
| Planner(s): | Paul Ely & Bill Hoey | | |
| Survey Unit Name: | A1910 Package | | |
| Comments: | HEPA Housing on 2nd Floor in Old Section of Bldg | | |
| Area (m²): | 18 | Classification: | 1 |
| Selected Test: | Sign | Estimated Sigma (cpm): | 300.6 |
| DCGL (cpm): | 1,074 | Sample Size (N): | 14 |
| LBGR (cpm): | 172 | Estimated Conc. (cpm): | 462 |
| Alpha: | 0.050 | Estimated Power: | 1.00 |
| Beta: | 0.050 | EMC Sample Size (N): | 14 |

## Prospective Power Curve



# Building Surface Survey Plan

## Contaminant Summary

| Contaminant | DCGLw (dpm/100 cm²) |
|---|---|
| Co-60 | 7,100 |

## Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 7,100
Total Efficiency: 0.12
Gross Beta DCGLw (cpm): 1,074

| ID | Type | Mode | Area (cm²) |
|---|---|---|---|
| 1 | Ludlum Model 2350 with Model 43-68 Detector | Beta | 126 |

| Contaminant | Energy[1] | Fraction[2] | Inst. Eff. | Surf. Eff. | Total Eff. |
|---|---|---|---|---|---|
| Co-60 | 96.09 | 1.0000 | 0.47 | 0.25 | 0.1175 |

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 600 ± 300 (1-sigma)
Count Time (min): 1

| Material | Number of BKG Counts | Average (cpm) | Standard Deviation (cpm) | MDC (dpm/100 cm²) |
|---|---|---|---|---|
| Steel Panel | 28 | 137.9 | 18.4 | 381 |

**BMS Download Survey Report Data Summary**
**Characterization Package A0810**
**Building 124 Second Floor Vent Systems Area**

| | Floor | | Wall | | Ceiling | | Structure | |
|---|---|---|---|---|---|---|---|---|
| | Background | Gross | Background | Gross | Background | Gross | Background | Gross |
| | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min | Counts/min | counts/min |
| | 178 | 229 | 149 | 145 | 147 | 162 | 163 | 146 |
| | 128 | 194 | 150 | 146 | 134 | 145 | 141 | 140 |
| | 152 | 223 | 157 | 160 | 156 | 122 | 132 | 132 |
| | 124 | 168 | 129 | 156 | 137 | 136 | 183 | 173 |
| | 139 | 200 | 132 | 155 | 133 | 141 | 133 | 132 |
| | 149 | 185 | 123 | 142 | 141 | 133 | 111 | 136 |
| | 151 | 148 | 158 | 154 | 162 | 194 | 132 | 113 |
| | 125 | 161 | 140 | 165 | 173 | 223 | 135 | 127 |
| | 150 | 130 | 158 | 151 | 101 | 111 | 115 | 115 |
| | 147 | 220 | 144 | 137 | 91 | 144 | 129 | 127 |
| | 153 | 181 | 143 | 138 | | | 122 | 119 |
| | 135 | 180 | 143 | 166 | | | 133 | 108 |
| | 139 | 165 | 123 | 146 | | | 128 | 130 |
| | 337 | 359 | 124 | 132 | | | 126 | 125 |
| | 308 | 433 | 134 | 118 | | | 131 | 126 |
| | 297 | 345 | 143 | 128 | | | | |
| | 329 | 385 | 107 | 105 | | | | |
| | 338 | 377 | 130 | 141 | | | | |
| | 315 | 325 | | | | | | |
| | 300 | 330 | | | | | | |
| | 322 | 340 | | | | | | |
| | 316 | 330 | | | | | | |
| | 293 | 324 | | | | | | |
| | 310 | 363 | | | | | | |
| | 302 | 283 | | | | | | |
| | 298 | 376 | | | | | | |
| | 370 | 336 | | | | | | |
| | 317 | 376 | | | | | | |
| | 323 | 398 | | | | | | |
| | 283 | 336 | | | | | | |
| **Average** | **240.9** | **280.0** | **138.2** | **143.6** | **137.5** | **151.1** | **134.3** | **129.9** |
| **Standard Deviation** | **88.2** | **91.8** | **14.0** | **15.9** | **25.5** | **33.9** | **17.9** | **15.6** |
| **No of Measurements** | **30** | **30** | **18** | **18** | **10** | **10** | **15** | **15** |
| **All Measurement Average** | **179.5** | **197.9** | | | | | | |
| **Standard Deviation** | **77.4** | **92.0** | | | | | | |
| **No of Measurements** | **73** | **73** | | | | | | |

**ATTACHMENT 6.14**
**SURVEY DOWNLOAD DATA SHEET**

**Download Technician: Print Name:** Douglas R Kiss **Signature:** [signature] **Date:** 3-25-03

Download Station #: 1 Download File #: 43
Serial # Verification: Model 2350: ■ Detector: ■ Problems: ☐ (See Comments)

Survey Technician(s):
**Print Name:** Douglas R Kiss **User ID** DRK2986 **Signature:** [signature] **Date:** 3-25-03

**Print Name:** _____ **User ID** _____ **Signature:** _____ **Date:** _____

Instrument Serial #(s): Model 2350: 120633

Survey Unit Description: Package A1910
(Example: Survey Package + description i.e. D16, Building 43, Area 09, Room 100, Floor - Grid Locations A1 through A7)

Instrument Calibration Due Date: 6-27-03 Detector Calibration Due Date: 6-27-03

Type Of Survey: ■ Term Survey ☐ Characterization ☐ Information Only
☐ Other (explain):

| Type of Measurement | Detector Serial Number | Detector Model Number | Detector Efficiency | Source Mean BKG Value | Pre & Post Use Info | |
|---|---|---|---|---|---|---|
| | | | | | Pre File# | Post File# |
| ■ Beta β | | 43-106B | | | | |
| ■ Beta β | PR092522 | 43-68B | .226 | | | |
| ☐ Alpha α | | 43-68A | | | | |
| ☐ Gamma γ | | 44-2 | N/A | N/A | | |
| | | | | | | |

Local Area Background Measurements — MEAN Value in cpm ↓

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| β Beta | 1 188 | 2 191 | 3 219 | 4 N/A | 5 N/A | 6 N/A | 199 |
| α Alpha | 1 | 2 | 3 | 4 | 5 | 6 | |

COMMENTS: C-14 Eff=.133

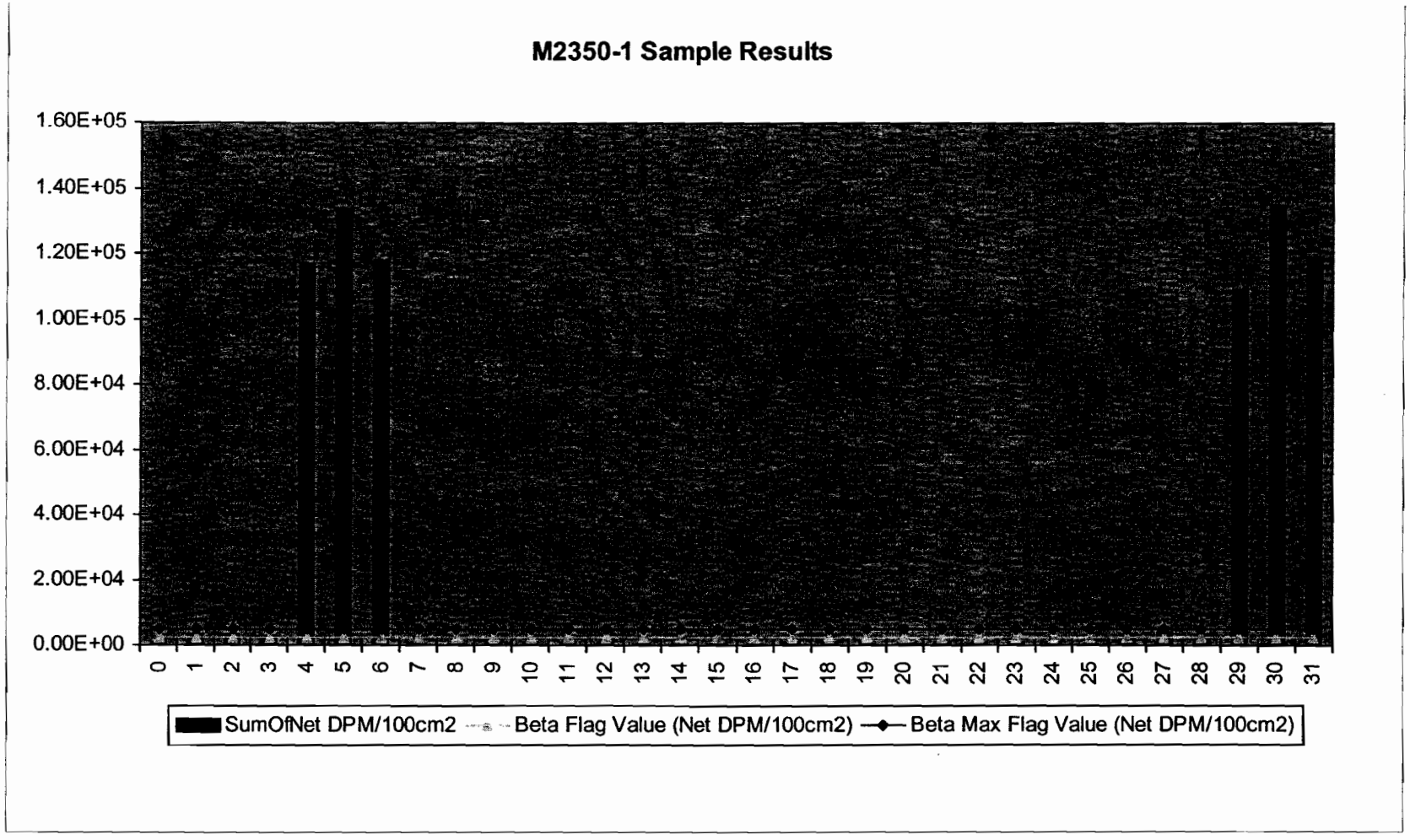
**M2350-1 Download BETA Report**

| | | |
|---|---|---|
| File Name : 00000043 | Survey Description :Package A1910 Bldg.124 2nd Floor | |
| Survey Reason : Termination | | |
| User ID : DRK2986 | Technician Name : Doug Kjos | |
| Instrument Model : 2350-1 | Instrument S/N : 120633 | Instrument Cal. Due : 6/27/03 |
| Detector Model : 43-68B | Detector S/N : 092522 | Detector Cal. Due : 6/27/03 |
| Measurement Type : BETA | Detector Type : 02200 : 126 cm2 Gas Proportional Detector | |
| Detector Area : 126 | Efficiency : 0.226 | Survey Date : 3/25/03 |

| Print Name | Signature | Date |
|---|---|---|
| Doug Kjos | DRK | 8/26/03 |
| | | |

**Comments:**

*Sign-Off* PAUL E. ELY (Print Name) Paul C Ely (Signature) 8/26/03 (Date)


M2350-1 Sample Results
1.60E+05
1.40E+05
1.20E+05
1.00E+05
8.00E+04
6.00E+04
4.00E+04
2.00E+04
0.00E+00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
SumOfNet DPM/100cm2
Beta Flag Value (Net DPM/100cm2)
Beta Max Flag Value (Net DPM/100cm2)

# *Duratek Beta Survey Report*

***Download File Name:*** 00000043

| *Package ID(L1)* | *Surface (L2)* | *Sample #* | *Counts* | *Time (sec)* | *Count Type(L5)* | *Material Type(L6)* | *Grid ID(L7)* | *Location # (L8)* | *Bkgd (cpm)* | *Net (DPM/100cm2)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ZZZZZ | ZZZZZ | 0 | 2,268.0 | 600 | PRBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 796 |
| ZZZZZ | FD184 | 1 | 1,171.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 227 | 3,315 |
| ZZZZZ | FD184 | 2 | 1,244.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 227 | 3,571 |
| ZZZZZ | FD184 | 3 | 1,115.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 227 | 3,118 |
| ZZZZZ | 10002 | 4 | 33,507.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 227 | [redacted] |
| ZZZZZ | 10002 | 5 | 38,289.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 227 | [redacted] |
| ZZZZZ | 10002 | 6 | 33,847.0 | 60 | PRB00 | ZZZZZ | ZZZZZ | 0 | 227 | [redacted] |
| A1910 | 01W01 | 7 | 188.0 | 60 | FLDBK | B9999 | ZZZZZ | 1 | 0.0001 | 660 |
| A1910 | 01W01 | 8 | 191.0 | 60 | FLDBK | B9999 | ZZZZZ | 2 | 0.0001 | 671 |
| A1910 | 01F01 | 9 | 219.0 | 60 | FLDBK | B0003 | ZZZZZ | 3 | 0.0001 | 769 |
| A1910 | 01C01 | 10 | 272.0 | 60 | FLDCT | B9999 | ZZZZZ | 14 | 0.0001 | 955 |
| A1910 | 01C01 | 11 | 224.0 | 60 | FLDCT | B9999 | ZZZZZ | 13 | 0.0001 | 787 |
| A1910 | 01C01 | 12 | 218.0 | 60 | FLDCT | B9999 | ZZZZZ | 12 | 0.0001 | 766 |
| A1910 | 01W01 | 13 | 192.0 | 60 | FLDCT | B9999 | ZZZZZ | 6 | 0.0001 | 674 |
| A1910 | 01W01 | 14 | 181.0 | 60 | FLDCT | B9999 | ZZZZZ | 1 | 0.0001 | 636 |
| A1910 | 01W01 | 15 | 195.0 | 60 | FLDCT | B9999 | ZZZZZ | 9 | 0.0001 | 685 |
| A1910 | 01W01 | 16 | 166.0 | 60 | FLDCT | B9999 | ZZZZZ | 10 | 0.0001 | 583 |
| A1910 | 01W01 | 17 | 211.0 | 60 | FLDCT | B9999 | ZZZZZ | 7 | 0.0001 | 741 |
| A1910 | 01W01 | 18 | 217.0 | 60 | FLDCT | B9999 | ZZZZZ | 8 | 0.0001 | 762 |
| A1910 | 01W01 | 19 | 193.0 | 60 | FLDCT | B9999 | ZZZZZ | 11 | 0.0001 | 678 |
| A1910 | 01W01 | 20 | 188.0 | 60 | FLDCT | B9999 | ZZZZZ | 5 | 0.0001 | 660 |
| A1910 | 01F01 | 21 | 330.0 | 60 | FLDCT | B9999 | ZZZZZ | 4 | 0.0001 | 1,159 |
| A1910 | 01F01 | 22 | 293.0 | 60 | FLDCT | B0003 | ZZZZZ | 3 | 0.0001 | 1,029 |
| A1910 | 01F01 | 23 | 264.0 | 60 | FLDCT | B0003 | ZZZZZ | 2 | 0.0001 | 927 |
| A1910 | 01F01 | 24 | 302.0 | 60 | FLDCT | B0003 | ZZZZZ | 15 | 0.0001 | 1,061 |
| ZZZZZ | ZZZZZ | 25 | 2,101.0 | 600 | PTBBK | ZZZZZ | ZZZZZ | 0 | 0.0001 | 738 |
| ZZZZZ | FD184 | 26 | 1,184.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 210 | 3,420 |
| ZZZZZ | FD184 | 27 | 1,308.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 210 | 3,856 |
| ZZZZZ | FD184 | 28 | 1,156.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 210 | 3,322 |
| ZZZZZ | 10002 | 29 | 31,285.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 210 | [redacted] |
| ZZZZZ | 10002 | 30 | 38,652.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 210 | [redacted] |
| ZZZZZ | 10002 | 31 | 34,132.0 | 60 | PTB00 | ZZZZZ | ZZZZZ | 0 | 210 | [redacted] |

| | | |
|---|---|---|
| ***Beta Flag*** | 2500 - | _____ |
| ***Beta Max Flag*** | 5000 | [redacted] |

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1910

## ATTACHMENT 6.2
## SMEAR SURVEY RESULTS FORM
(example)

Performed by Douglas R Kyos (Print) Signature [signature] Date 3-25-03 Time 1315

Counted by Douglas R Kyos (Print) Signature [signature] Date 3-25-03 Time 1433

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 53 Count Time = 1 min CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = 0.25 Count Time = 1 min CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 53 | 0 | <MDA |
| 15 | 47 | 0 | <MDA |
| 11 | 60 | 7 | <MDA |
| 4 | 48 | 0 | <MDA |
| 3 | 45 | 0 | <MDA |

| Circle: | α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | <MDA |
| 15 | 0 | 0 | <MDA |
| 11 | 0 | 0 | <MDA |
| 4 | 0 | 0 | <MDA |
| 3 | 1 | .75 | <MDA |

Remarks- β-γ-MDA: cpm-27.2, dpm-107 ; α-MDA · cpm-4.4, dpm-13.5

Signature- [signature] Reviewed by- Paul C Eg 4/28/03

of

SURVEY DOCUMENTATION AND REVIEW REDS-OPS-302

REVISION 4

Survey #- A1910

**ATTACHMENT 6.2**
**SMEAR SURVEY RESULTS FORM**
**(example)**

Performed by Douglas R Kyos (Print) Signature [signature] Date 3-25-03 Time 1315

Counted by Douglas R Kyos (Print) Signature [signature] Date 3-25-03 Time 1433

All smears are 100 cm² unless otherwise noted.

β-γ Counter Type/Model No.: 2929 Bkg = 53 Count Time = 1 min CPM Eff. Factor = .255

Serial #- 118419 Cal Due Date—5-29-03

α-Counter Type/Model No.: 2929 Bkg = 0.25 Count Time = 1 min CPM Eff. Factor = .325

Serial #- 118419 Cal Due Date—5-29-03

| Circle: | β-γ | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100 cm² |
| 2 | 53 | 0 | <MDA |
| 15 | 47 | 0 | <MDA |
| 11 | 60 | 7 | <MDA |
| 4 | 48 | 0 | <MDA |
| 3 | 45 | 0 | <MDA |

| Circle: | α | | |
|---|---|---|---|
| Smear Number | CPM (gross) | nCPM (CPM-BKG) | dpm 100cm² |
| 2 | 0 | 0 | <MDA |
| 15 | 0 | 0 | <MDA |
| 11 | 0 | 0 | <MDA |
| 4 | 0 | 0 | <MDA |
| 3 | 1 | .75 | <MDA |

Remarks- β-γ-MDA: cpm-27.2, dpm-107 ; α-MDA - cpm-4.4, dpm-13.5

Signature- [signature] Reviewed by- Paul C Ely 4/28/03

of