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
1009 Commerce Park Drive
Oak Ridge, TN 37830

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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COMPASS	N/A	Site Report	N/A	CHR01
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A0200	124	148 & 149	Floor	A0200
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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
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A1700	83	Tank Vault (1.86)	All	A1700
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Survey Package	Building	Room/Area Description	Surface	Tab No.
		Class 2 Survey Units Consist of the Following		
B0100	124	Tank Vault	All	B0100
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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. 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 (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

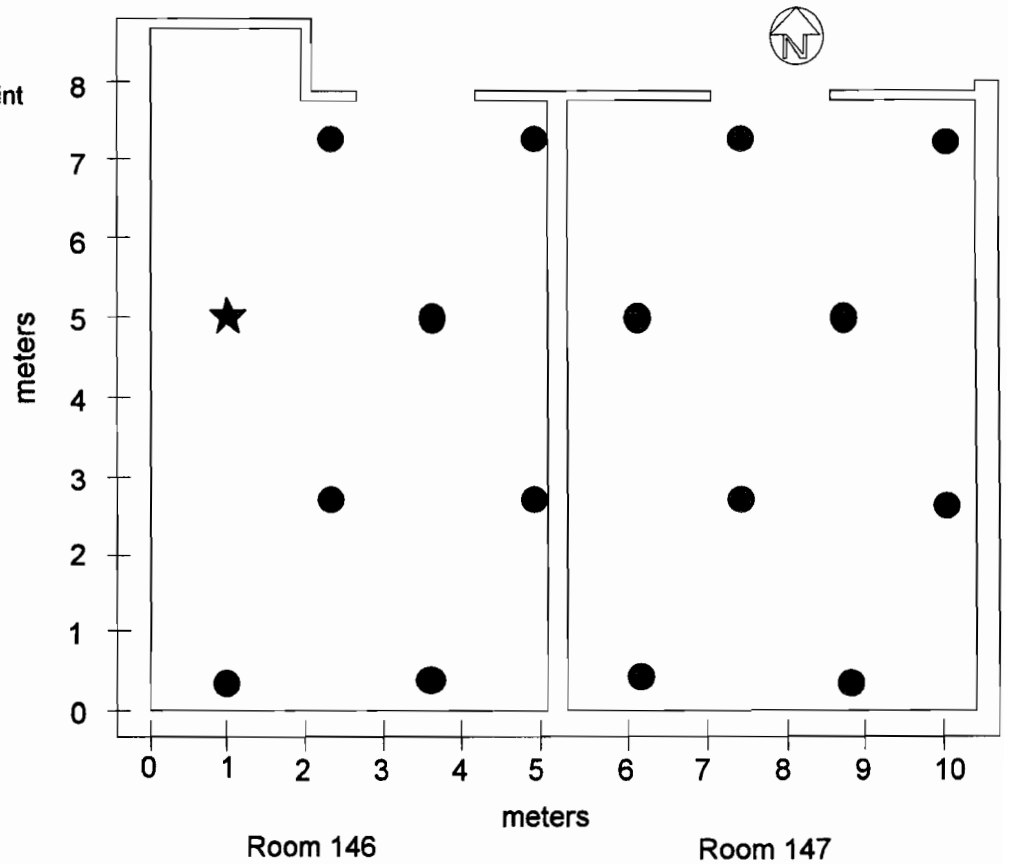
Package Review
Date Package Completed: 4/30/03
Package Reviewed by and Date: Paul C Ely 4/30/03

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

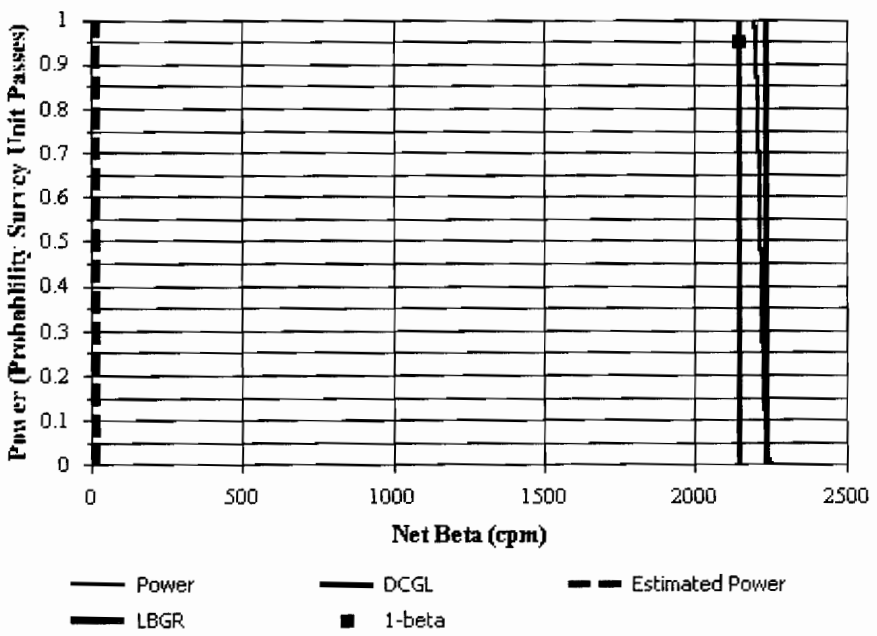
This is the Excel spread sheet used to generate the coordinates.

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

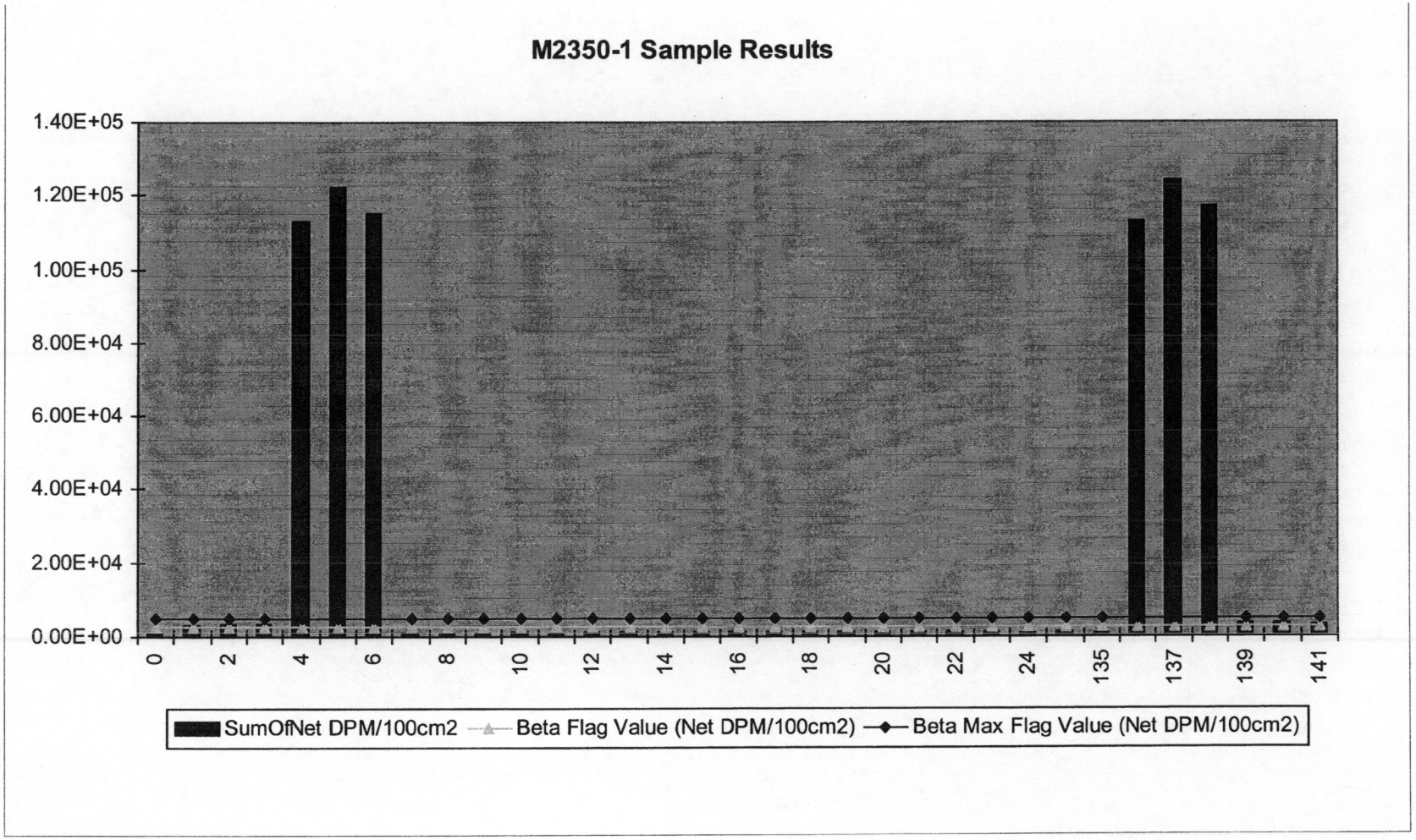
M2350-1 Download Beta Report

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. 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 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

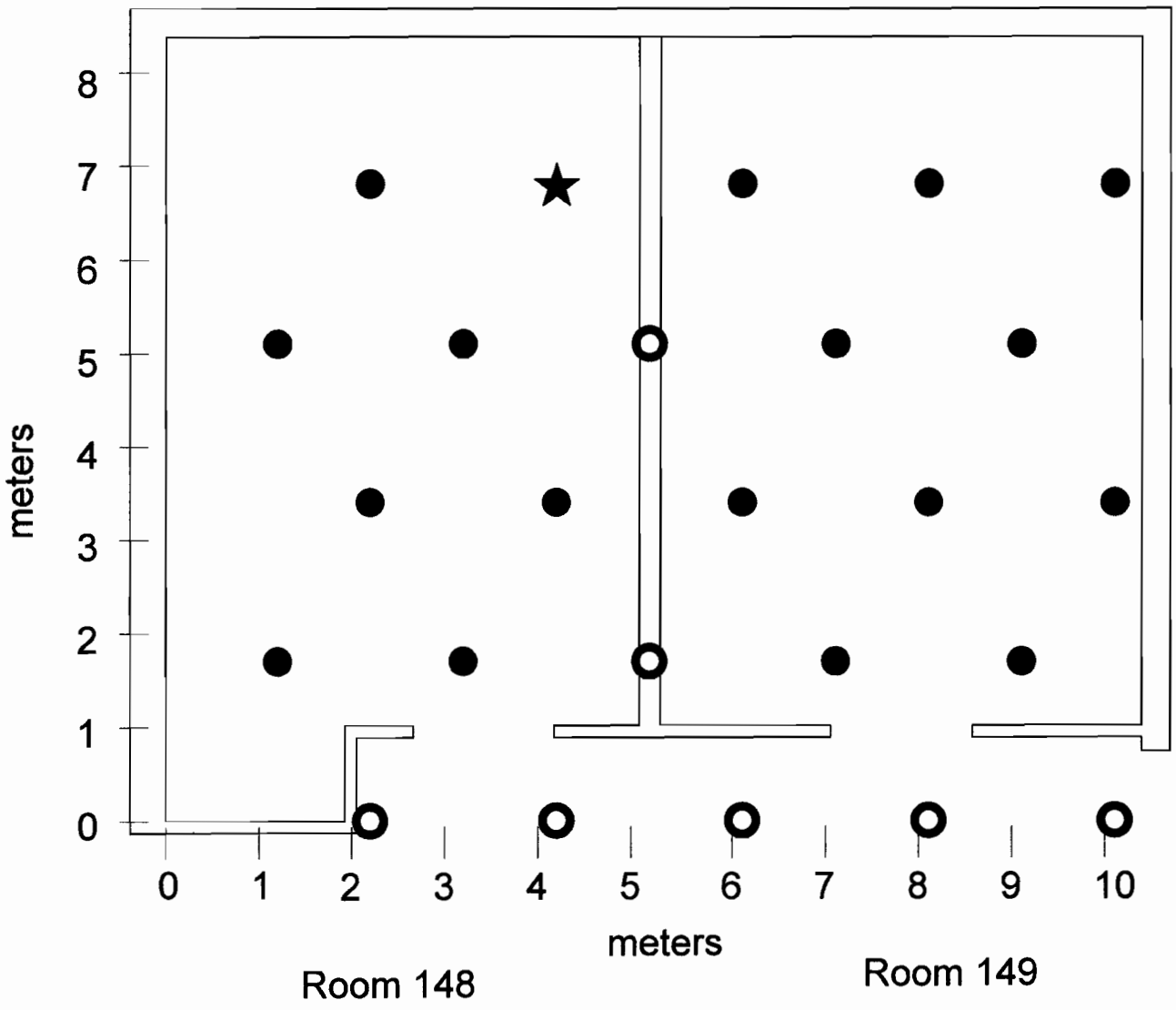
Number of rows:	5
Number of columns:	5

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

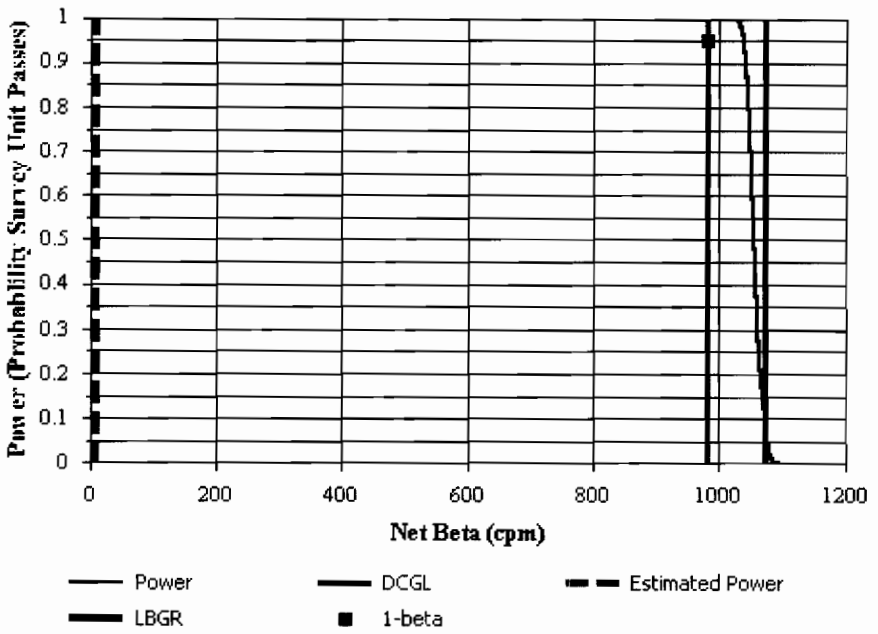


Building Surface Survey Plan

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

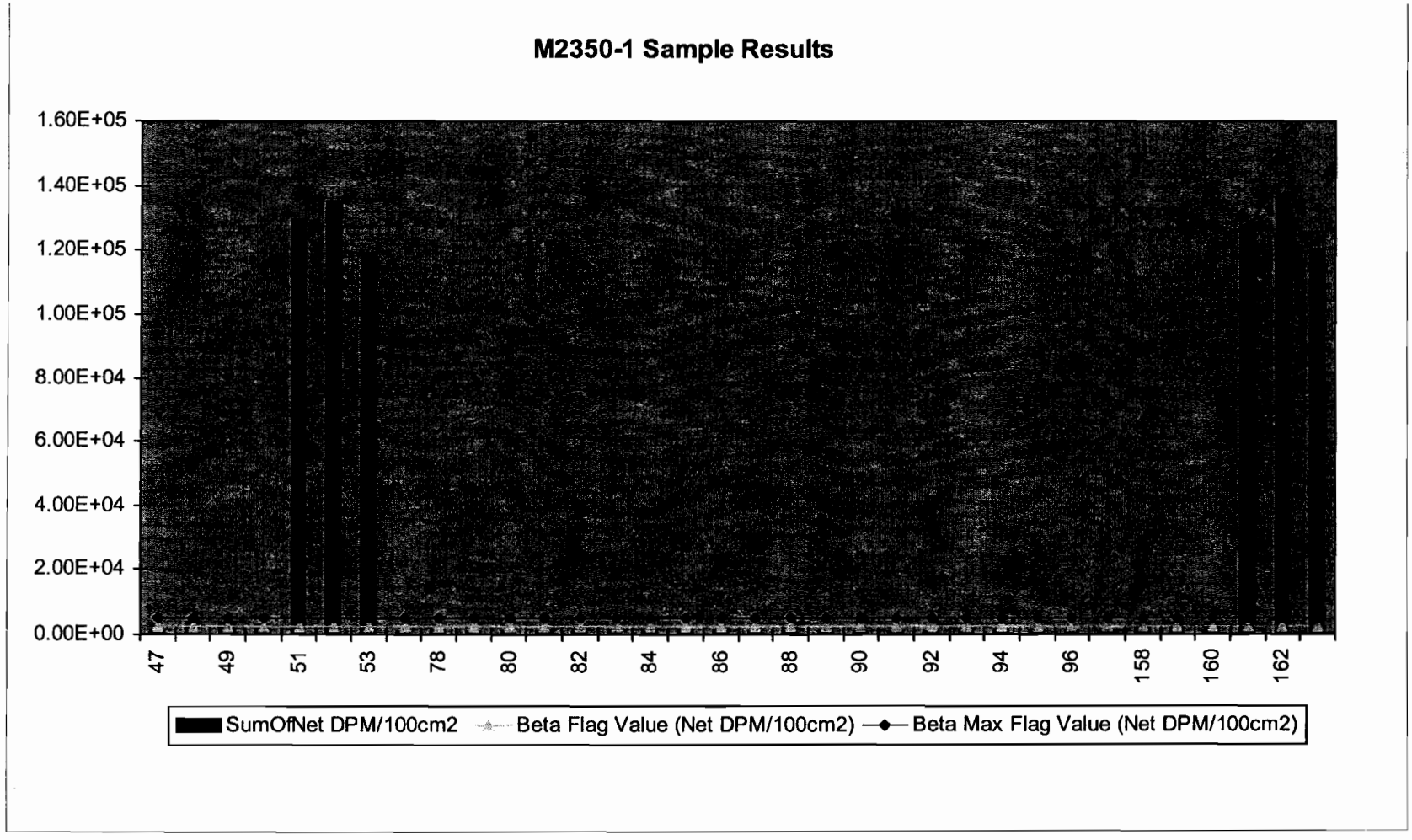
M2350-1 Download BETA Report

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

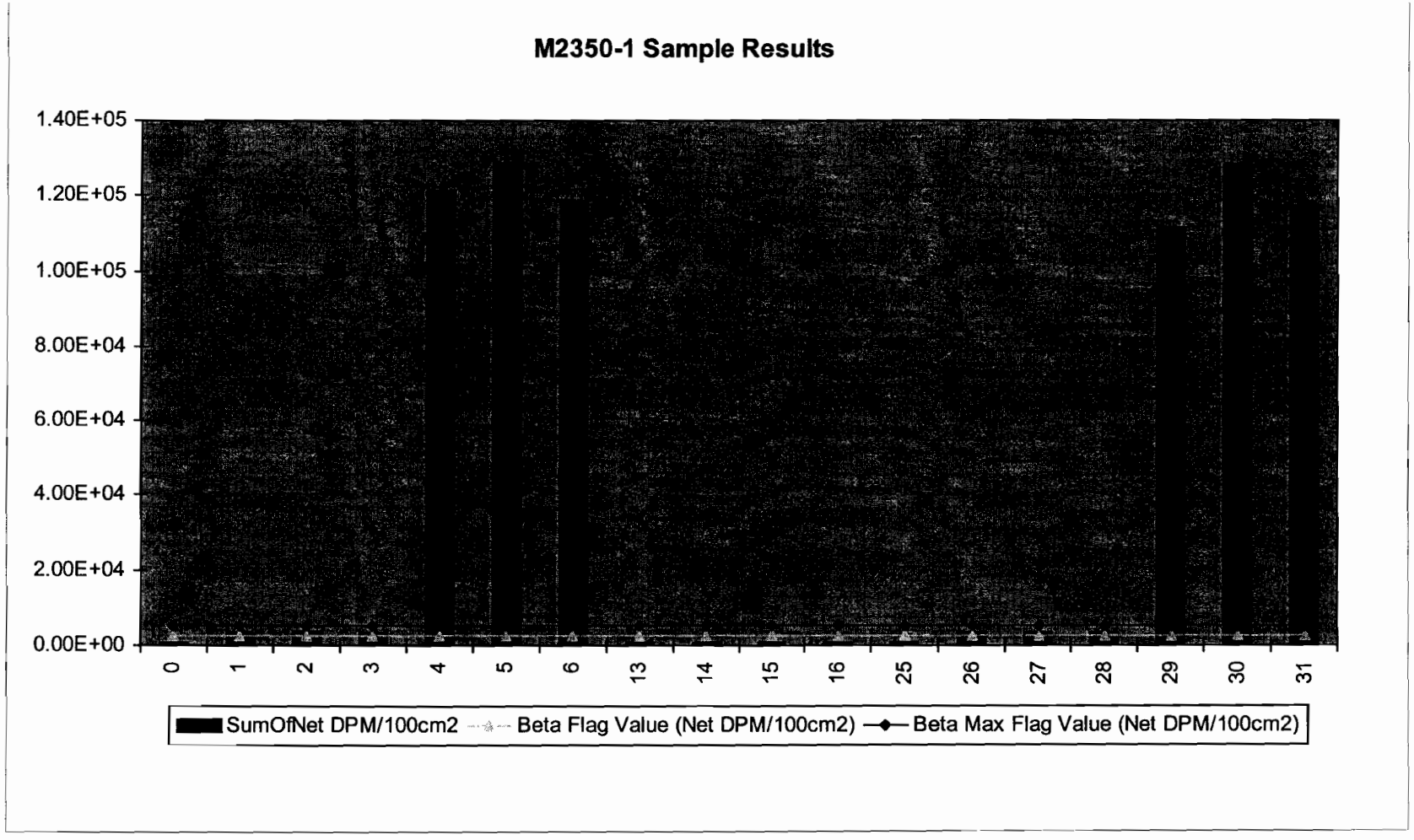
M2350-1 Download Beta Report

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. 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. No contamination in either room was identified during the characterization survey. 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. 2) Scan 100% of the soil surface keeping the detector within 6 inches of the soil surface. 3) Scan down the middle of each trench keeping the detector within 6 inches of the soil surface. 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. 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. Perform a one minute background count in the hallway outside of 150 and 152 at the beginning and end of the survey. Use detector model number 44-2 for surveys.

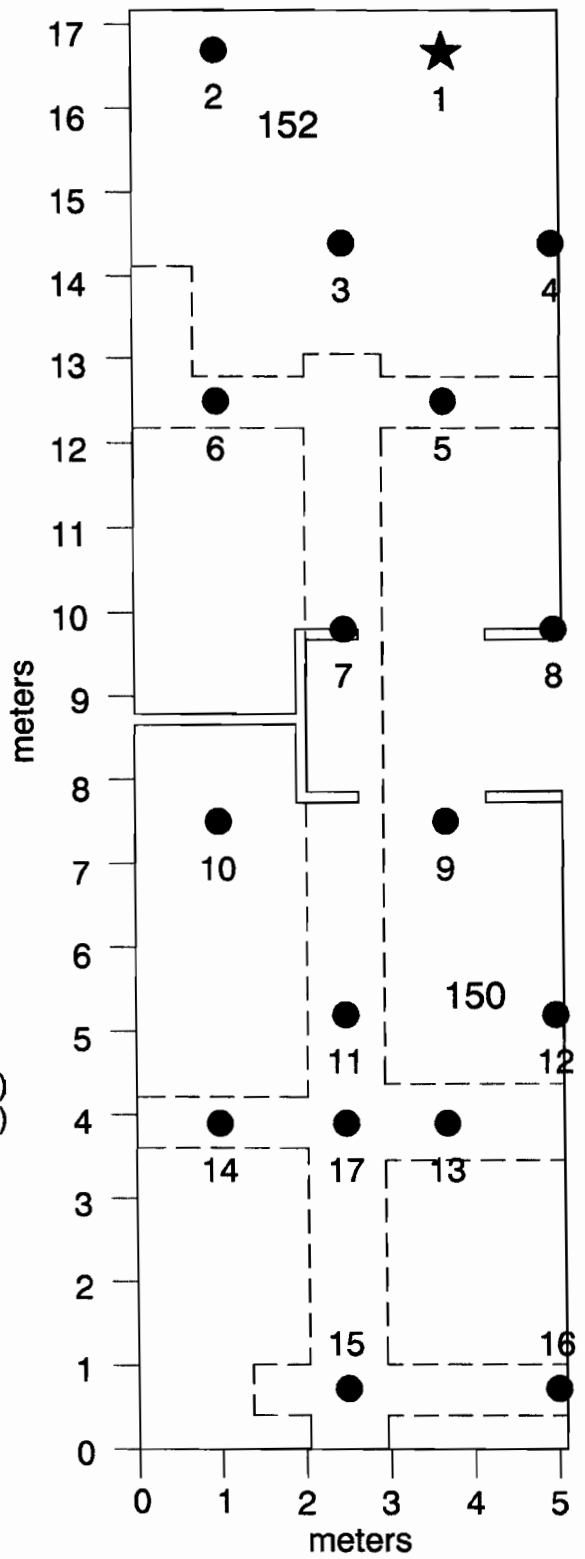
Survey performance (Initial and date as each survey is complete)

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

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

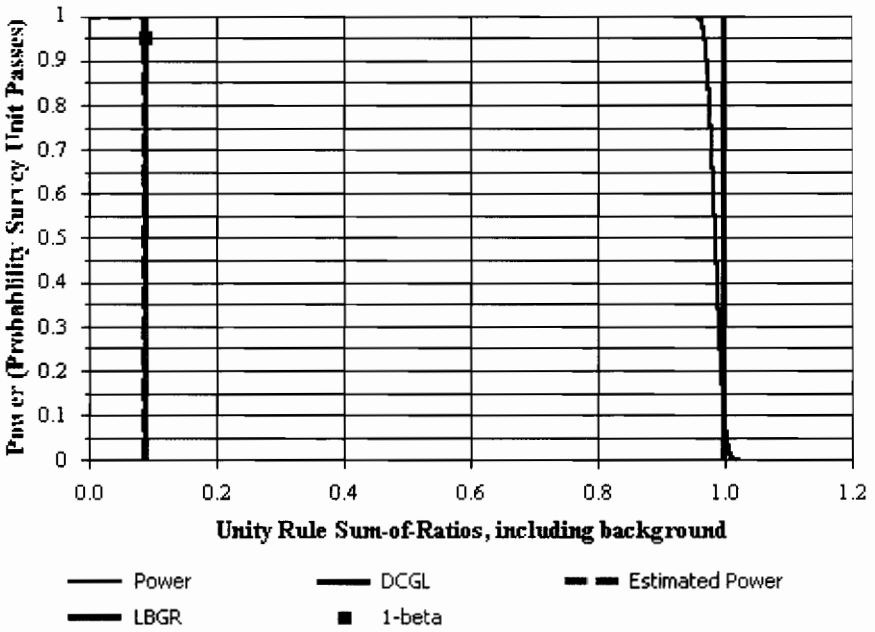
The numbers in parentheses indicate that the random locations were shifted to the locations in parentheses. This was done to bias the survey locations to obtain at least 50% of the samples from the trenches where pipe removal or soil remediation took place.
Point 17 was added because this location required 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, σ, is very small compared to the $DCGL_W$. Therefore, per MARSSIM, section 8.3.3, the LBGR set so the relative shift, Δ/σ, 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

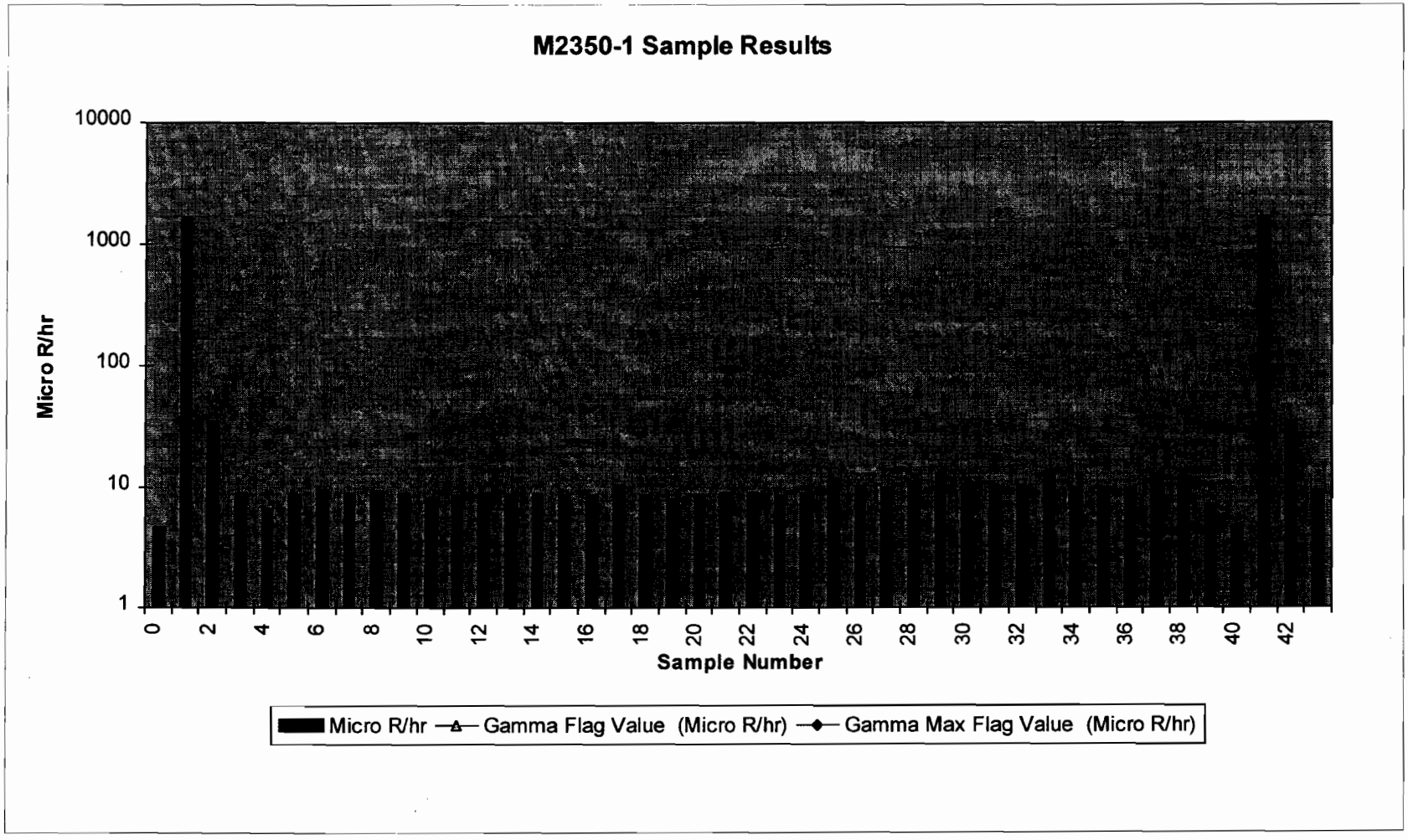
File Name : 00000039	Survey Description :Package A0300 Rooms 150 & 152	
Survey Reason : Termination		
User ID : DPS4133	Technician Name : Donnie Schumaker	
Instrument Model : 2350-1	Instrument S/N : 129401	Instrument Cal. Due : 6/30/03
Detector Model : LMI 44-2	Detector S/N : 088920	Detector Cal. Due : 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

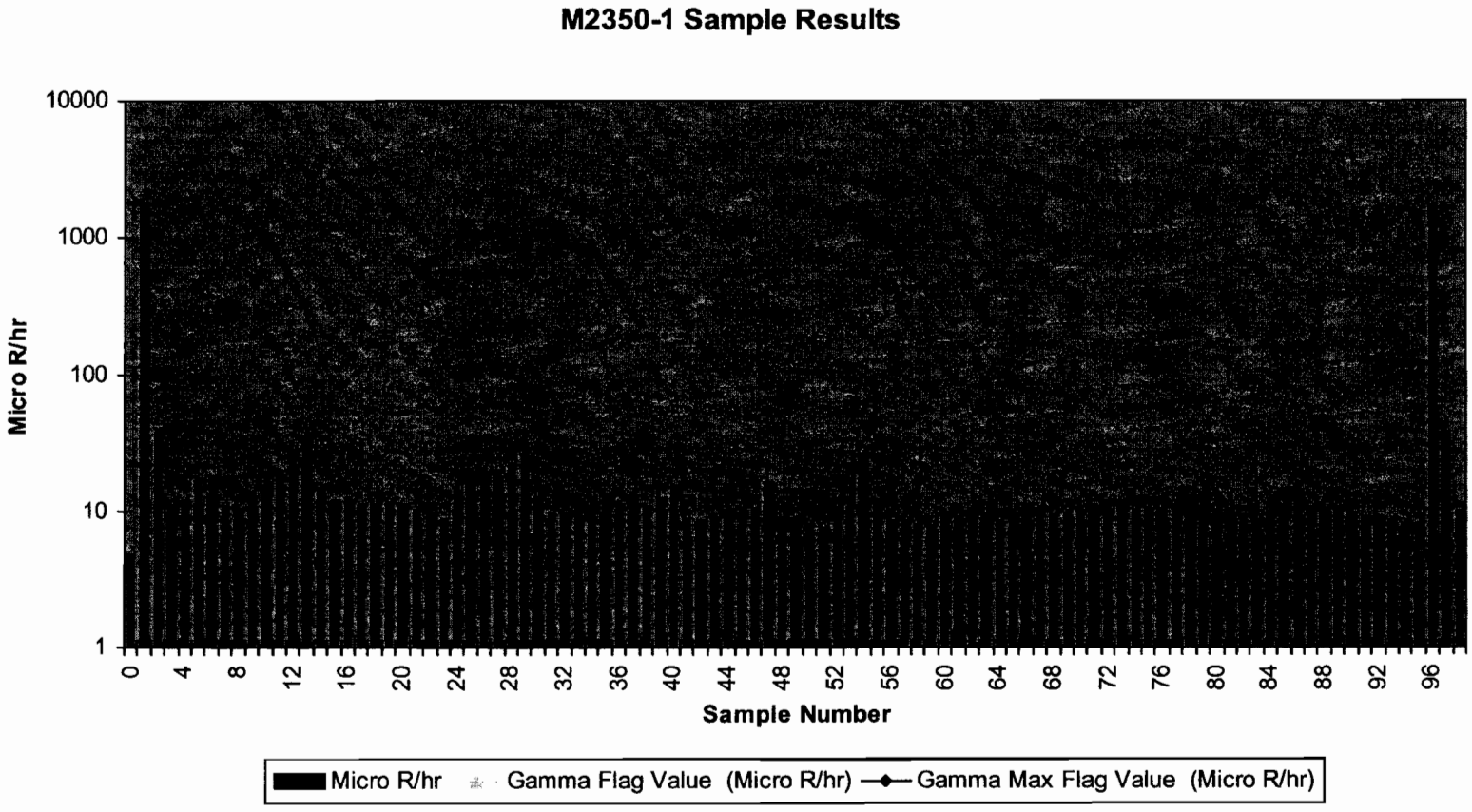
File Name : 00000008	Survey Description :Remediation Scan of trenches in rooms 148,150,152	
Survey Reason : Characterization		
User ID : DRK2986	Technician Name : Doug Kjos	
Instrument Model : 2350-1	Instrument S/N : 129401	Instrument Cal. Due : 6/30/03
Detector Model : LMI 44-2	Detector S/N : 088920	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

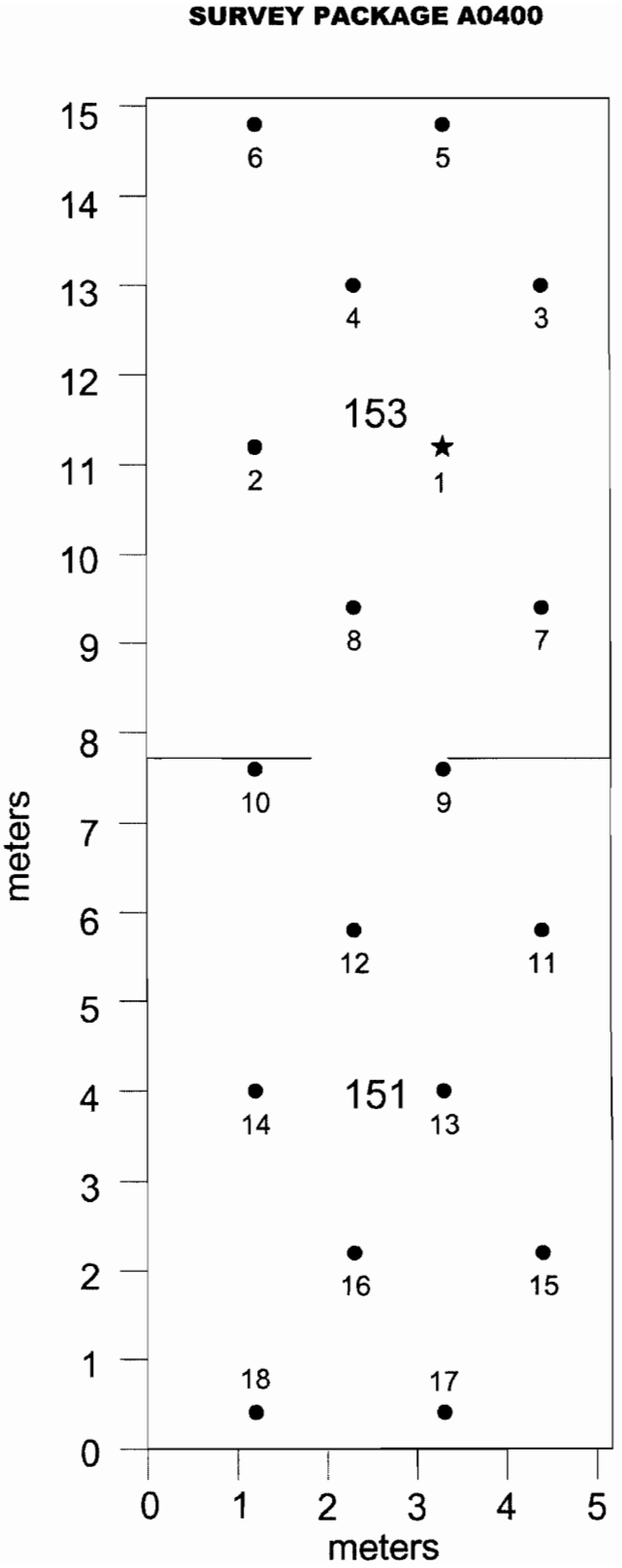
Special Instructions
Source check meters to Tc-99 and C-14 for beta measurements. Use gas proportional detector model numbers 43-68 or 43-106 for surveys. Perform a minimum of three one minute field backgrounds in air prior to survey. Take five smears in survey unit at five unspecified survey locations.

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						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**	

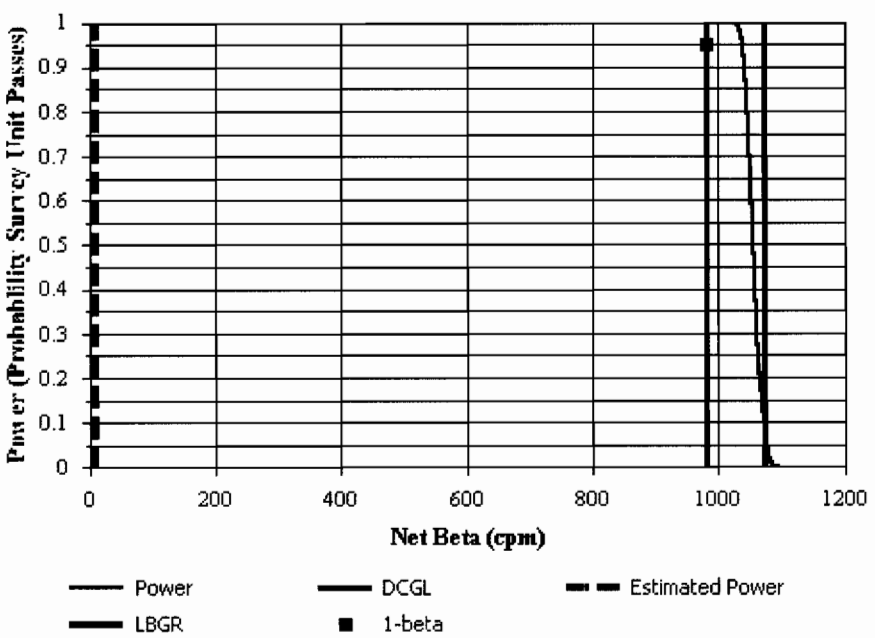
Survey Point	**Survey Location X**	**Y**	**Row**
Starting Point (1)	3.3	11.2	6
2	1.2	11.2	
3	4.4	13.0	7
4	2.3	13.0	
5	3.3	14.8	8
6	1.2	14.8	
7	4.4	9.4	5
8	2.3	9.4	
9	3.3	7.6	4
10	1.2	7.6	
11	4.4	5.8	3
12	2.3	5.8	
13	3.3	4.0	2
14	1.2	4.0	
15	4.4	2.2	1
16	2.3	2.2	
17	3.3	0.4	0
18	1.2	0.4	

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)

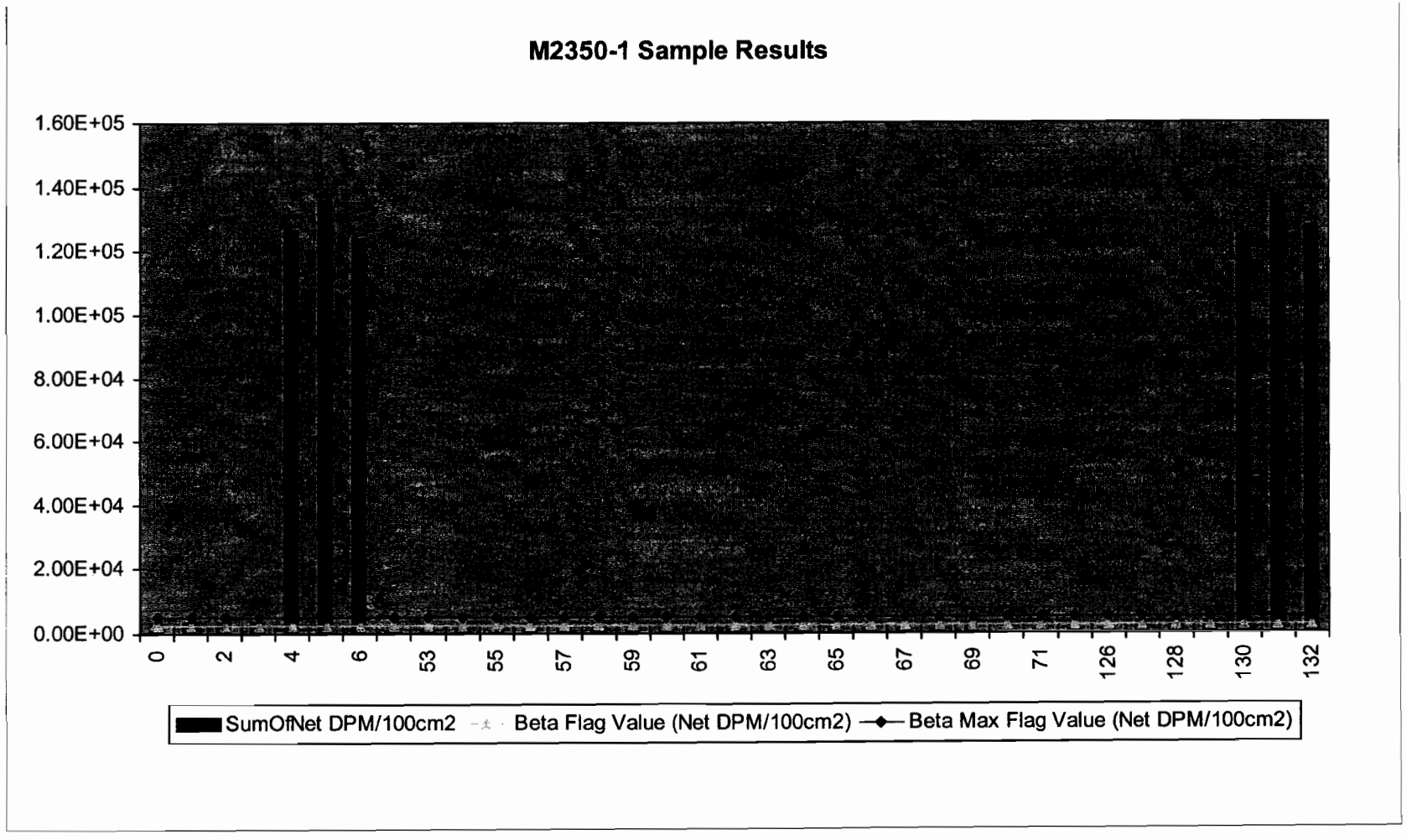
M2350-1 Download BETA Report

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. 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						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)

$$D = 0.866 * L$$

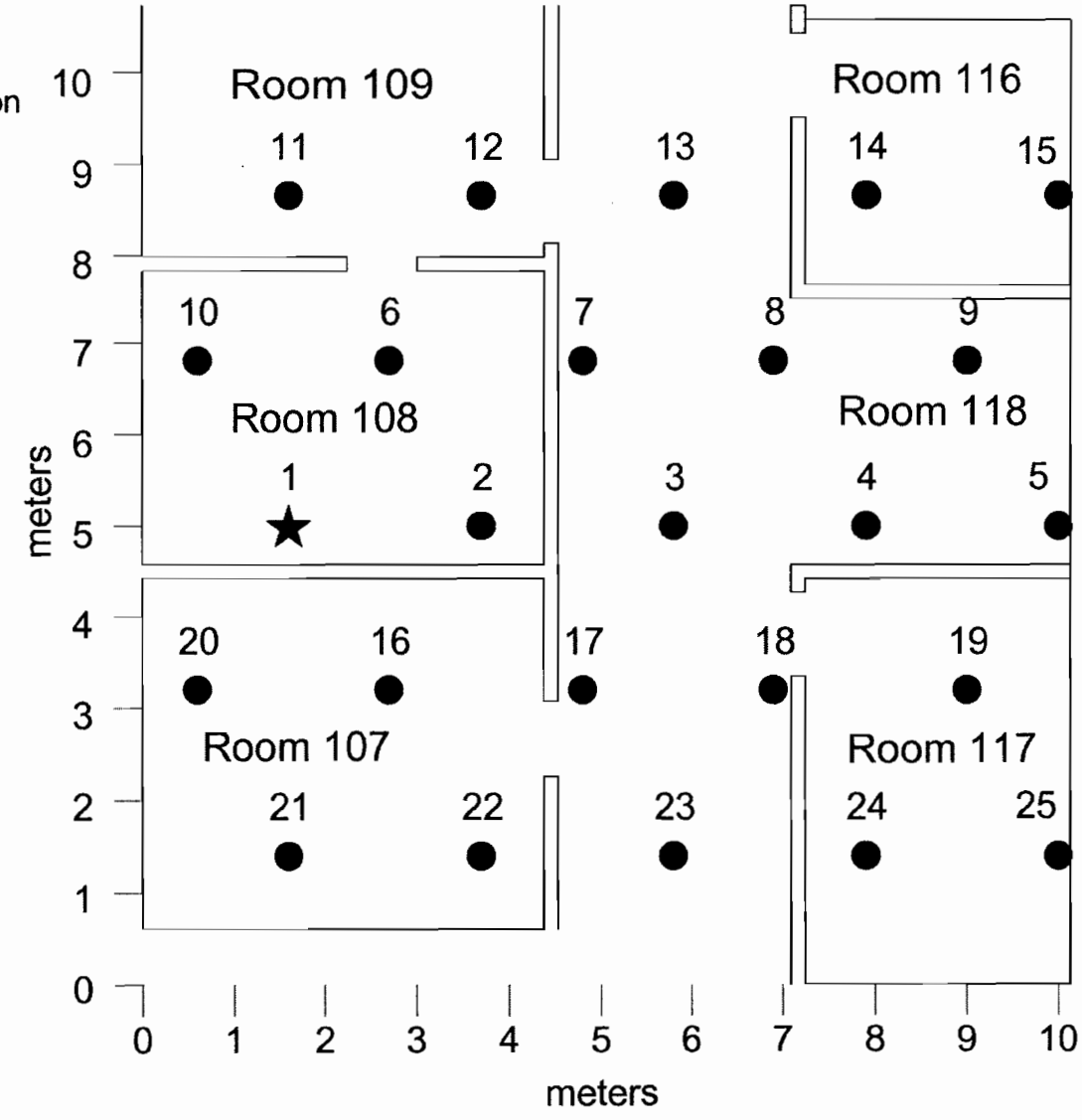
D=	1.8	meters	(distance between rows)
L/2=	1.1	meters	(row offset value)
X (Random):	2.1		random number generator
Y (Random):	6.9		random number generator
X (Origin):	1.6		initially generated random number
Y (Origin):	5.0		initially generated random number
Number of rows:	5	**5**	
Number of columns: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

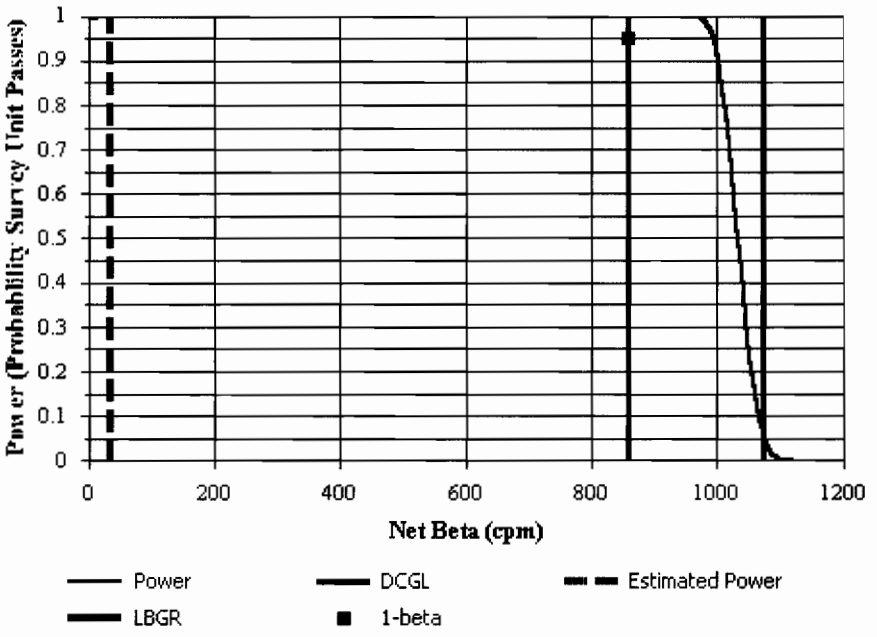


Building Surface Survey Plan

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)

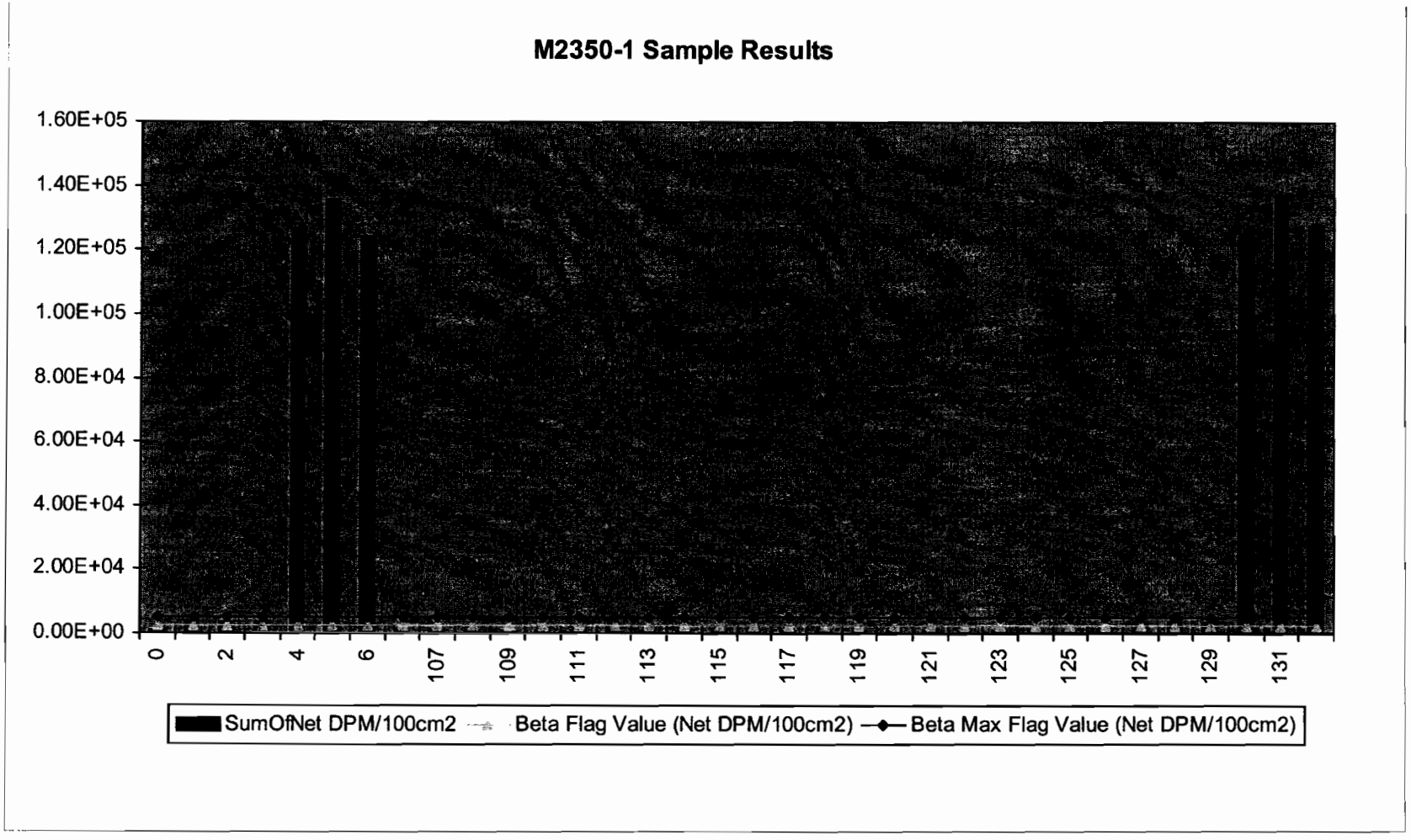
M2350-1 Download BETA Report

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 [signature] Date 4-28-03 Time 14-30

Counted by Betty S. Kjos (Print) Signature [signature] 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=105dpm/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

N/A

Circle:	MDA=14dpm/100cm² α		
Smear Number	CPM (gross)	nCPM (CPM-BKG)	dpm 100cm²
3	1	.70	<MDA
12	0	0	
13	0	0	
21	1	.70	
24	0	0	<MDA

N/A

Remarks-

Signature- [signature] Reviewed by- Paul C Ely

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. 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						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	

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

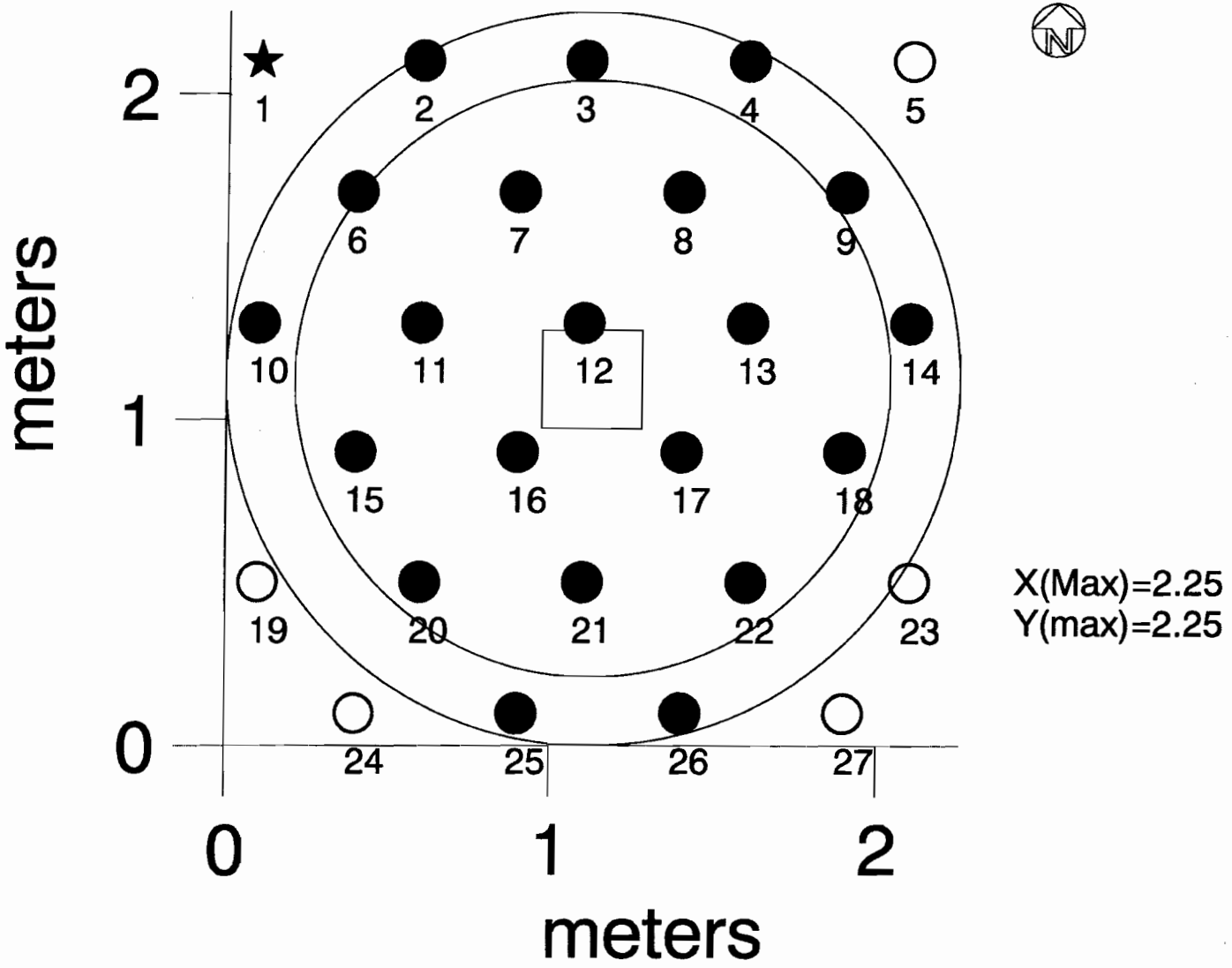
L=	1.5	meters	(distance between measurement points)

$$D = 0.866 * L$$

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

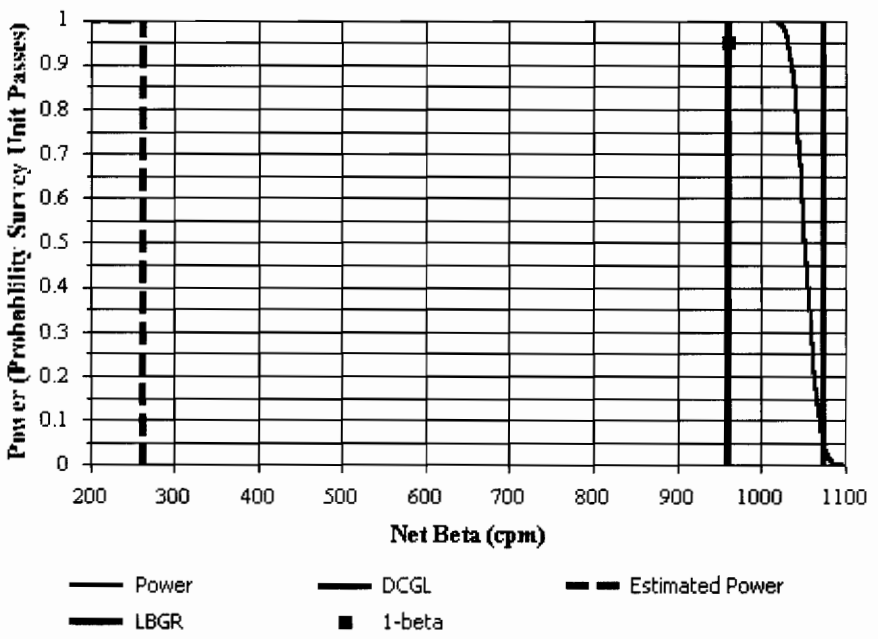


Building Surface Survey Plan

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

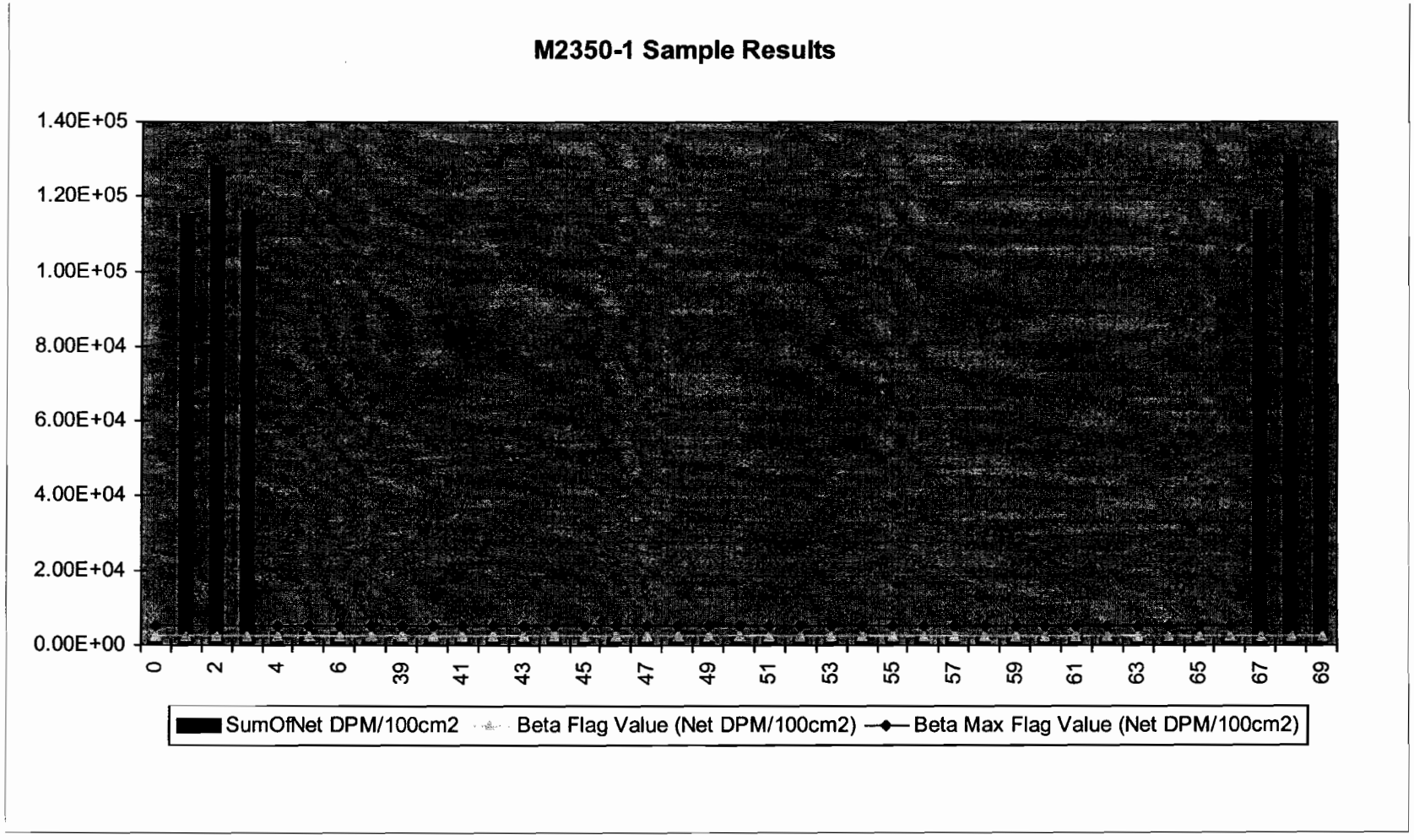
M2350-1 Download BETA Report

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

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

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. 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 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

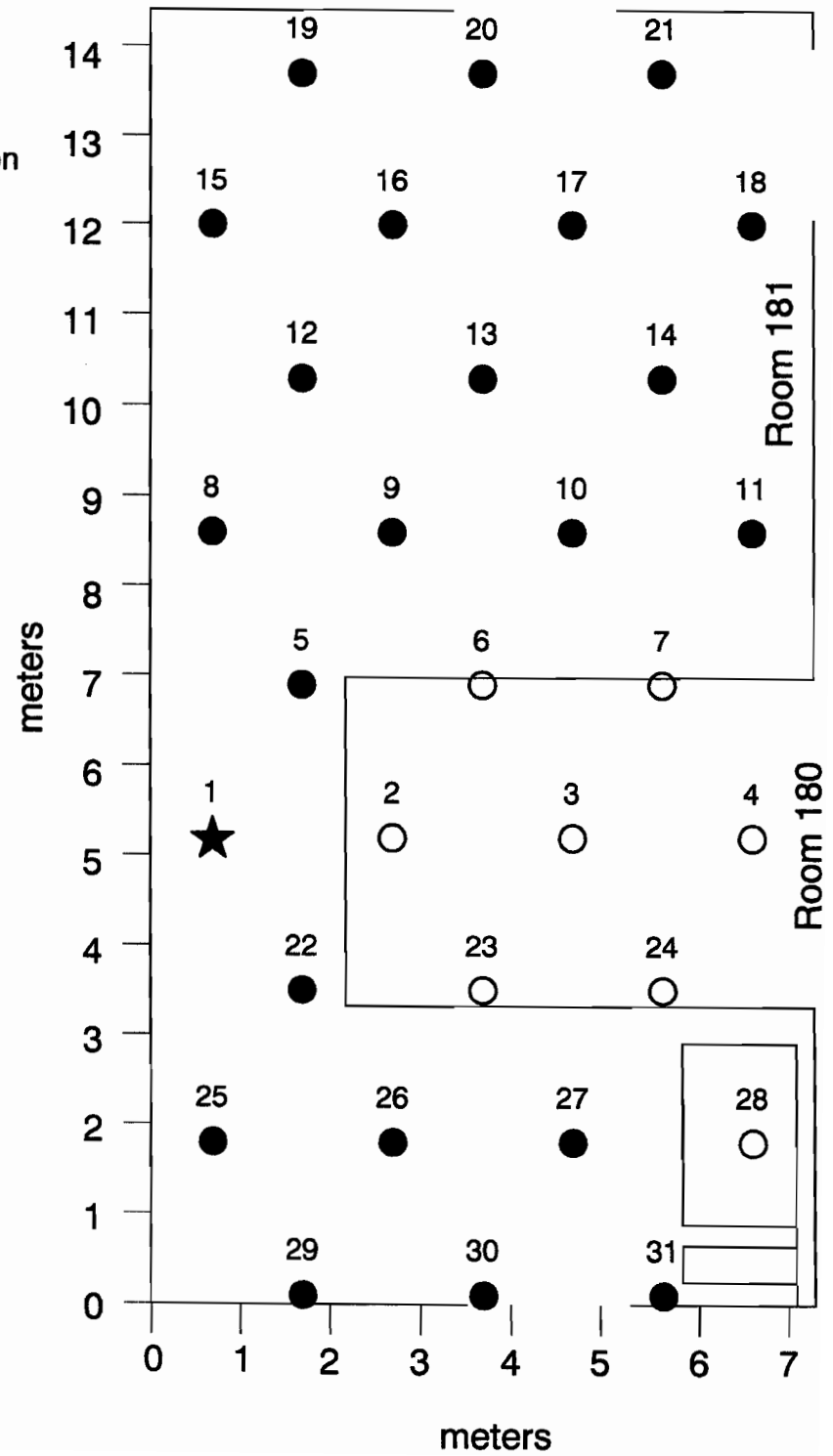
Package Review	
Date Package Completed:	4/29/03
Package Reviewed by and Date:	Paul C Ely 4/29/03

Survey Comments

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**	

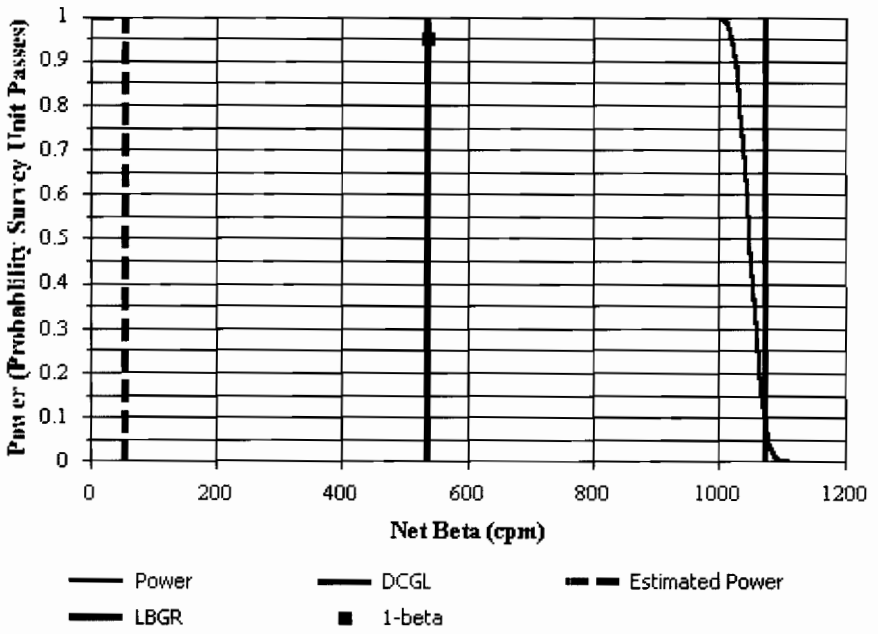
Survey Point	**Survey Location X**	**Survey Location Y**	**Row**
Starting Point (1)	0.7	5.2	4
2	2.7	5.2	
3	4.7	5.2	
4	6.7	5.2	
5	1.7	6.9	5
6	3.7	6.9	
7	5.7	6.9	
8	0.7	8.6	6
9	2.7	8.6	
10	4.7	8.6	
11	6.7	8.6	
12	1.7	10.3	7
13	3.7	10.3	
14	5.7	10.3	
15	0.7	12.0	8
16	2.7	12.0	
17	4.7	12.0	
18	6.7	12.0	
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

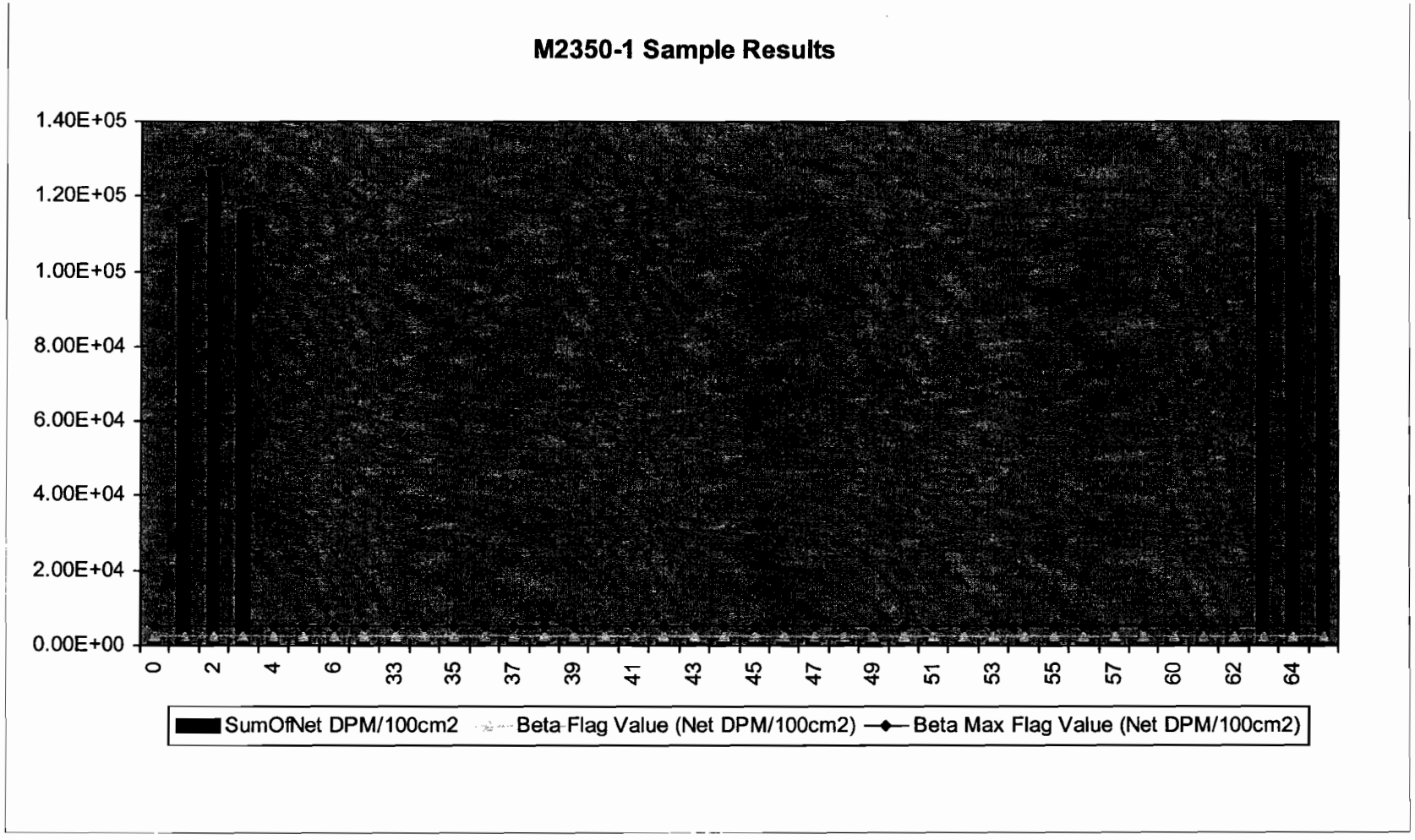
M2350-1 Download BETA Report

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.

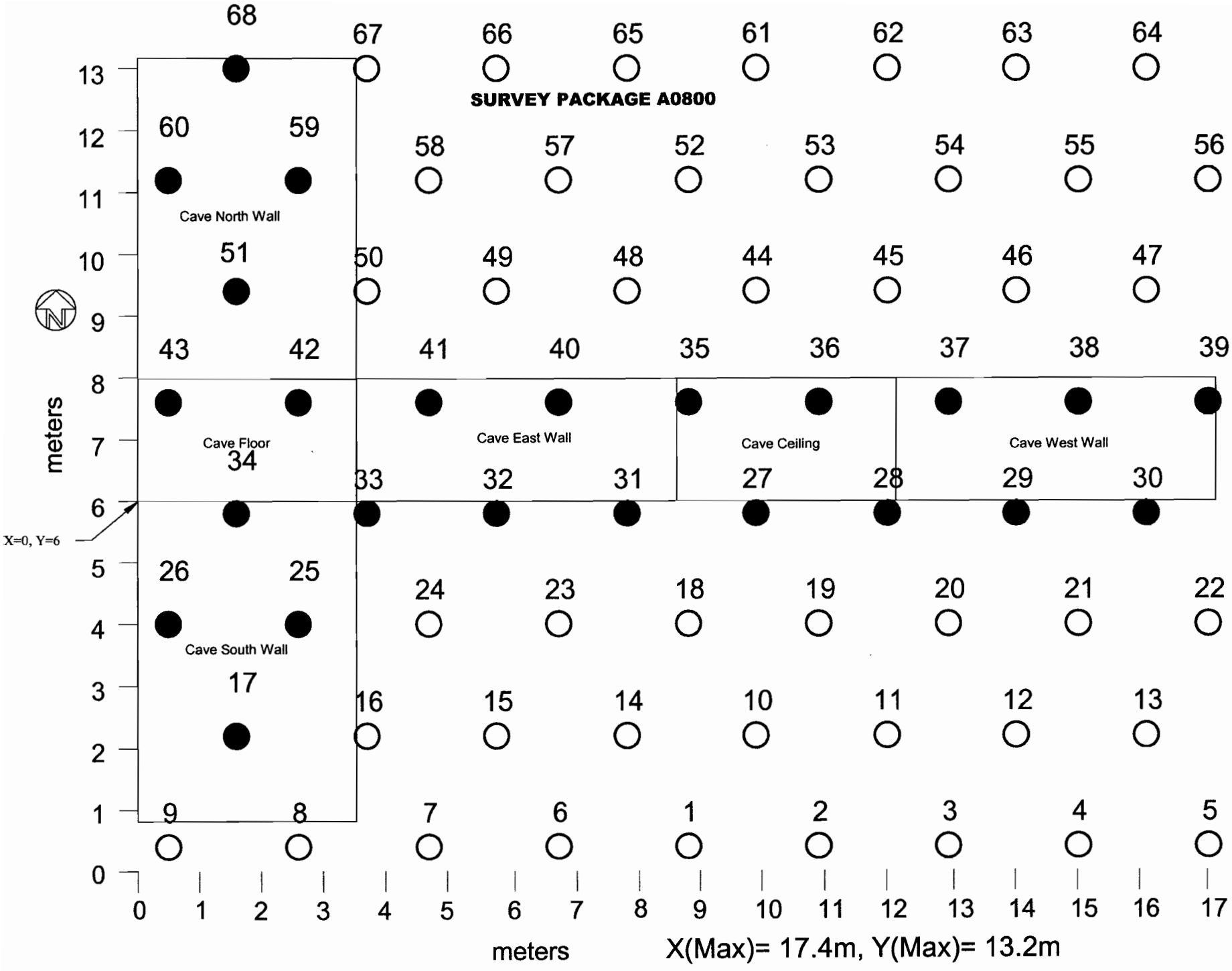
Survey Package: A0800 continued

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

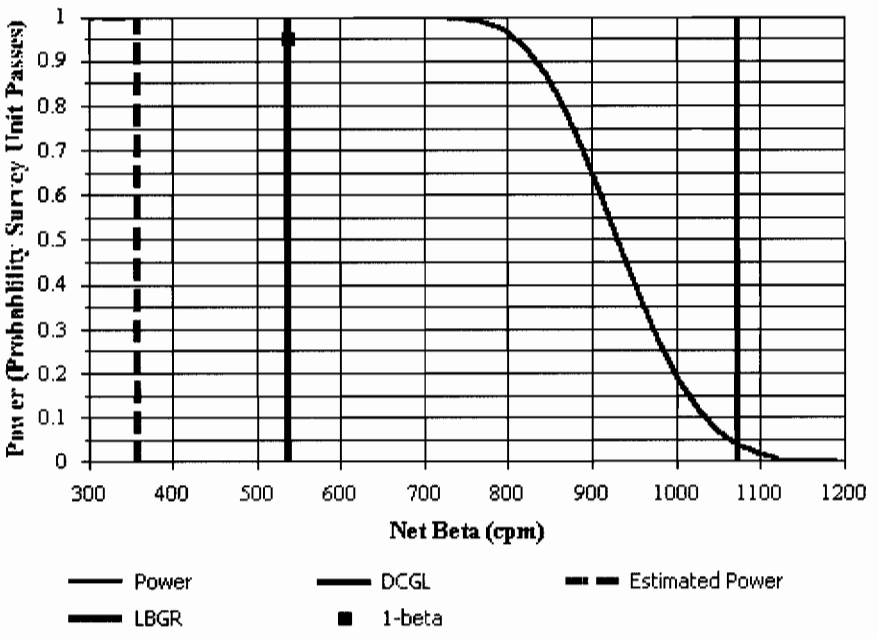
Survey Point	**Survey Location X**	**Survey Location Y**	**Row**
Starting Point (1)	8.9	0.4	1
2	11.0	0.4	
3	13.1	0.4	
4	15.2	0.4	
5	17.3	0.4	
6	6.8	0.4	
7	4.7	0.4	
8	2.6	0.4	
9	0.5	0.4	
10	10.0	2.2	2
11	12.1	2.2	
12	14.2	2.2	
13	16.3	2.2	
14	7.9	2.2	
15	5.8	2.2	
16	3.7	2.2	
17	1.6	2.2	
18	8.9	4.0	3
19	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

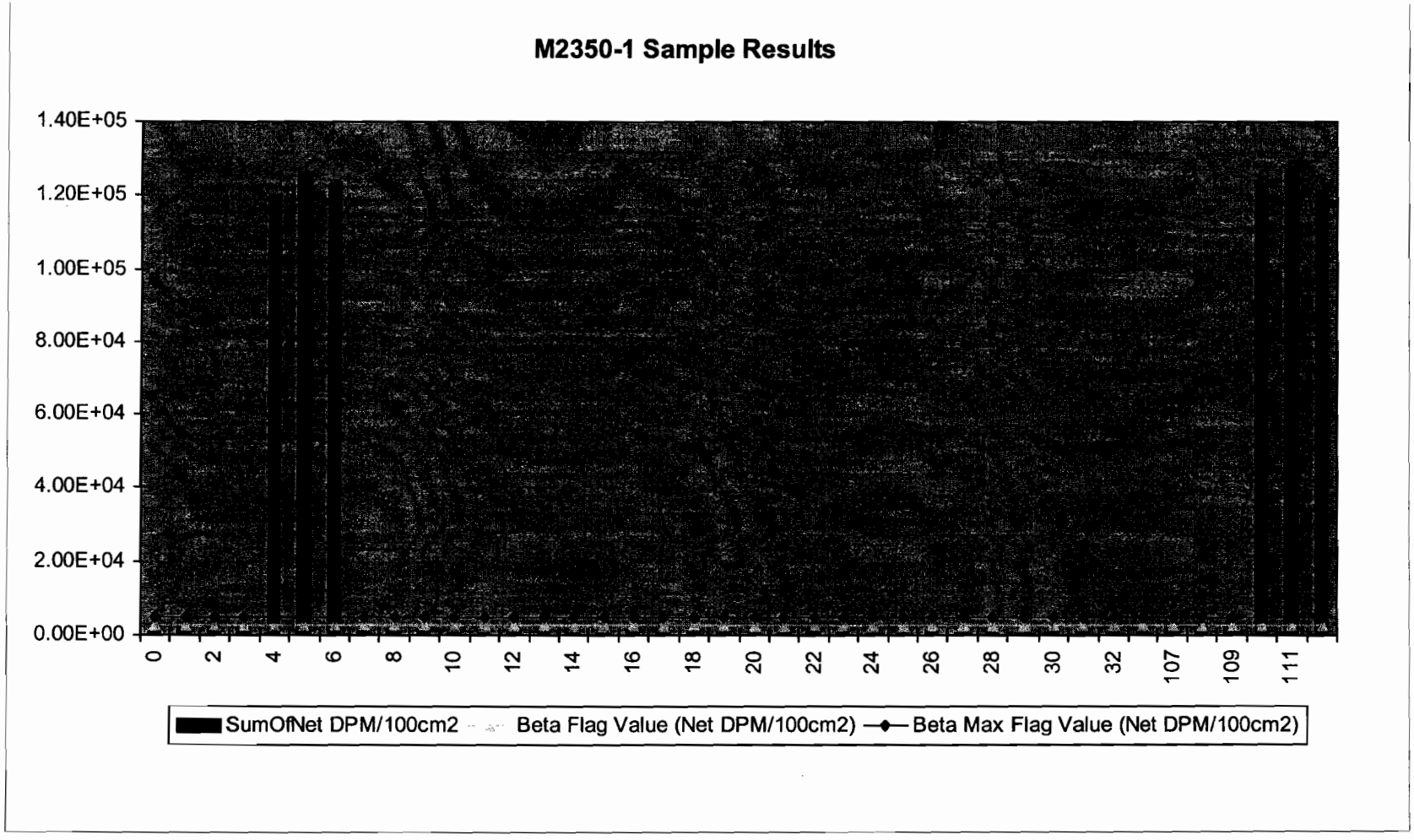
M2350-1 Download BETA Report

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. 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 on floor in survey unit at five unspecified survey locations.

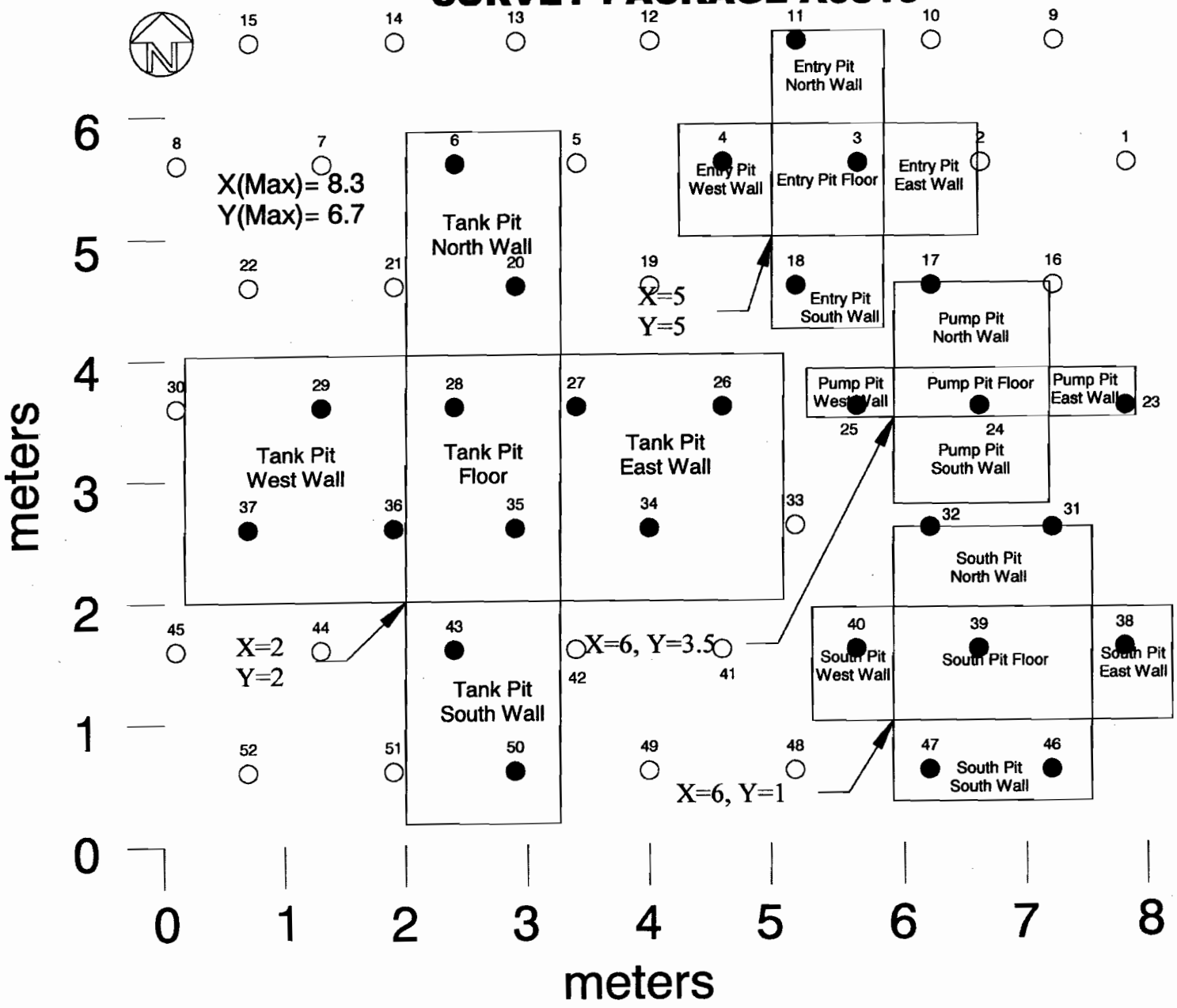
Survey performance (Initial and date as each survey is complete)

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		

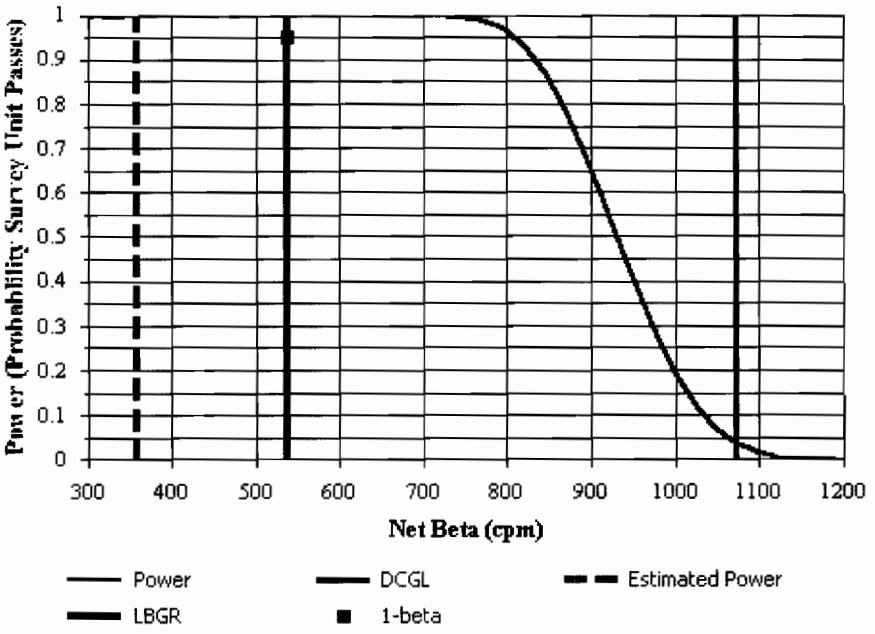
Survey Point	**Survey Location X**	**Y**	**Row**
Starting Point (1)	7.8	5.6	6
2	6.7	5.6	
3	5.6	5.6	
4	4.5	5.6	
5	3.4	5.6	
6	2.3	5.6	
7	1.2	5.6	
8	0.1	5.6	
9	7.3	6.6	7
10	6.2	6.6	
11	5.1	6.6	
12	4.0	6.6	
13	2.9	6.6	
14	1.8	6.6	
15	0.7	6.6	
16	7.3	4.6	5
17	6.2	4.6	
18	5.1	4.6	
19	4.0	4.6	
20	2.9	4.6	
21	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

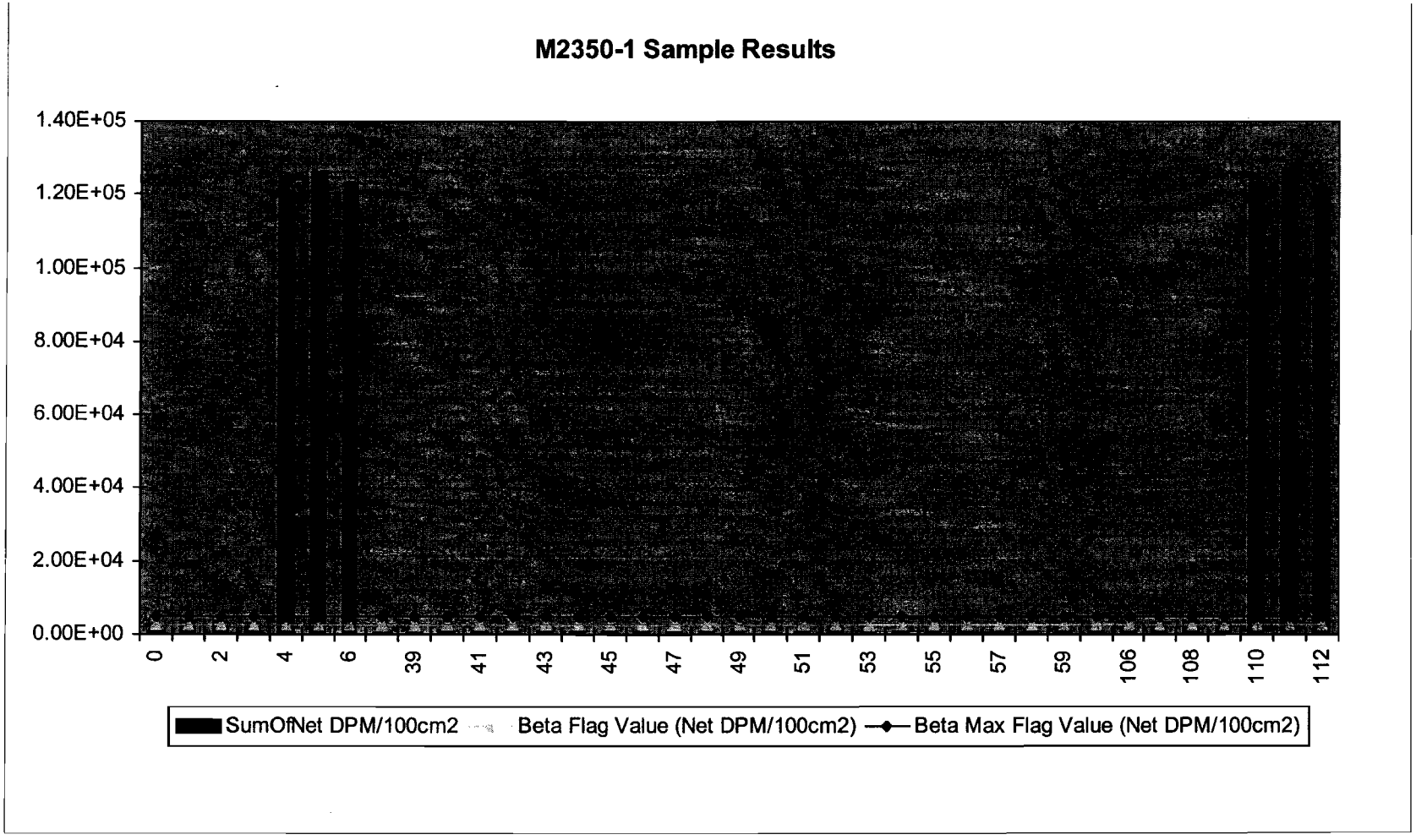
M2350-1 Download BETA Report

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:

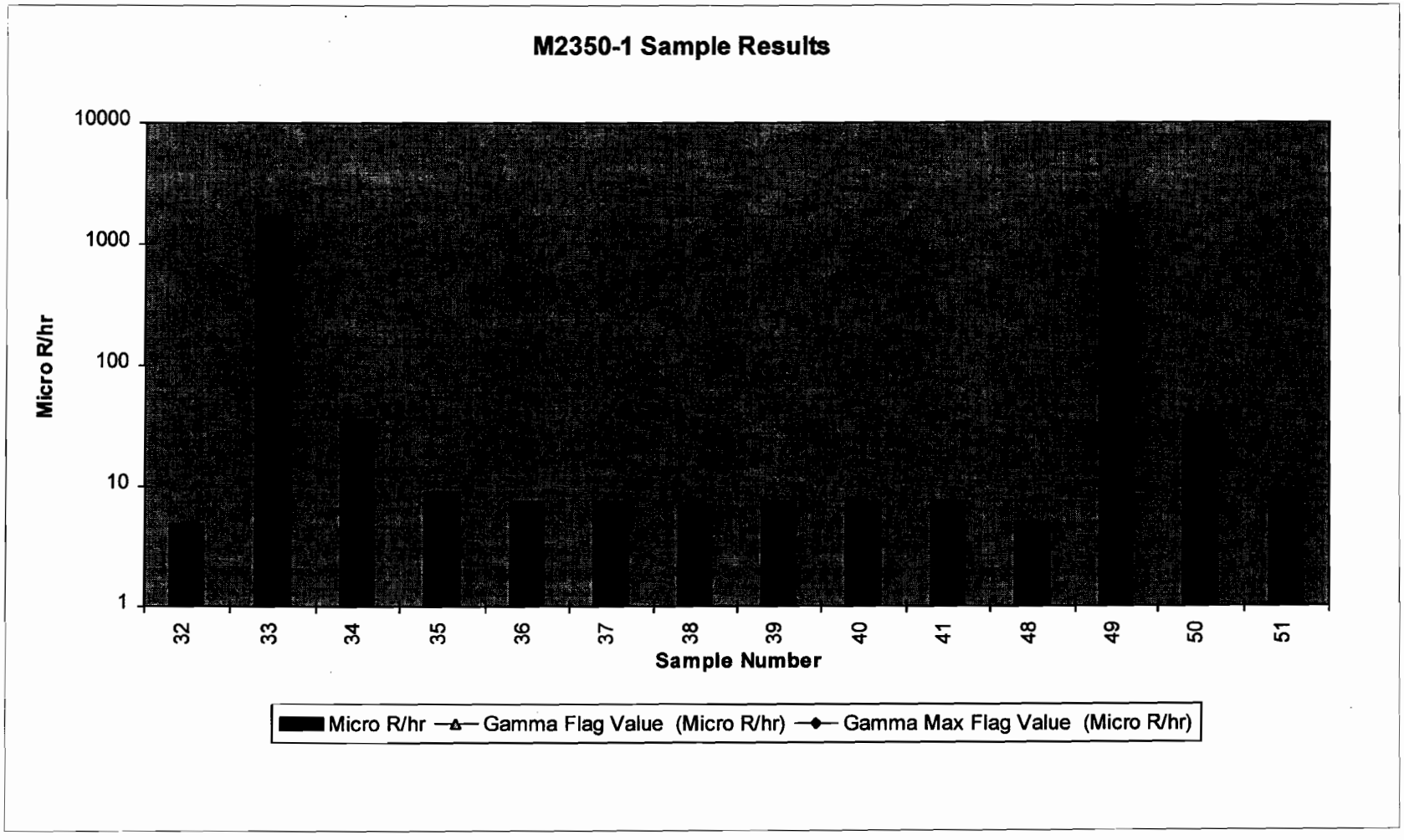
M2350-1 Download Gamma Report

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

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

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		

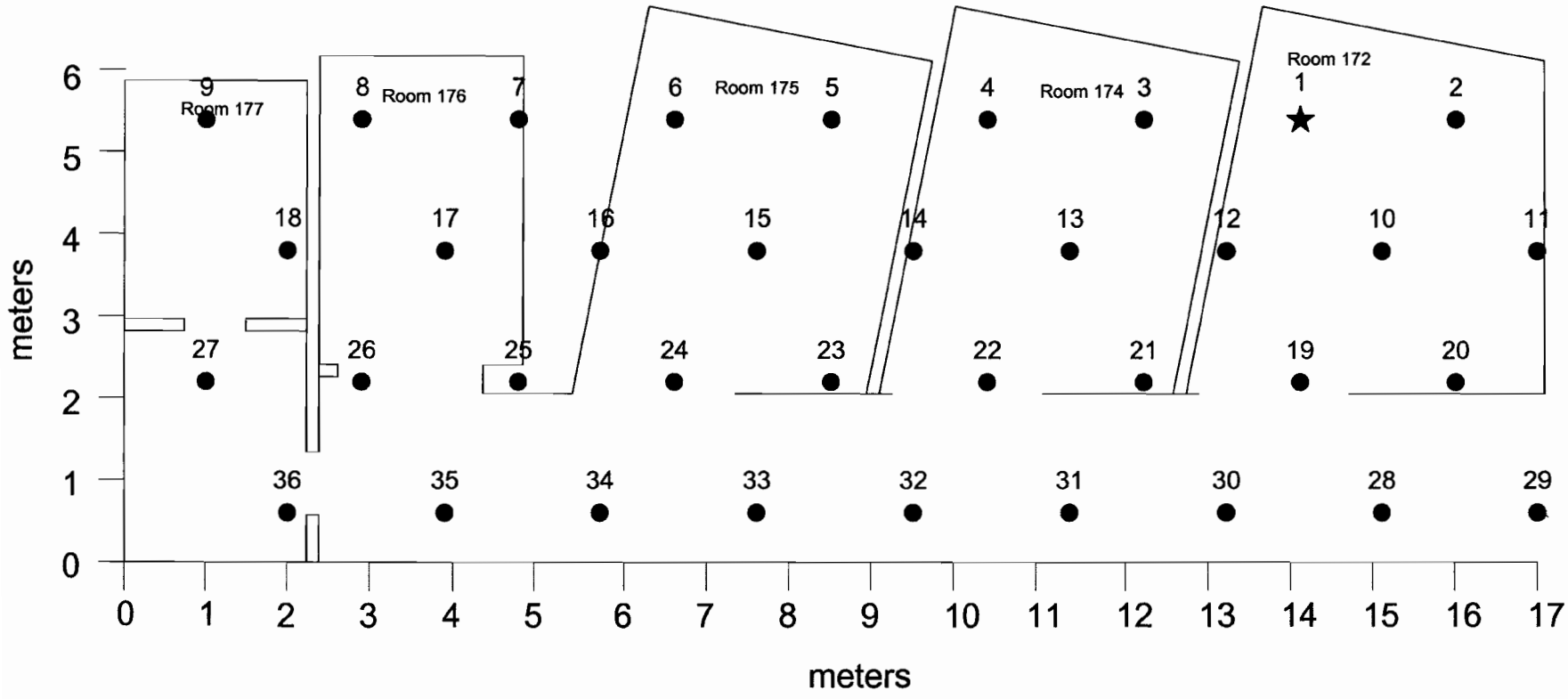
Survey Point	**Survey Location X**	**Y**	**Row**
Starting Point (1)	14.3	5.4	4
2	16.2	5.4	
3	12.4	5.4	
4	10.5	5.4	
5	8.6	5.4	
6	6.7	5.4	
7	4.8	5.4	
8	2.9	5.4	
9	1.0	5.4	
10	15.3	3.8	3
11	17.2	3.8	
12	13.4	3.8	
13	11.5	3.8	
14	9.6	3.8	
15	7.7	3.8	
16	5.8	3.8	
17	3.9	3.8	
18	2.0	3.8	
19	14.3	2.2	2
20	16.2	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

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

SURVEY PACKAGE A0900

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

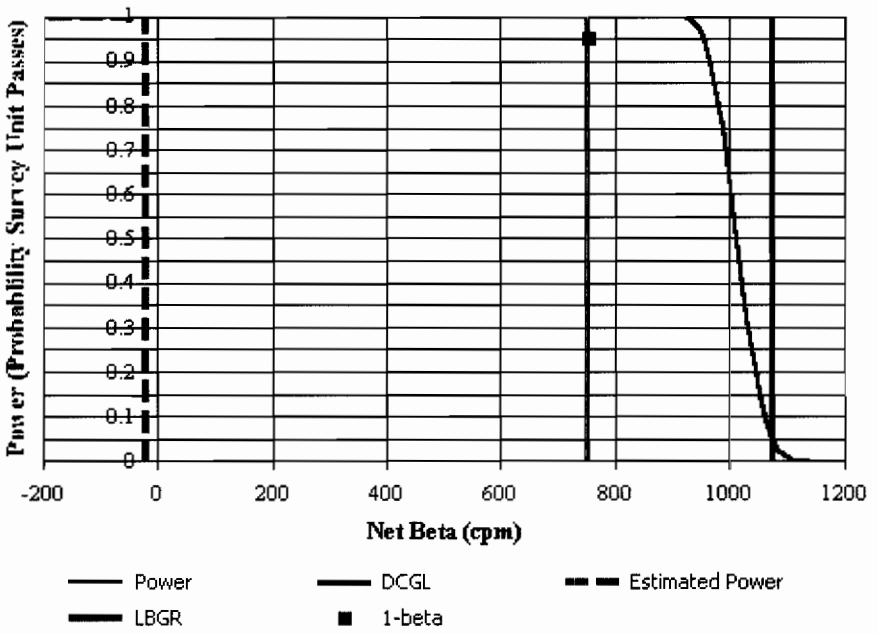


Building Surface Survey Plan

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

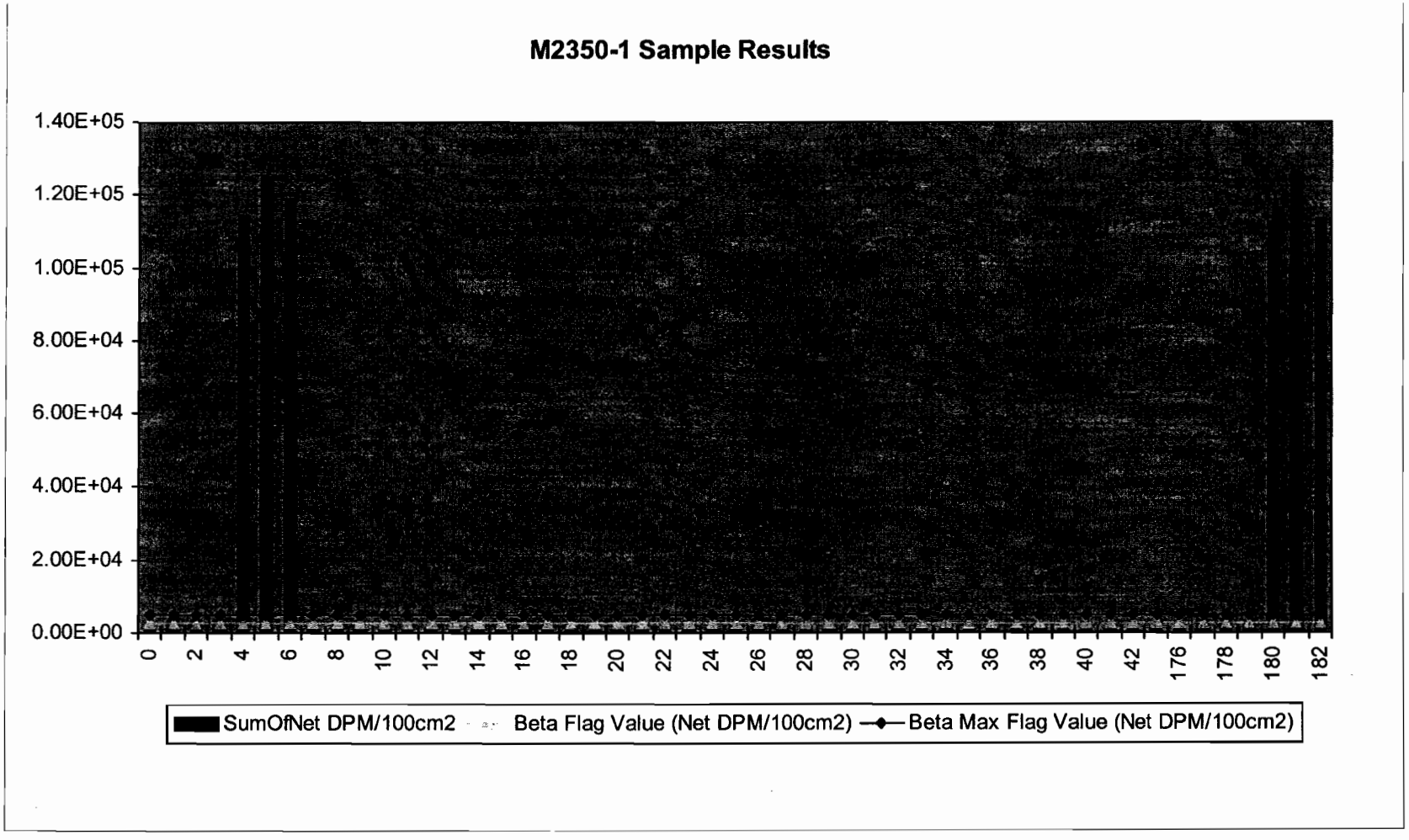
M2350-1 Download BETA Report

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. 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 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

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.

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		

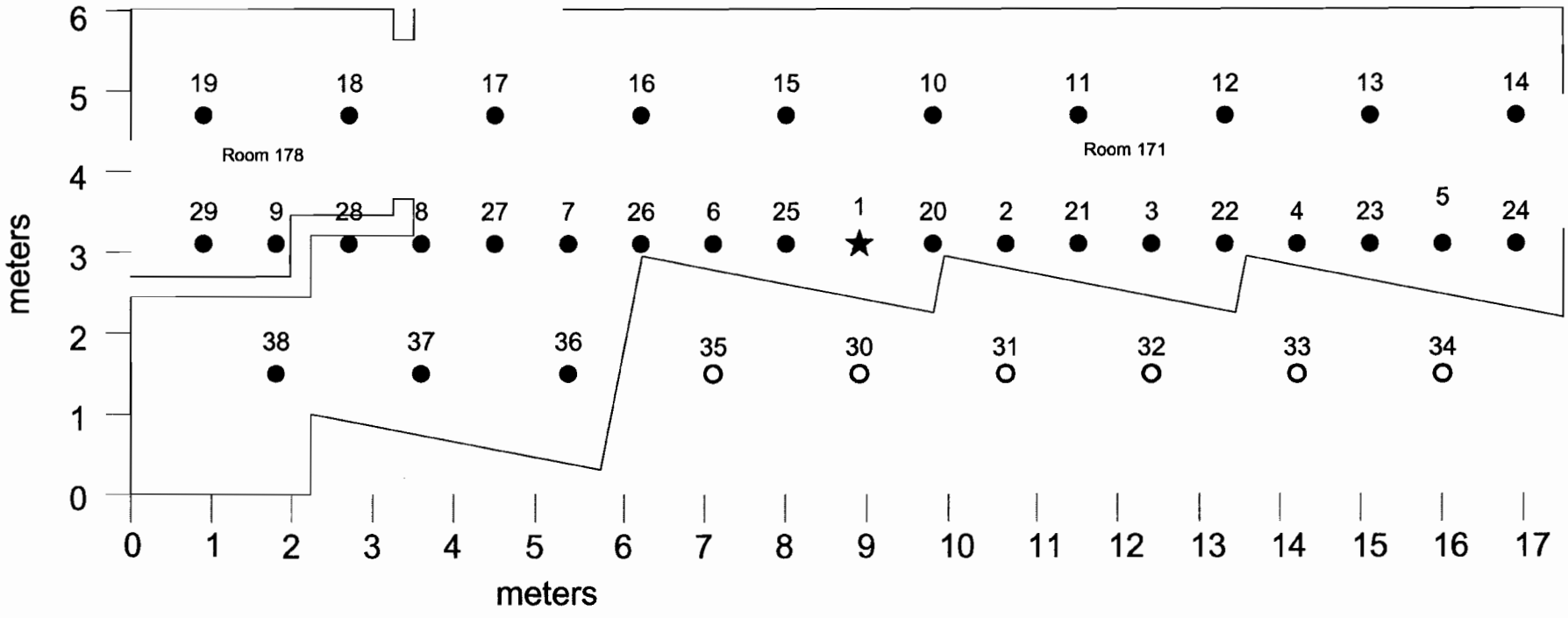
Survey Point	**Survey Location X**	**Y**	**Row**
Starting Point (1)	9.0	3.1	3
2	10.8	3.1	
3	12.6	3.1	
4	14.4	3.1	
5	16.2	3.1	
6	7.2	3.1	
7	5.4	3.1	
8	3.6	3.1	
9	1.8	3.1	
10	9.9	4.7	4
11	11.7	4.7	
12	13.5	4.7	
13	15.3	4.7	
14	17.1	4.7	
15	8.1	4.7	
16	6.3	4.7	
17	4.5	4.7	
18	2.7	4.7	
19	0.9	4.7	
20	9.9	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

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

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

SURVEY PACKAGE A1000

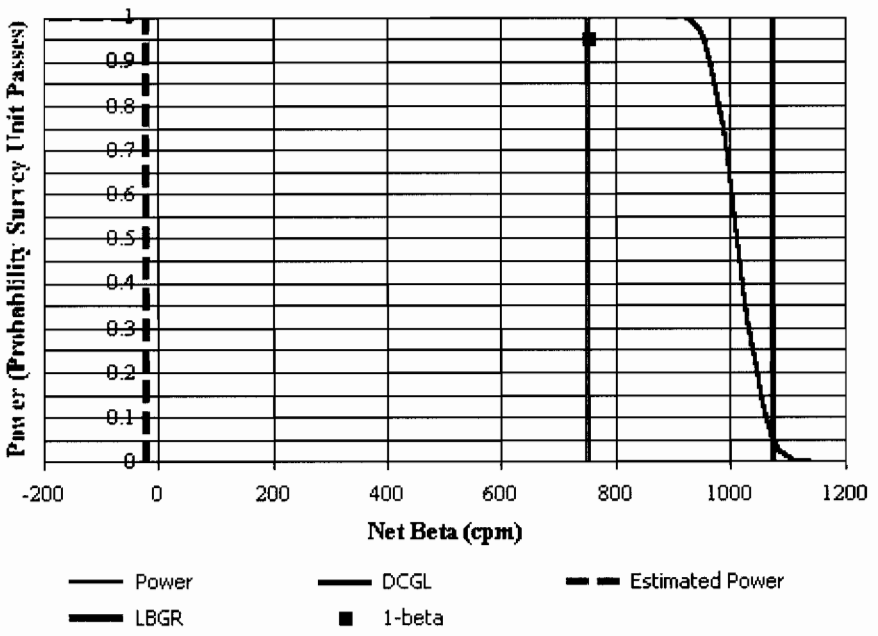


Building Surface Survey Plan

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

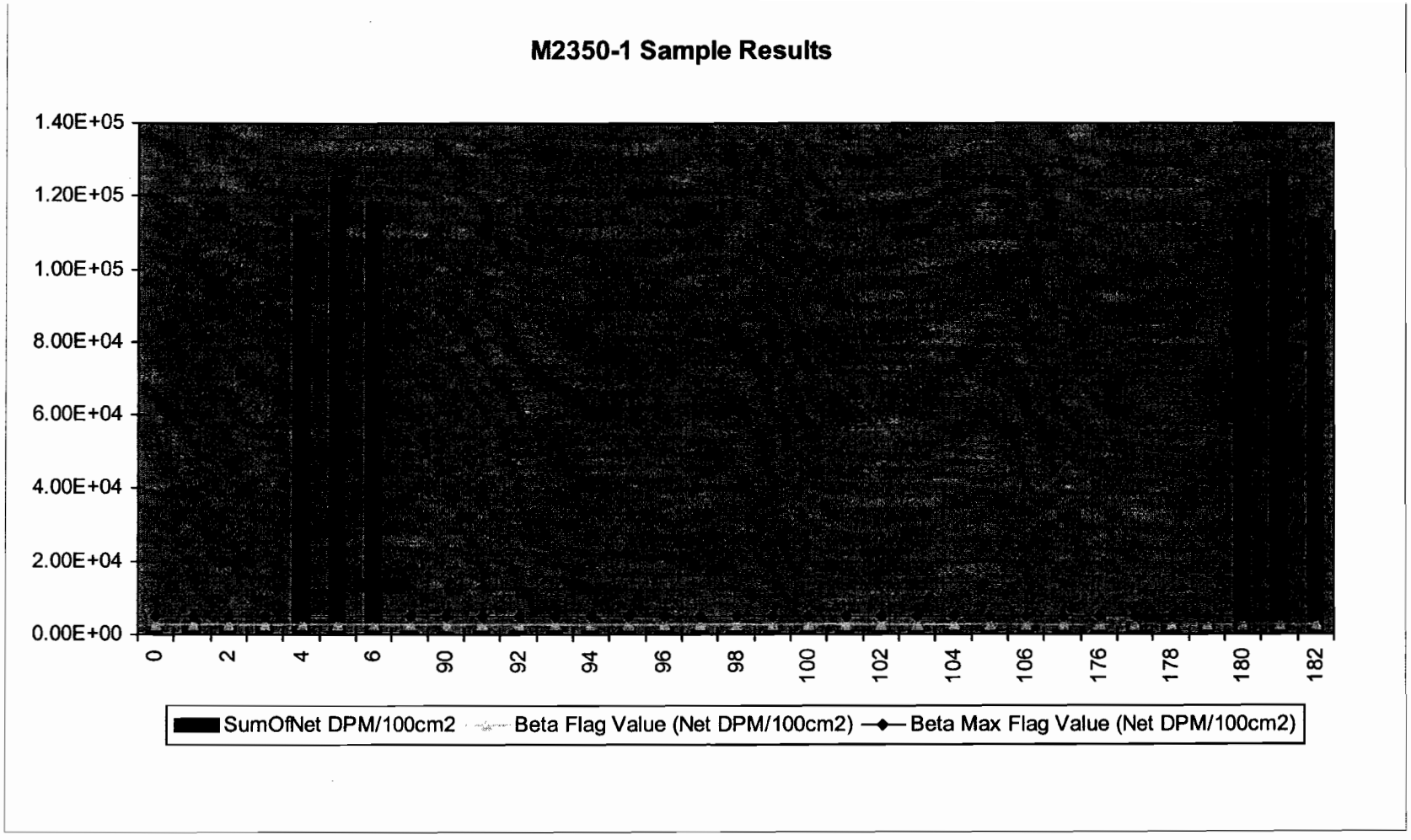
File Name : 00000095	Survey Description :Package A1000, B-124, Rooms 171 and 178 (Floors)	
Survey Reason : Termination		
User ID : DRK2986	Technician Name : Doug Kjos	
Instrument Model : 2350-1	Instrument S/N : 129401	Instrument Cal. Due : 6/30/03
Detector Model : 43-68B	Detector S/N : 119337	Detector 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

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

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. 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						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

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		

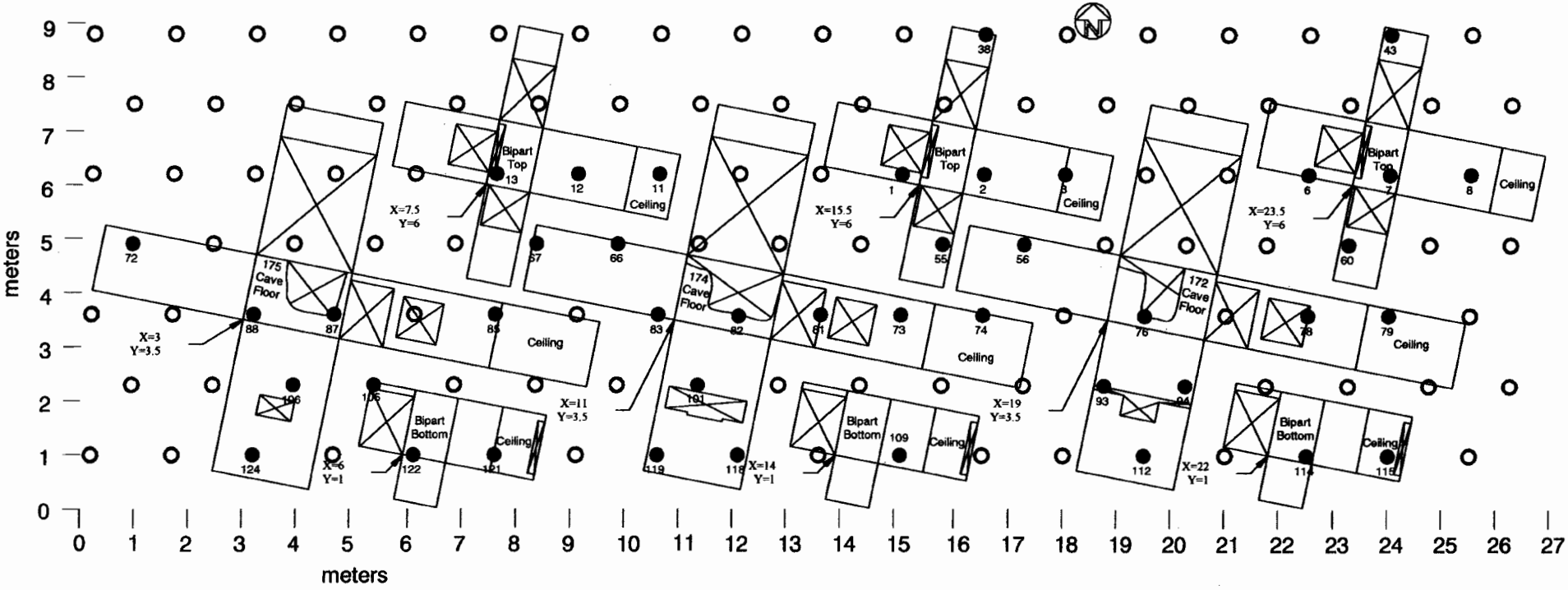
Survey Point	**Survey Location X**	**Y**	**Row**	**Survey Point**	**Survey Location X**	**Y**	**Row**
Starting Point (1)	15.2	6.2	5	55	16.0	4.9	4
2	16.7	6.2		56	17.5	4.9	
3	18.2	6.2		57	19.0	4.9	
4	19.7	6.2		58	20.5	4.9	
5	21.2	6.2		59	22.0	4.9	
6	22.7	6.2		60	23.5	4.9	
7	24.2	6.2		61	25.0	4.9	
8	25.7	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

σ =	360.9	cpm (Calculated by COMPASS)
DCGLW =	1,074	cpm (Calculated by COMPASS)
$DCGL_W/\sigma$ =	3.0	2.9758936
Δ/σ =	$(DCGL_W - LBGR) / \sigma$ =	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	
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$$L = \left[\frac{A}{0.866 * N}\right]^{1/2}$$

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

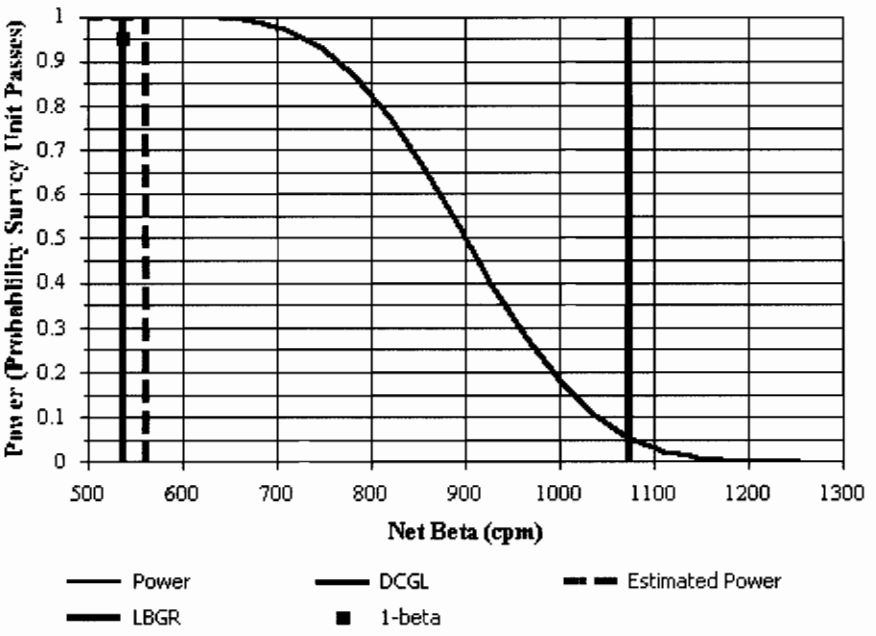
σ =	360.9	cpm (Calculated by COMPASS)
DCGLW =	1,074	cpm (Calculated by COMPASS)
$DCGL_W/\sigma$ =	3.0	2.9758936
Δ/σ =	$(DCGL_W - LBGR) / \sigma$ =	3
LBGR =	$DCGL_W - 3\sigma$	
LBGR =	537	cpm

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

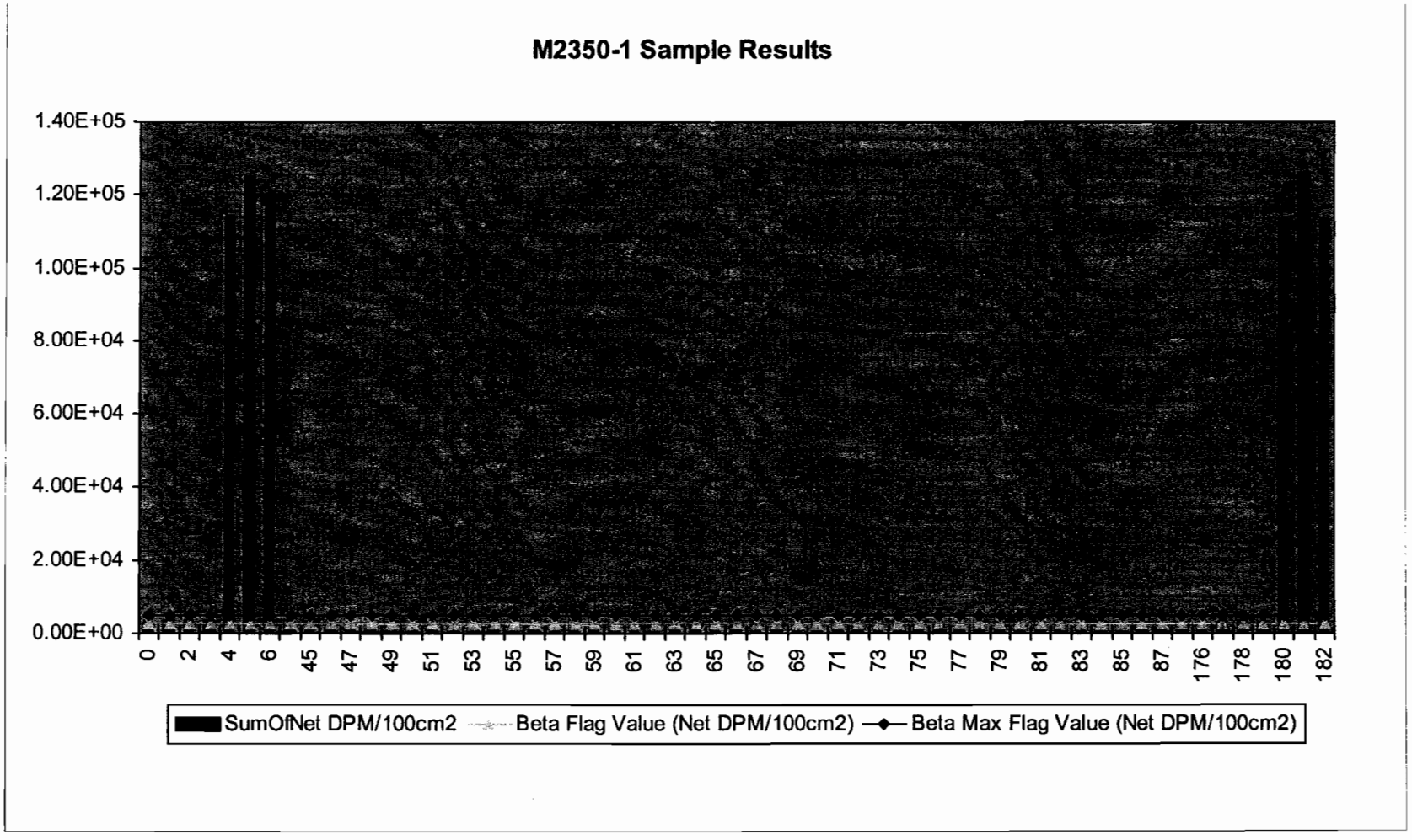
M2350-1 Download BETA Report

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

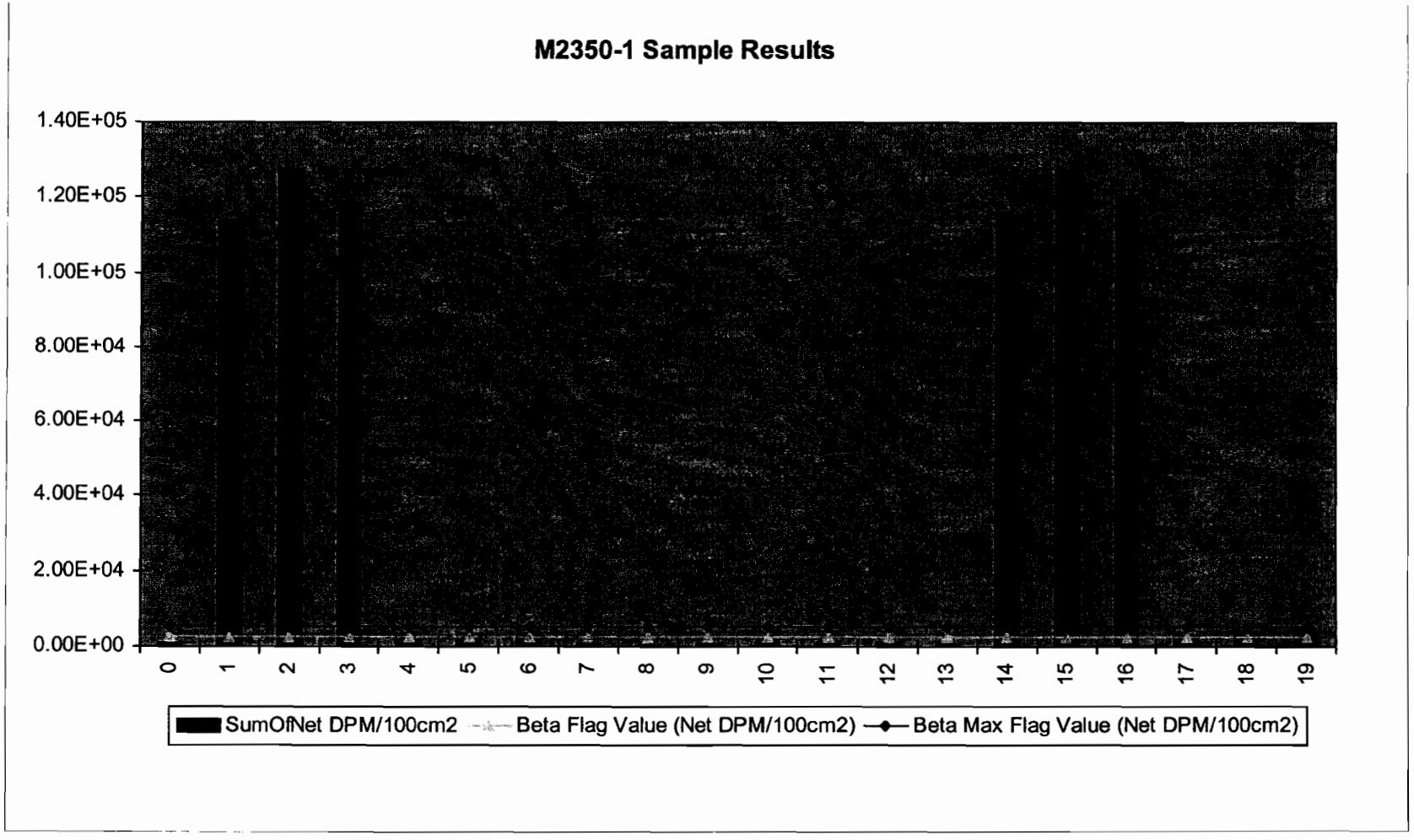
File Name : 00000045	Survey Description :Package A1100 RM 172 Wall Support (floor under wal	
Survey Reason : Termination		
User ID : DRK2986	Technician Name : Doug Kjos	
Instrument Model : 2350-1	Instrument S/N : 126197	Instrument Cal. Due : 6/30/03
Detector Model : 43-68B	Detector S/N : 092524	Detector 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

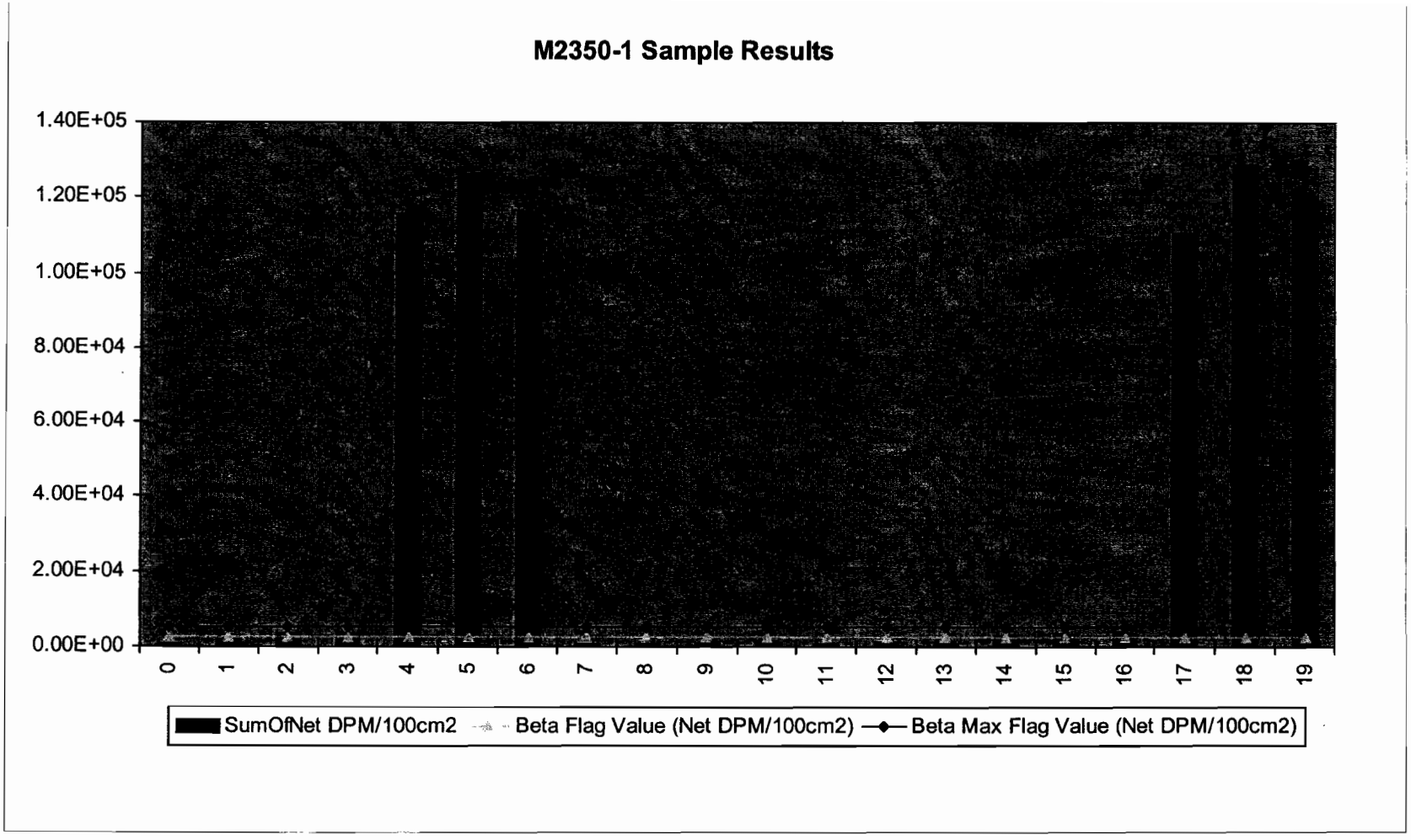
M2350-1 Download BETA Report

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
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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

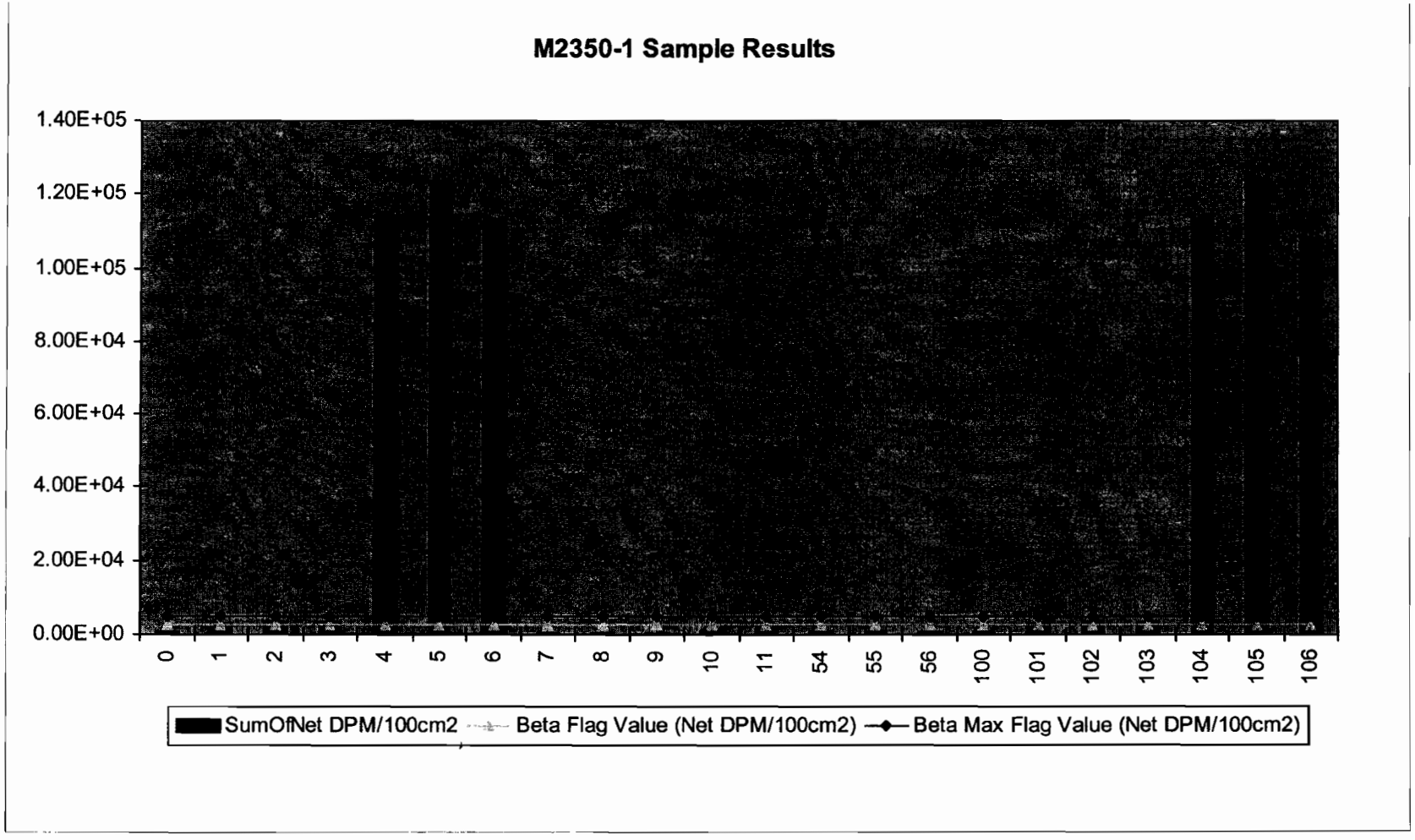
M2350-1 Download BETA Report

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. 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						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)

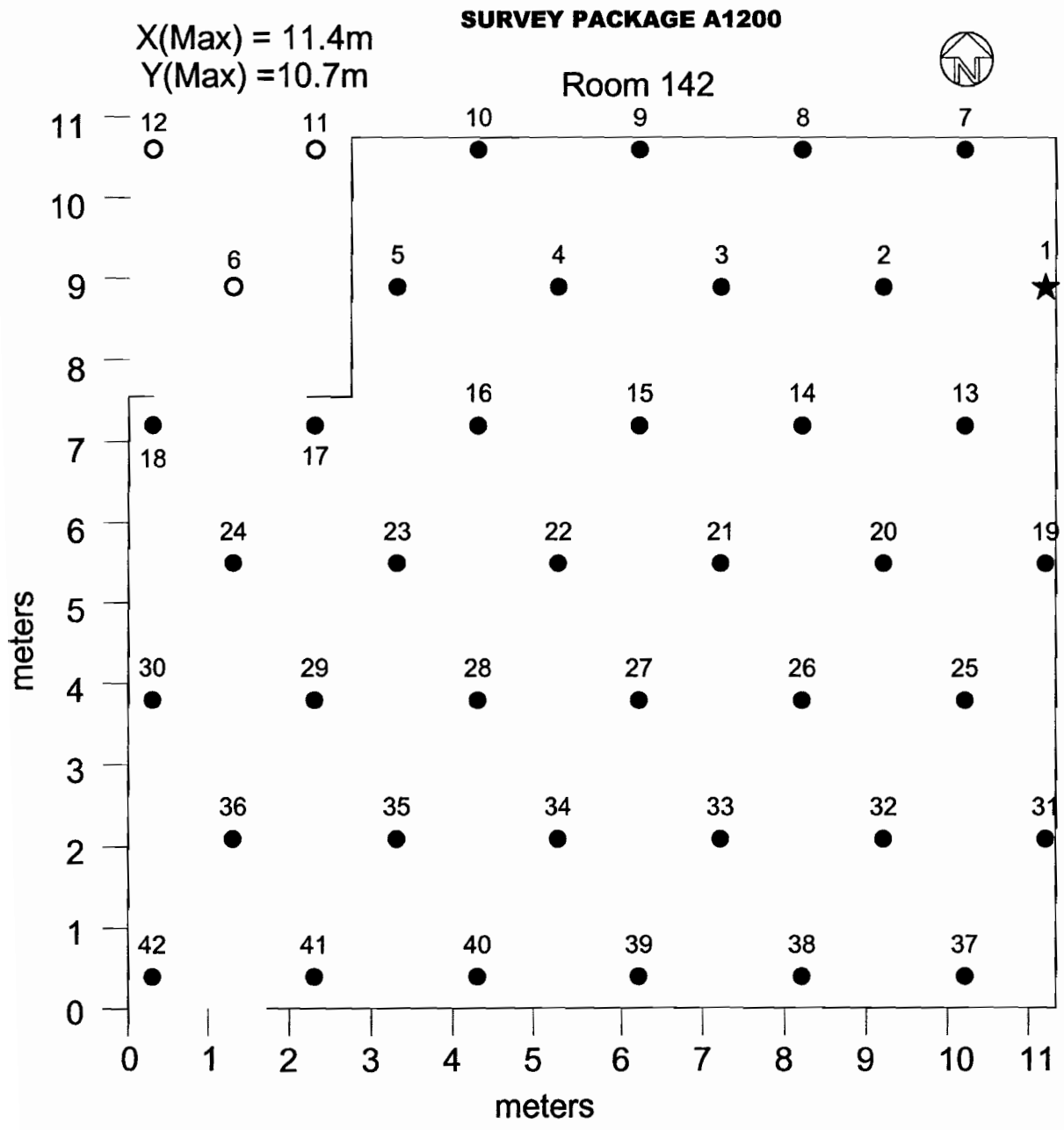
$$D = 0.866 * L$$

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

σ =	358.6	cpm (Calculated by COMPASS)
DCGLW =	1,074	cpm (Calculated by COMPASS)
$DCGL_W/\sigma$ =	3.0	**2.99**
Δ/σ =	$(DCGL_W - LBGR) / \sigma$ =	**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
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11
12
11
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9
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7
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3
2
1
18
17
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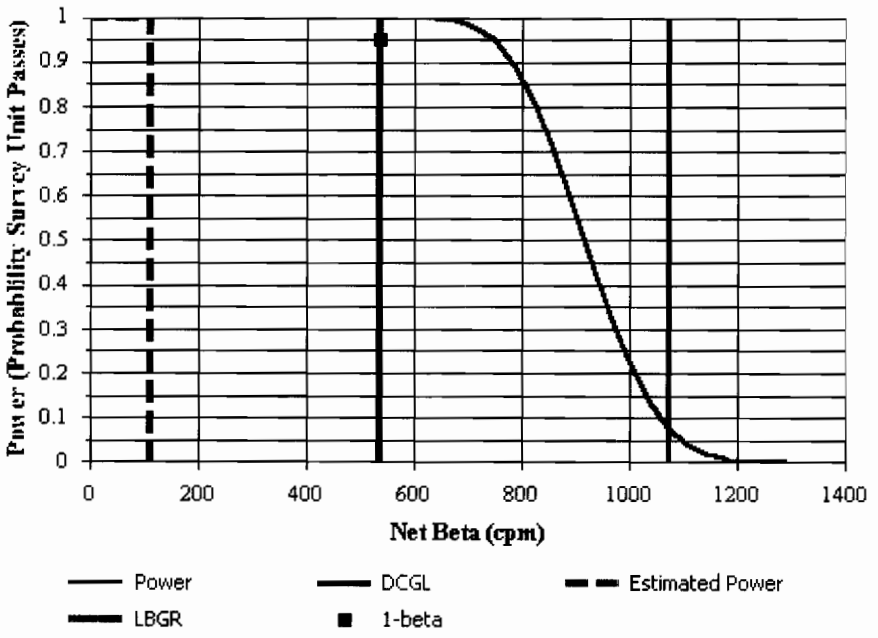
37

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

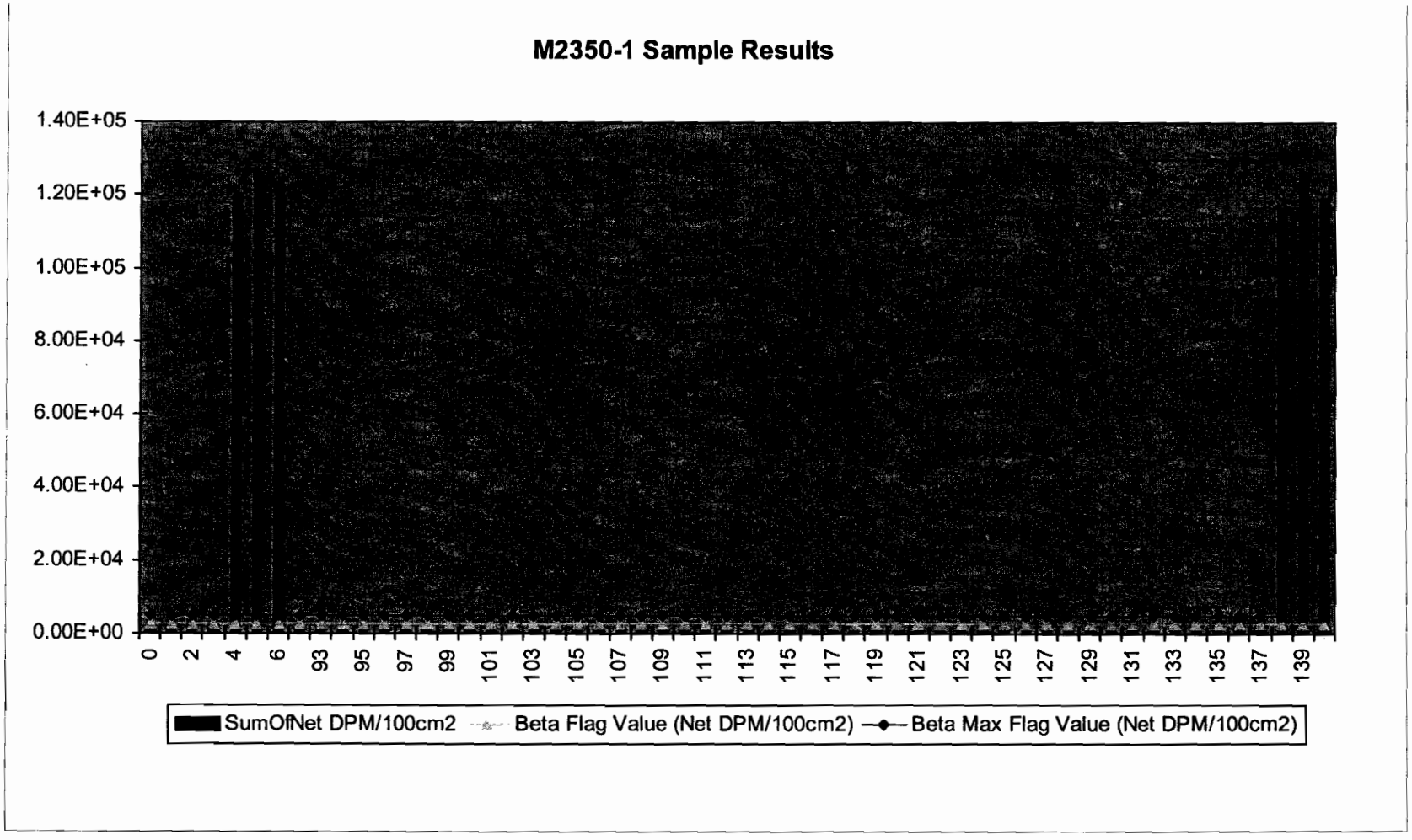
M2350-1 Download BETA Report

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
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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. 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						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)

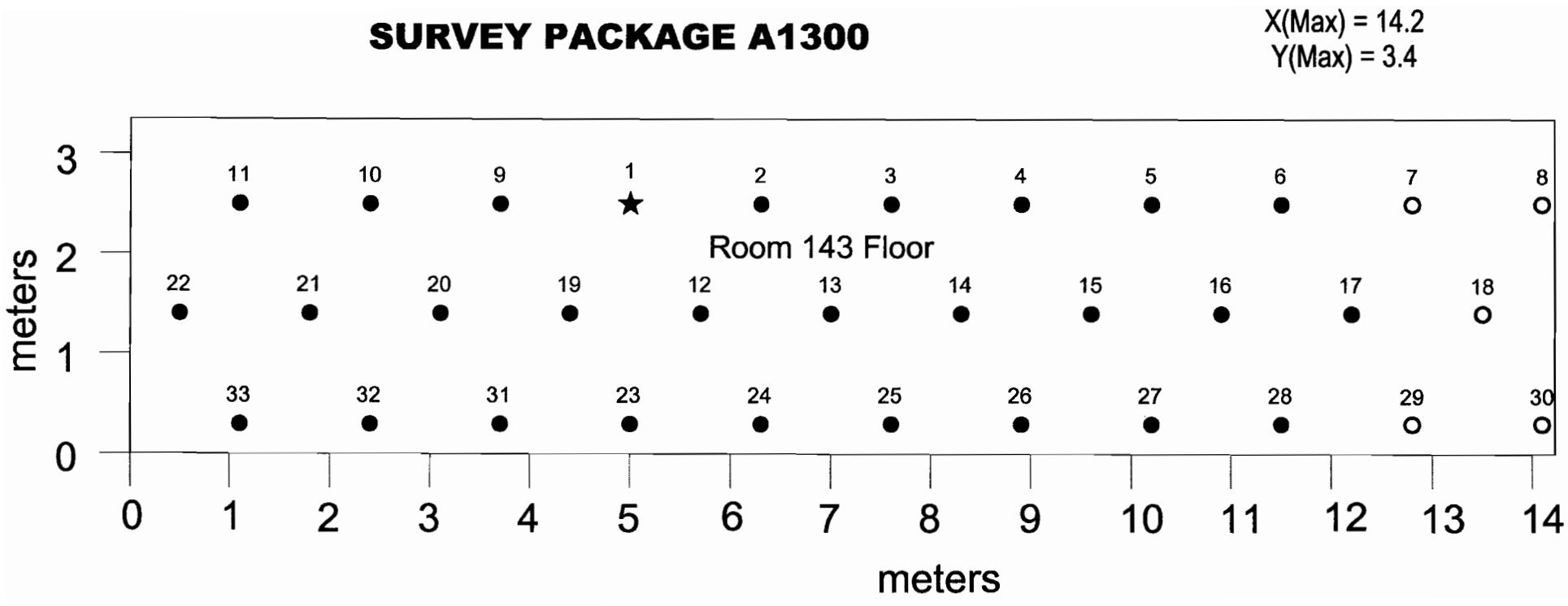
$$D = 0.866 * L$$

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

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

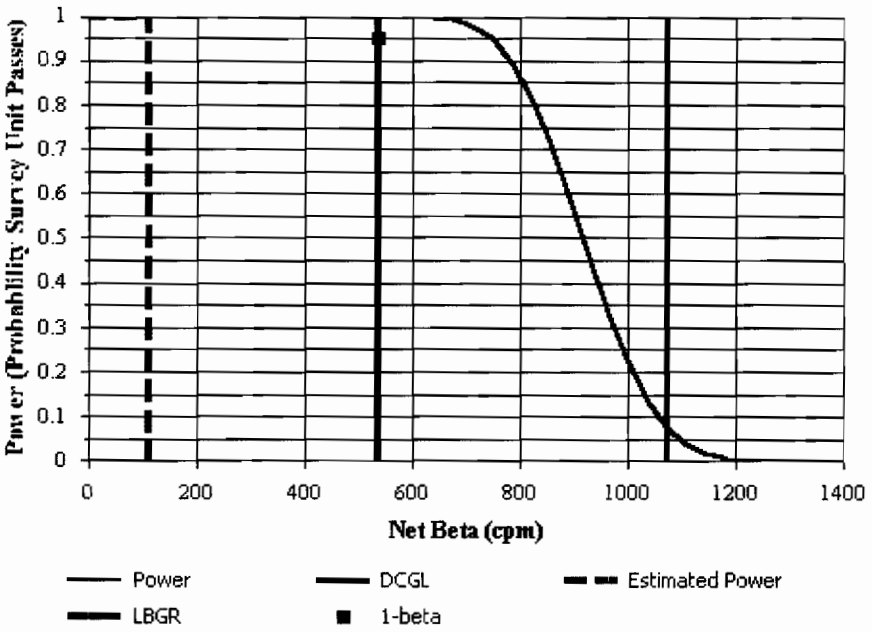

SURVEY PACKAGE A1300
X(Max) = 14.2
Y(Max) = 3.4
Room 143 Floor
11
10
9
1
2
3
4
5
6
7
8
22
21
20
19
12
13
14
15
16
17
18
33
32
31
23
24
25
26
27
28
29
30
meters
0
1
2
3
meters
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14

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

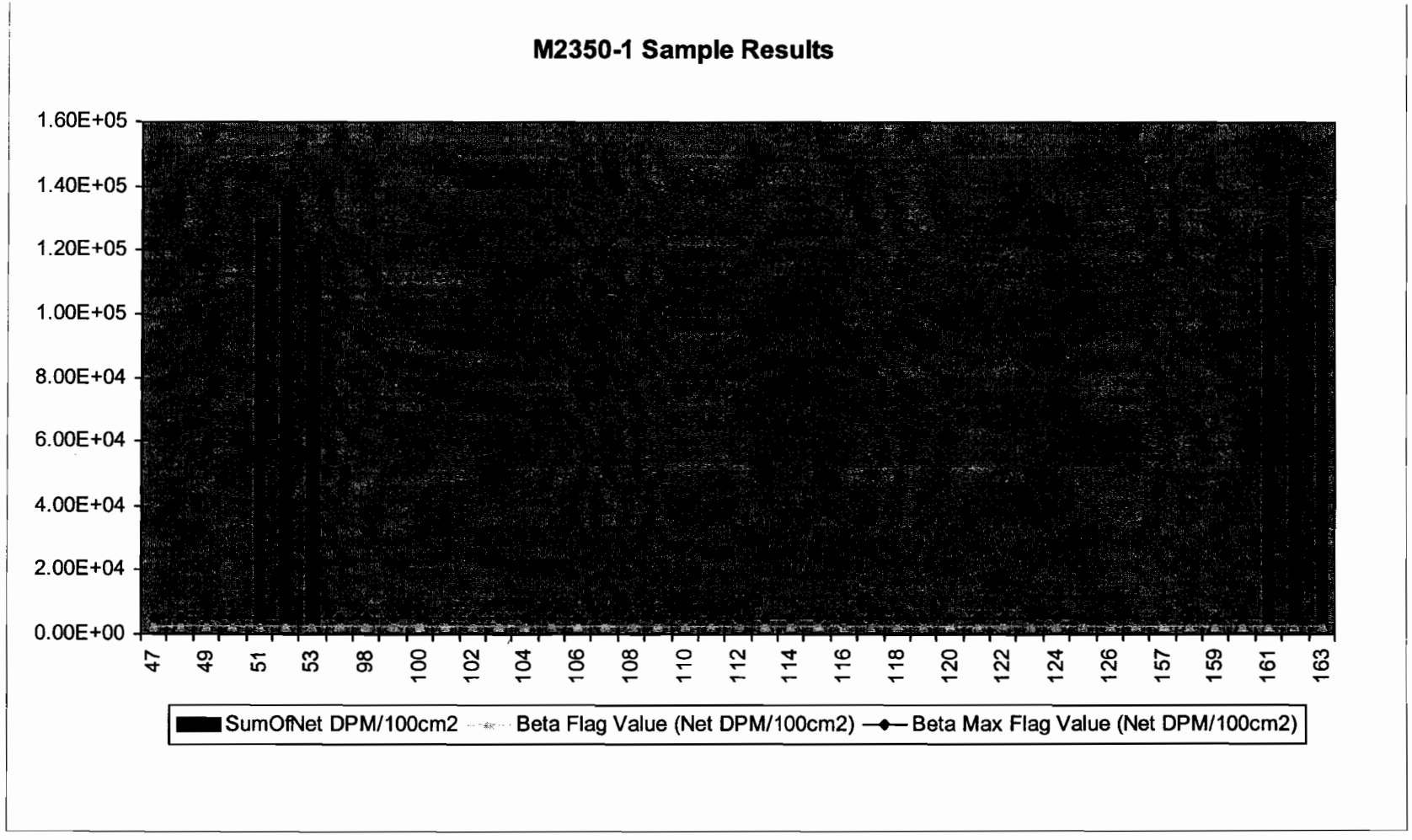
M2350-1 Download BETA Report

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. Use gas flow proportional detector model numbers 43-68 or 43-106 for surveys. The direct alpha and beta measurements and smears should be taken equidistant (where possible) and at the same measurement locations throughout the survey area. 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

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							

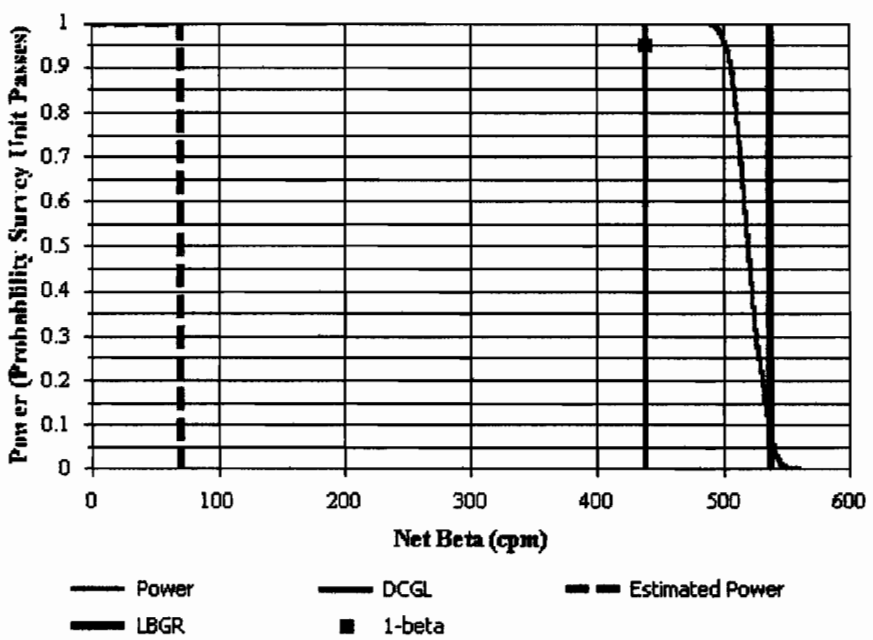
Survey Comments

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 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, σ, is much smaller that the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, Δ/σ, 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

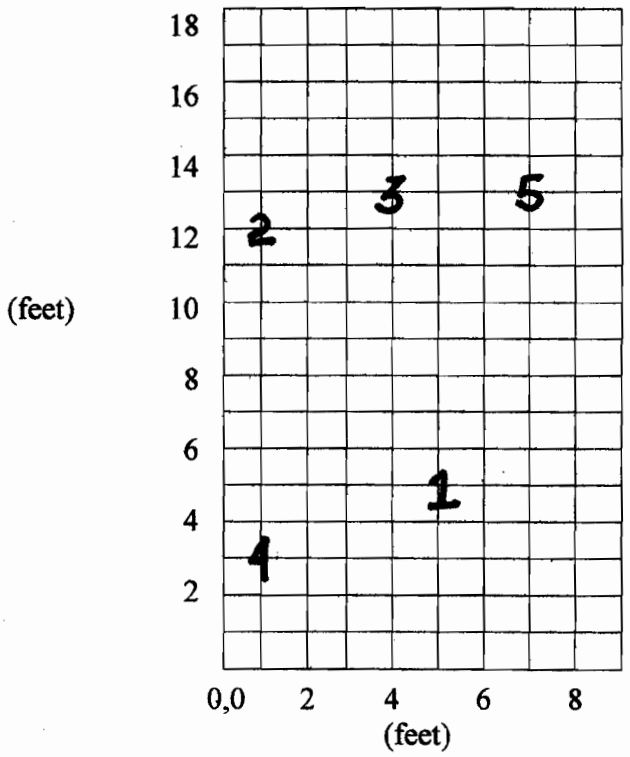
	x	y
1.	2	6
2.	8	0

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

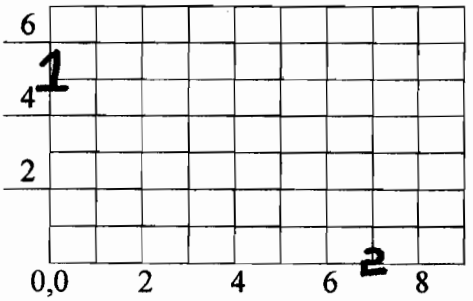
	x	Y
1.	2	6
2.	8	0

West Wall

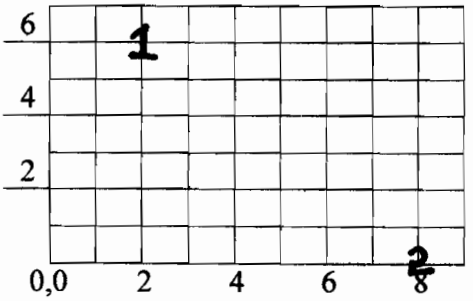
	x	y
1.	3	0
2.	17	2

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

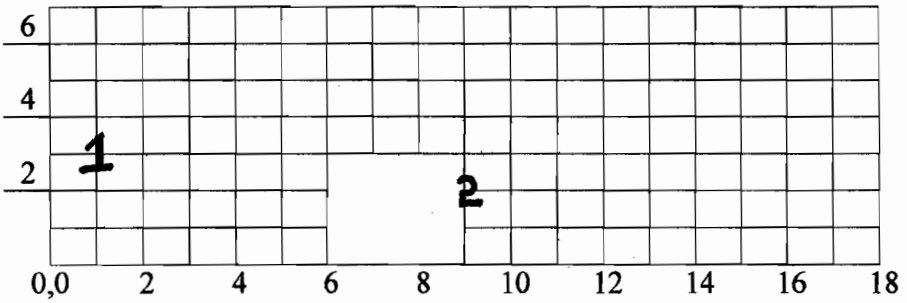
	x	Y
1.	2	6
2.	8	0

West Wall

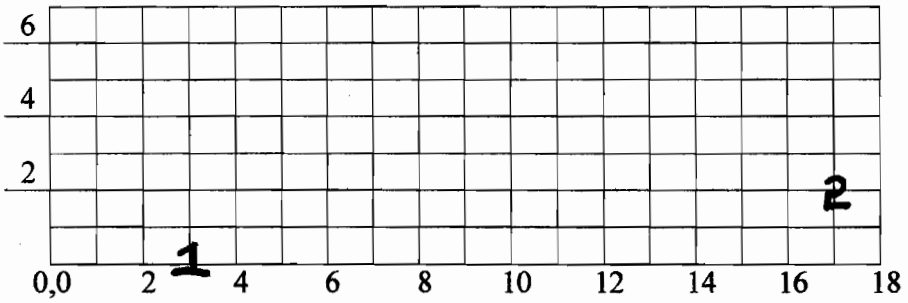
	x	y
1.	3	0
2.	17	2

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)

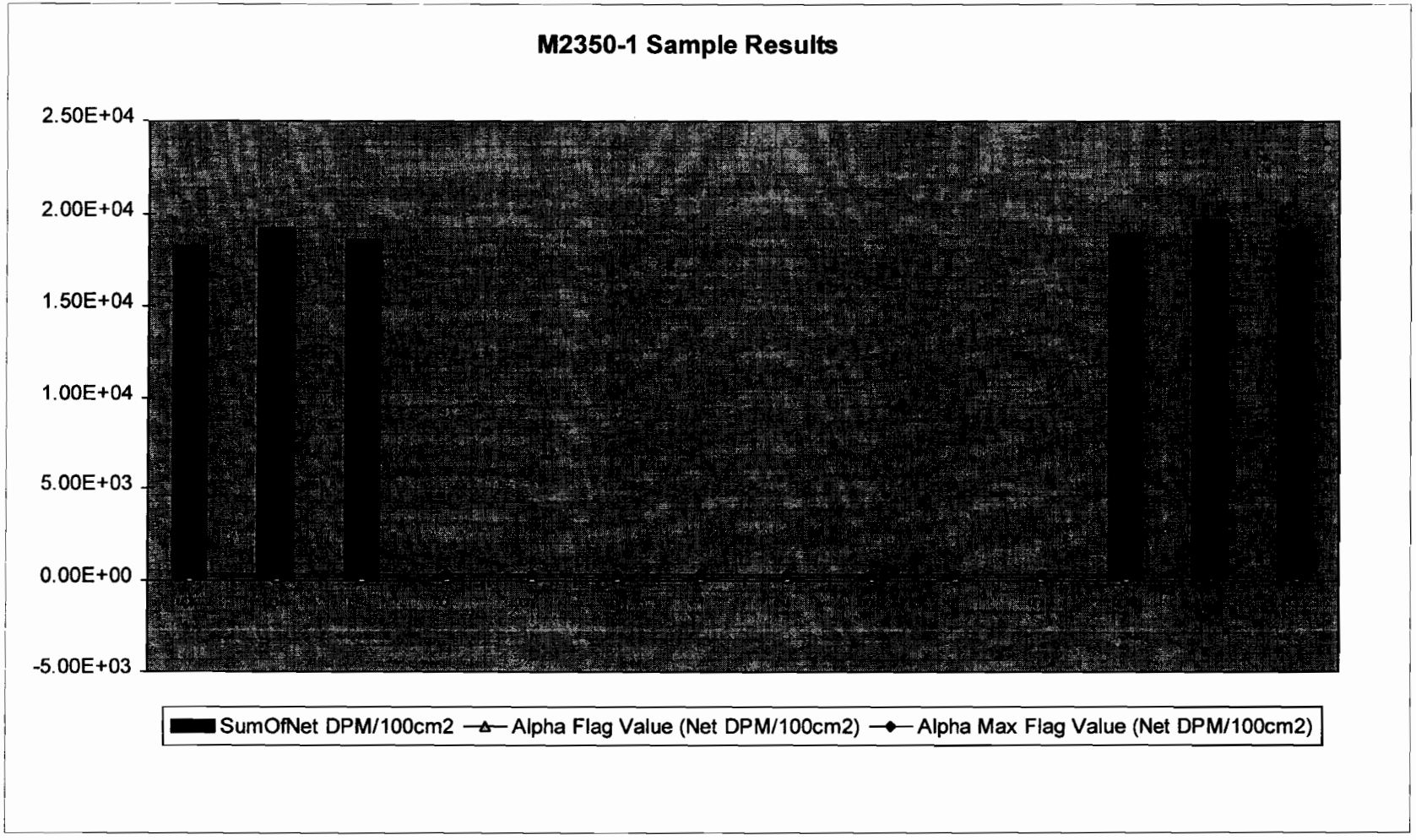
M2350-1 Download ALPHA Report

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

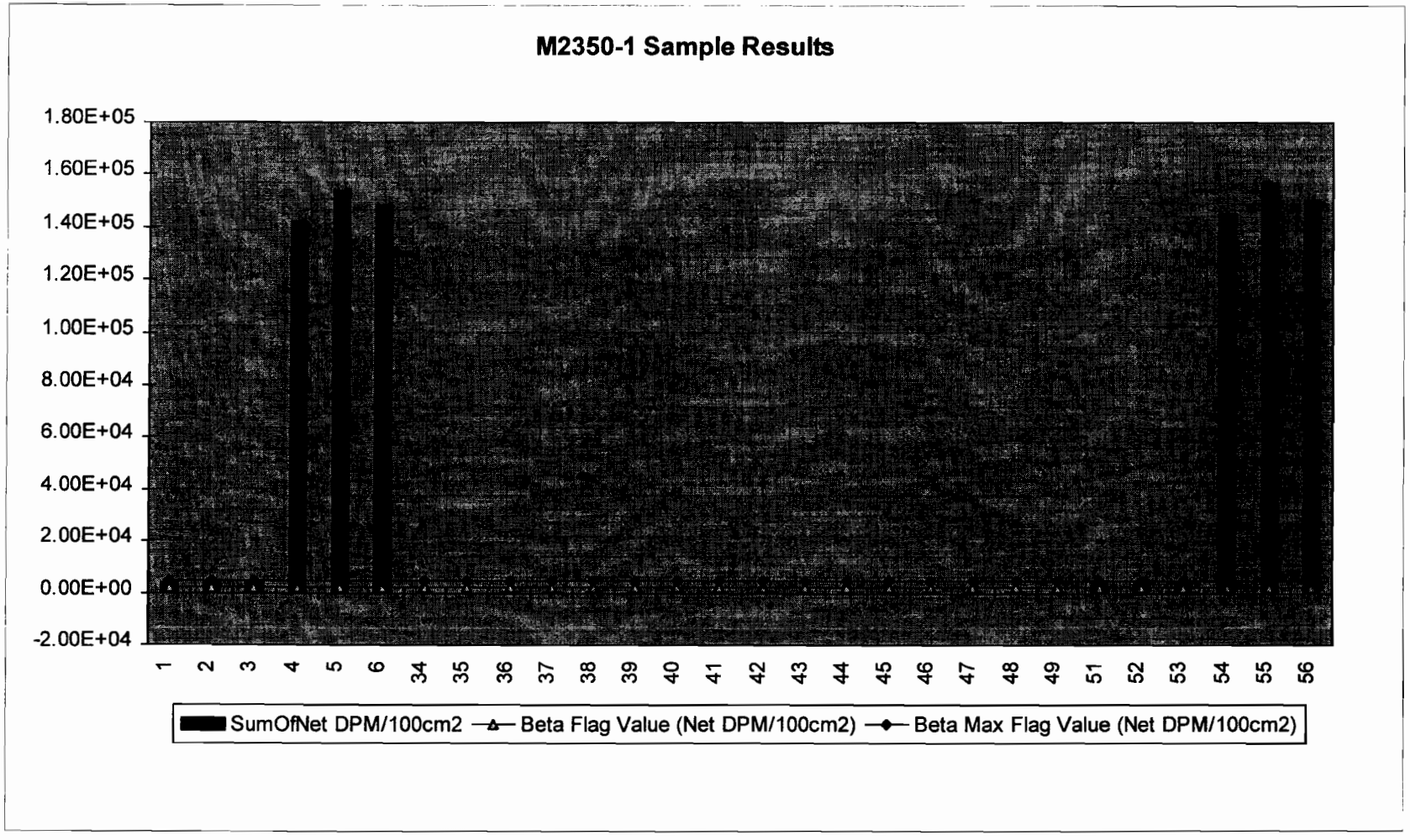
M2350-1 Download BETA Report

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 ✓

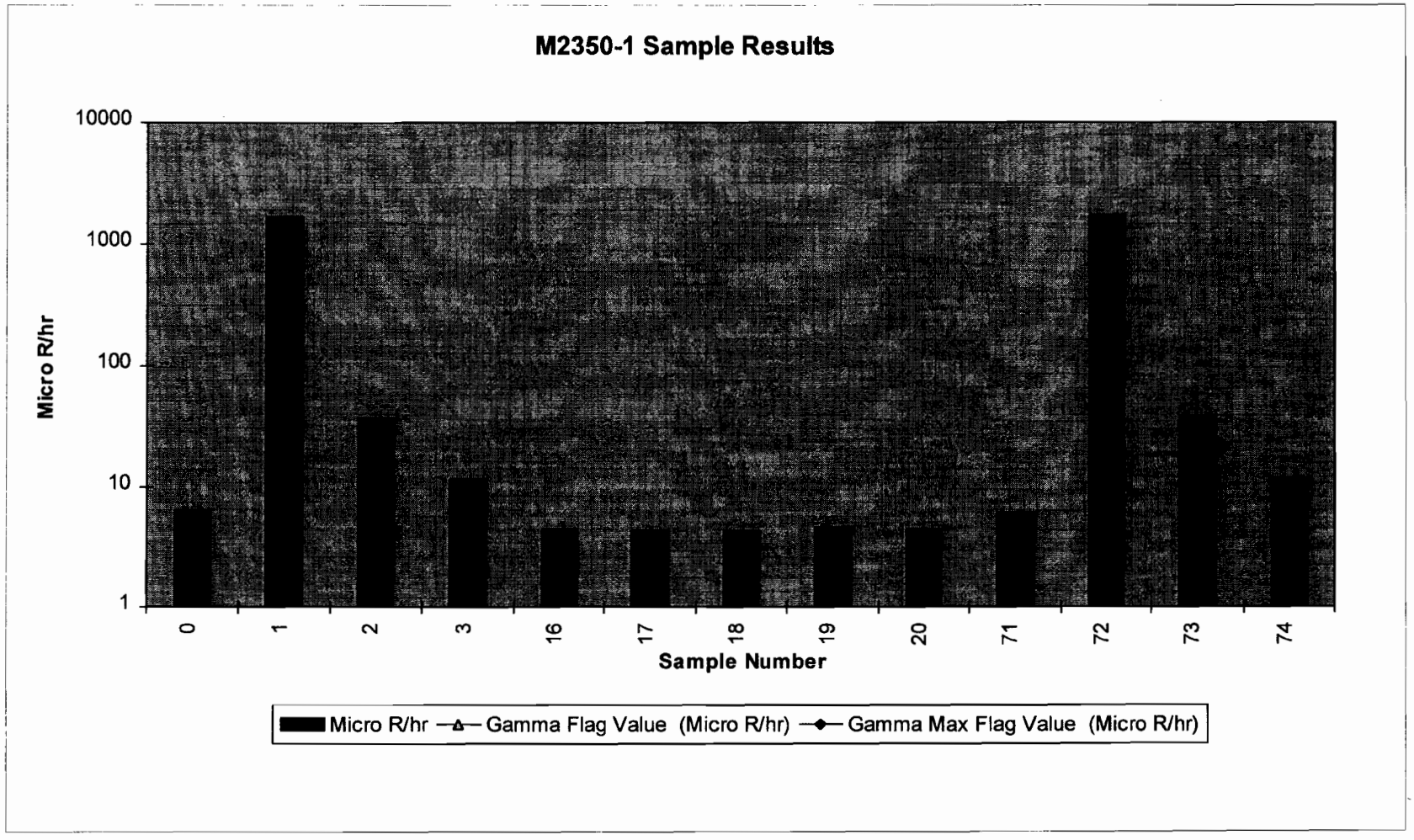
M2350-1 Download Gamma Report

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. 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 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)

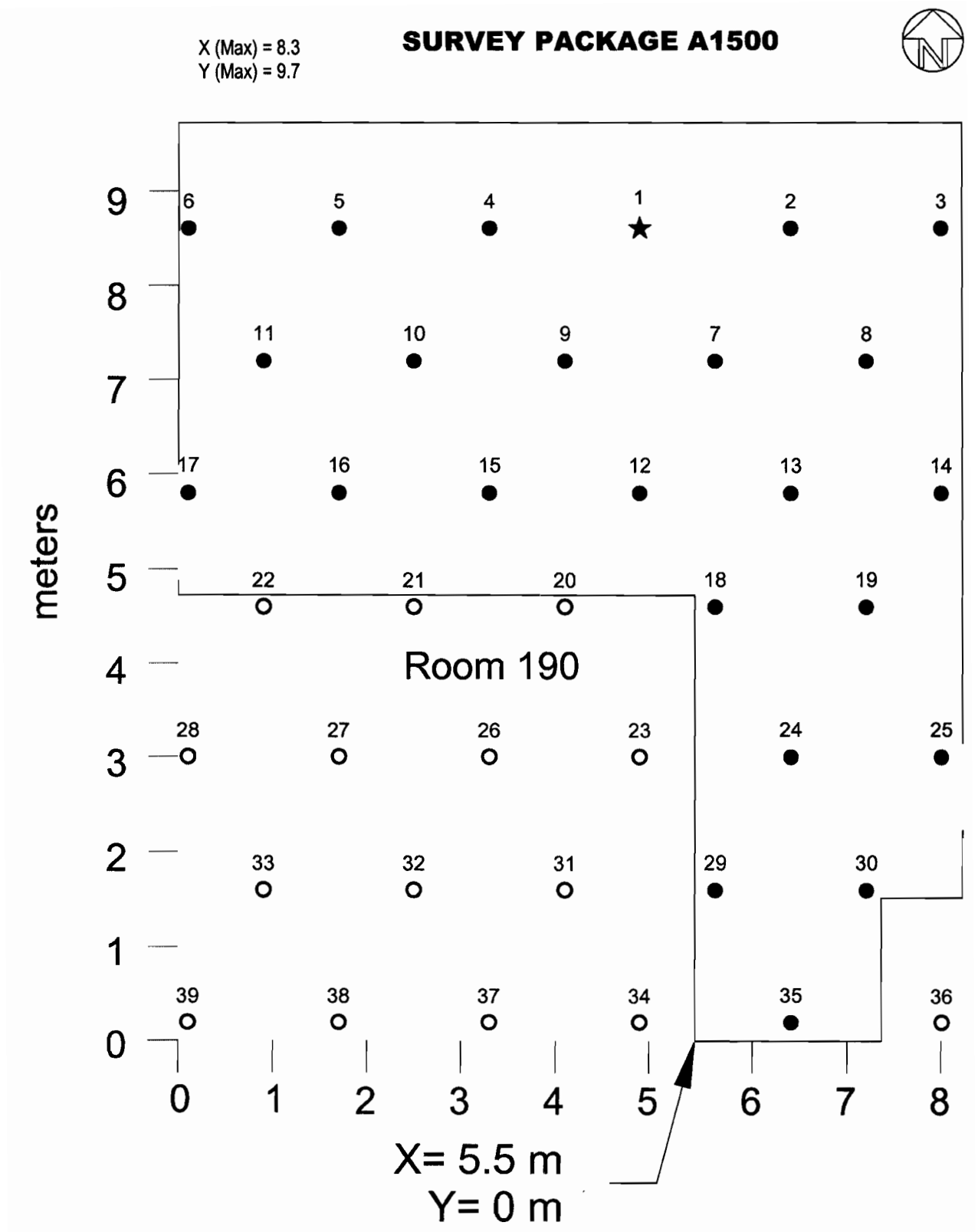
$$D = 0.866 * L$$

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

σ =	301.1	cpm (Calculated by COMPASS)
DCGLW =	1,074	cpm (Calculated by COMPASS)
$DCGL_W/\sigma$ =	3.6	>3
Δ/σ =	$(DCGL_W - LBGR) / \sigma$ =	3
LBGR =	$DCGL_W - 3\sigma$	
LBGR =	**171**	**cpm**

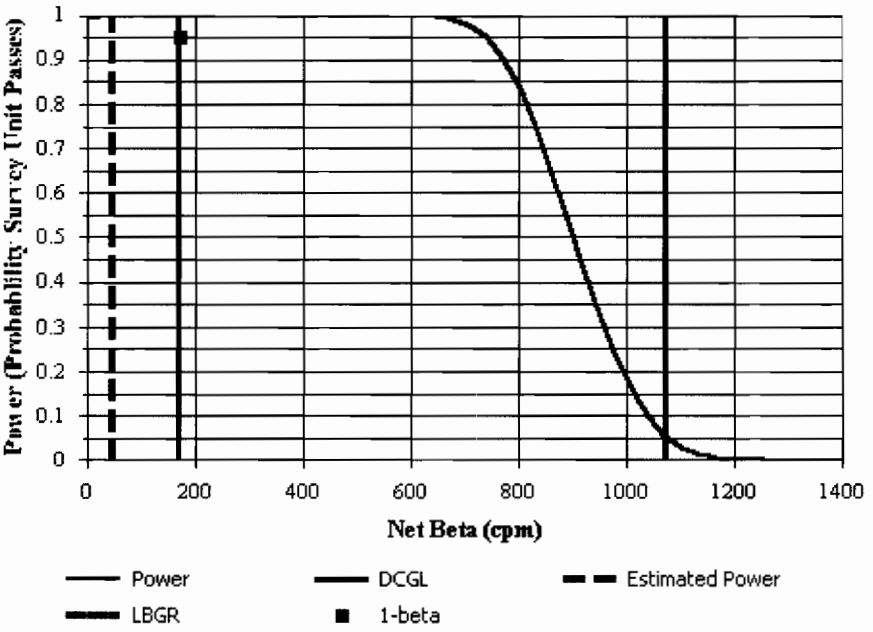

SURVEY PACKAGE A1500
X (Max) = 8.3
Y (Max) = 9.7
meters
Room 190
X= 5.5 m
Y= 0 m

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

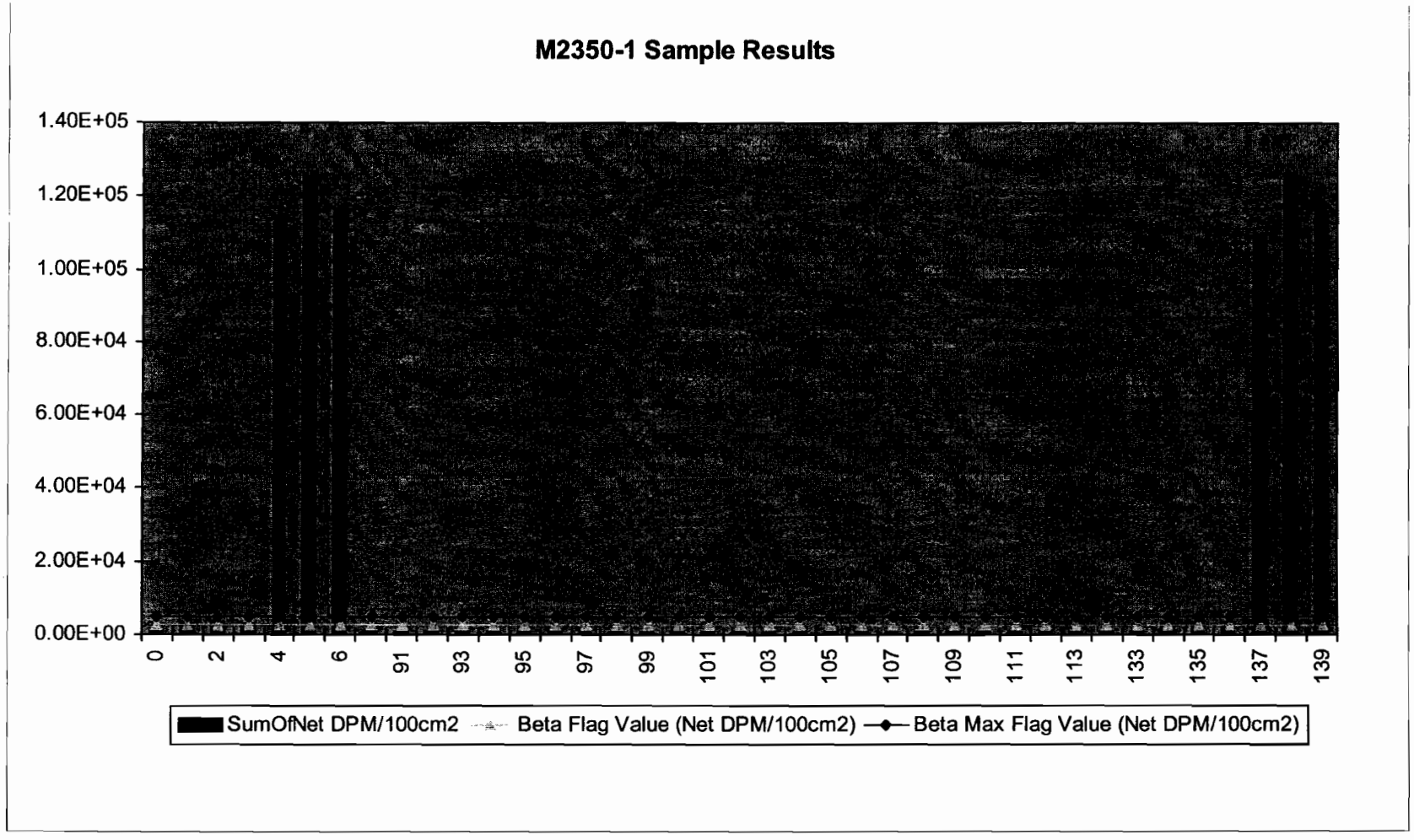
M2350-1 Download BETA Report

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

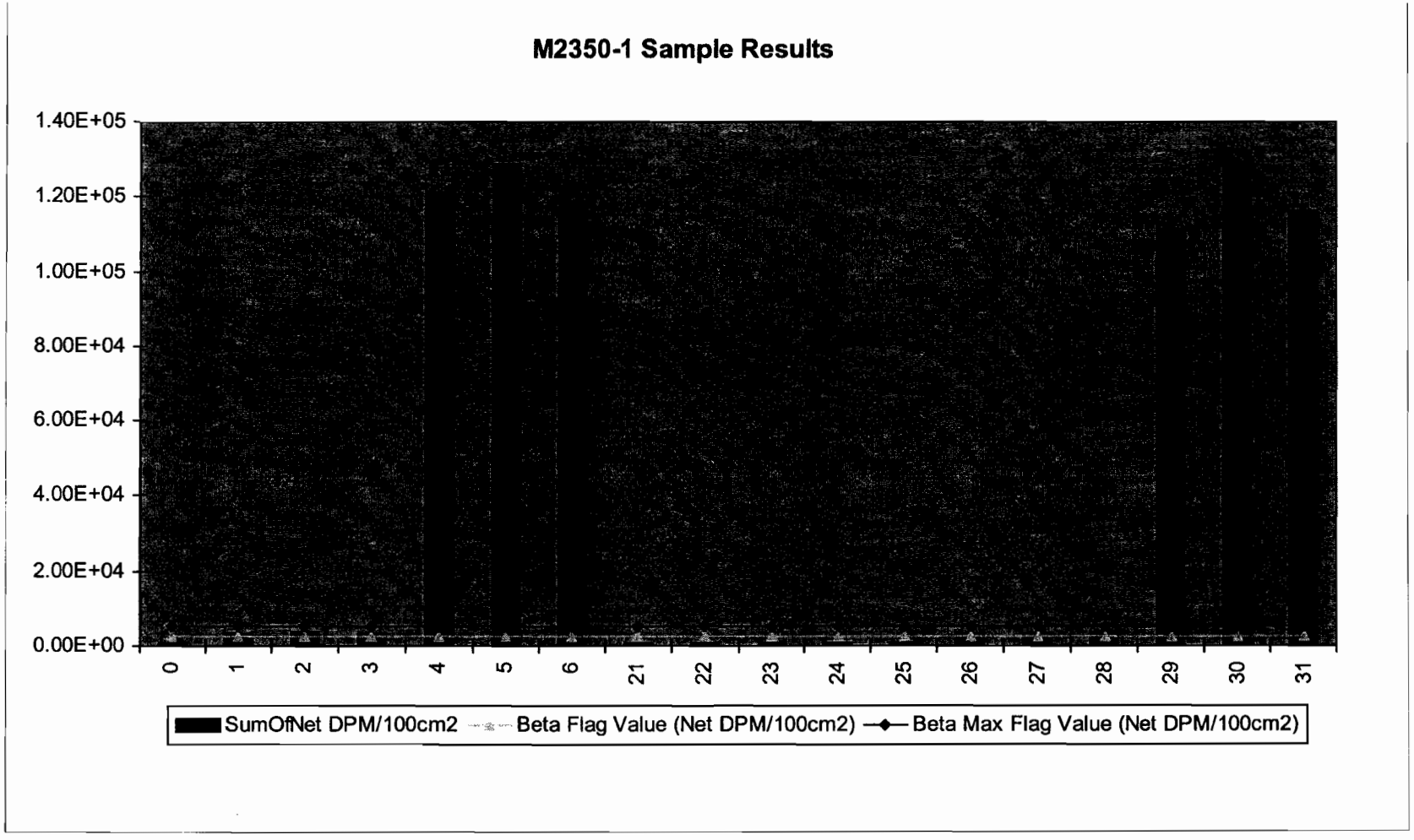
M2350-1 Download Beta Report

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. 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 on floor in survey unit at five unspecified survey locations. 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

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

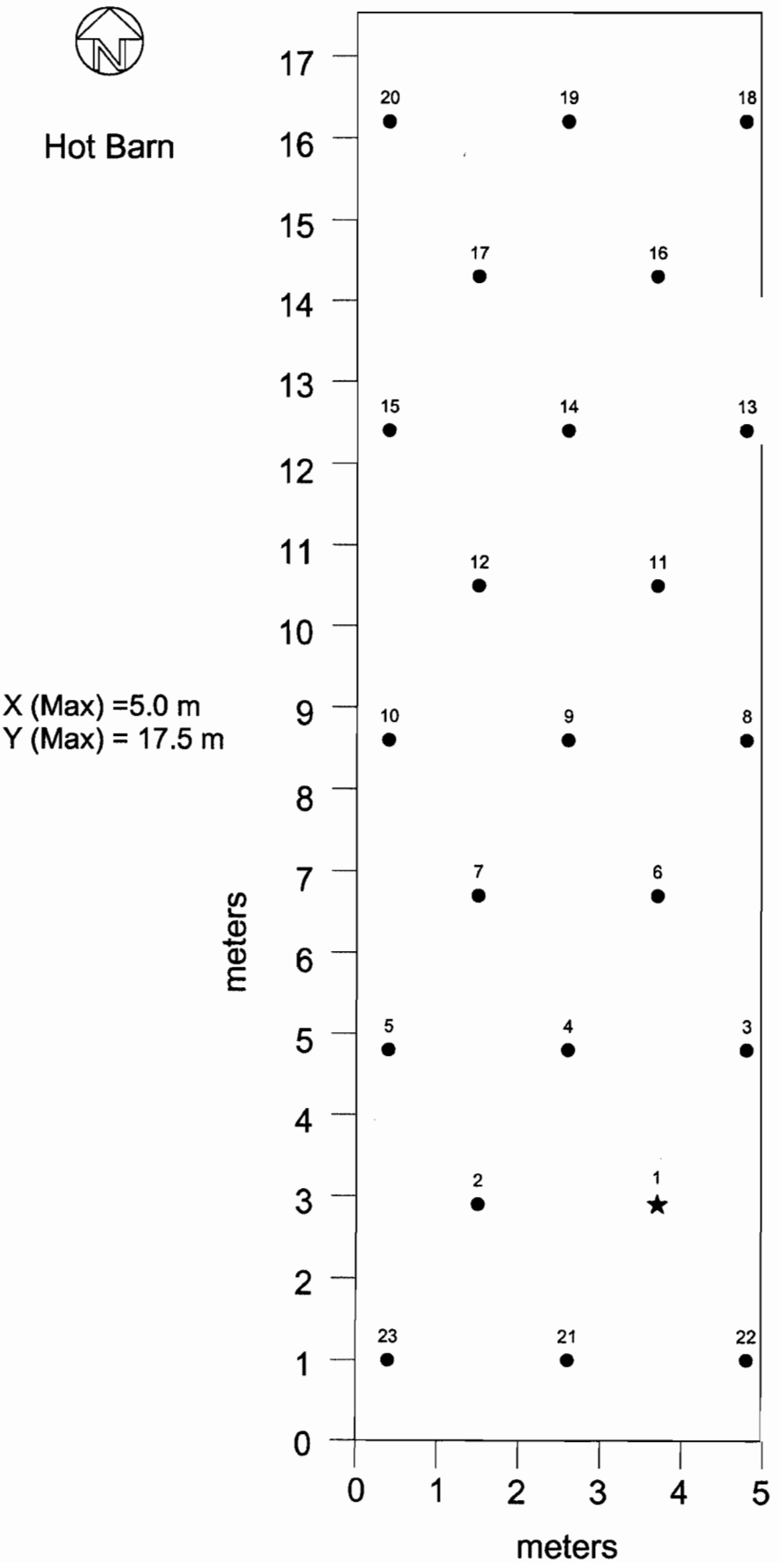
L=	2.2	meters	(distance between measurement points)

$$D = 0.866 * L$$

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

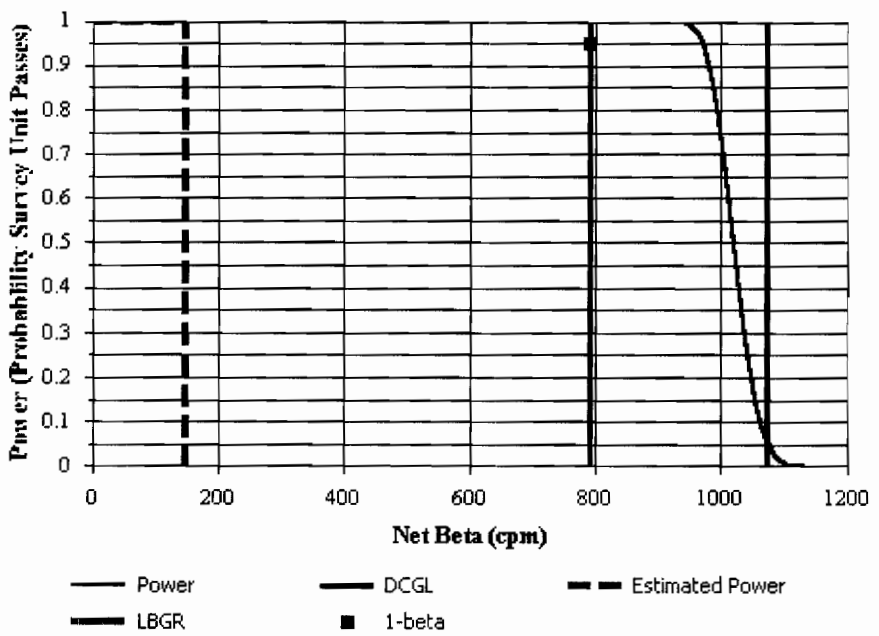


Building Surface Survey Plan

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, σ, is much smaller than the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, Δ/σ, is about 3.

Package A1600, A1610 & A1620

σ =	94.0	cpm (Calculated by COMPASS)
DCGLW =	1,074	cpm (Calculated by COMPASS)
$DCGL_W/\sigma$ =	11.4	**>3**
Δ/σ =	$(DCGL_W - LBGR) / \sigma$ =	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

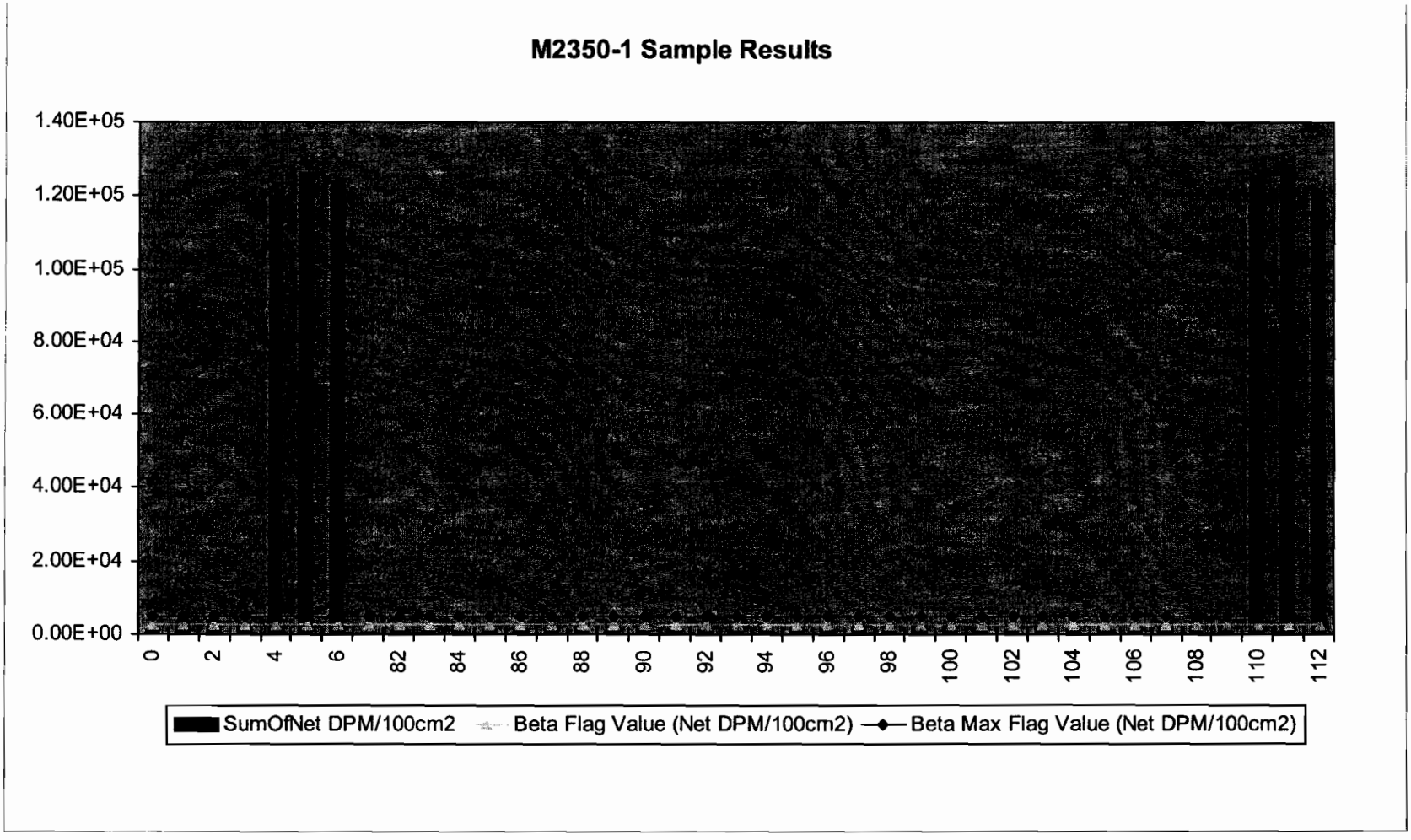
File Name : 00000068	Survey Description :Package A1600 B-122 Room 222 Floor	
Survey Reason : Termination		
User ID : DRK2986	Technician Name : Doug Kjos	
Instrument Model : 2350-1	Instrument S/N : 95359	Instrument Cal. Due : 6/12/03
Detector Model : 43-68B	Detector S/N : 088917	Detector Cal. Due : 10/15/03
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. 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 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

Package Review	
Date Package Completed:	4/28/03
Package Reviewed by and Date:	Paul C Ely 4/28/03

Survey Comments

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)

$$D = 0.866 * L$$

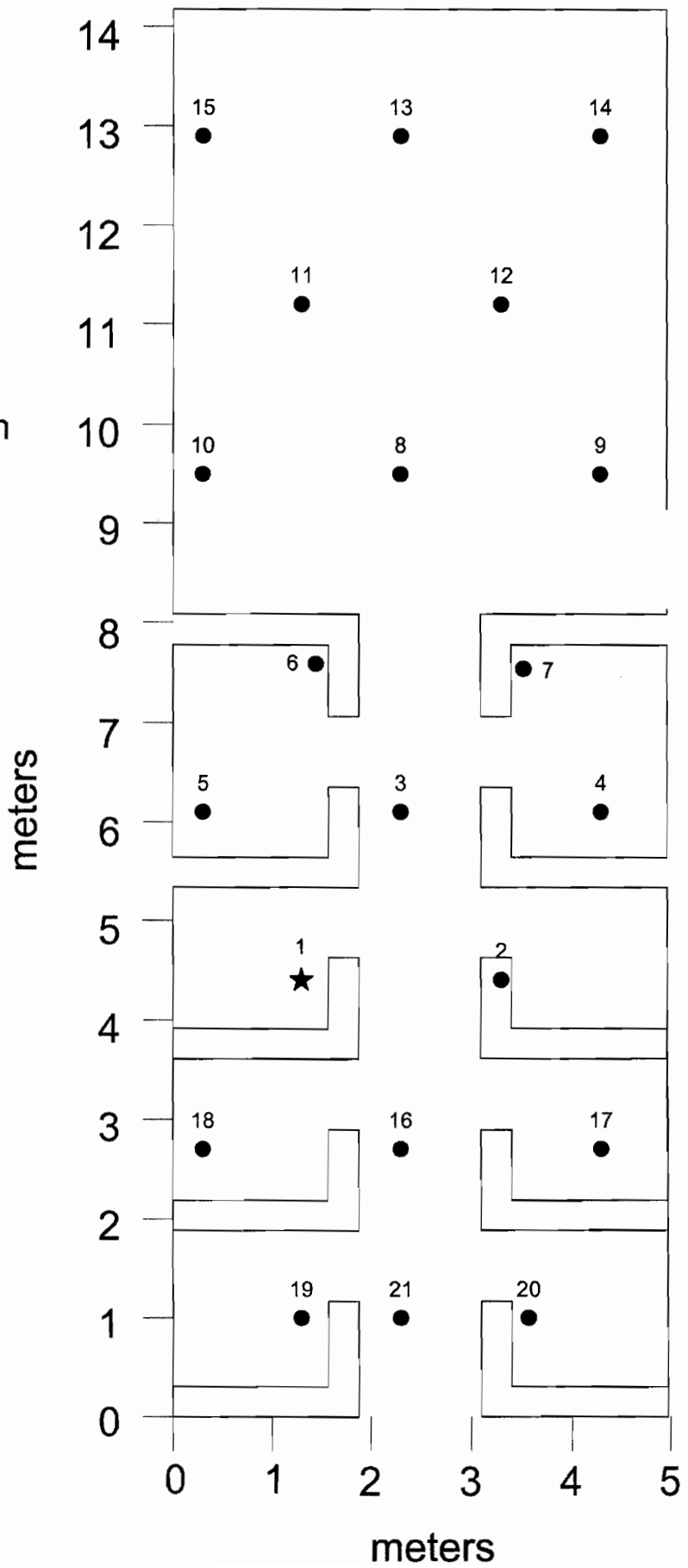
D=	1.7	meters	(distance between rows)
L/2=	1.0	meters	(row offset value)
X (Random):	2		random number generator
Y (Random):	11.5		random number generator
X (Origin):	1.3		initially generated random number
Y (Origin):	4.4		initially generated random number
Number of rows:	8		
Number of columns:	3		

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

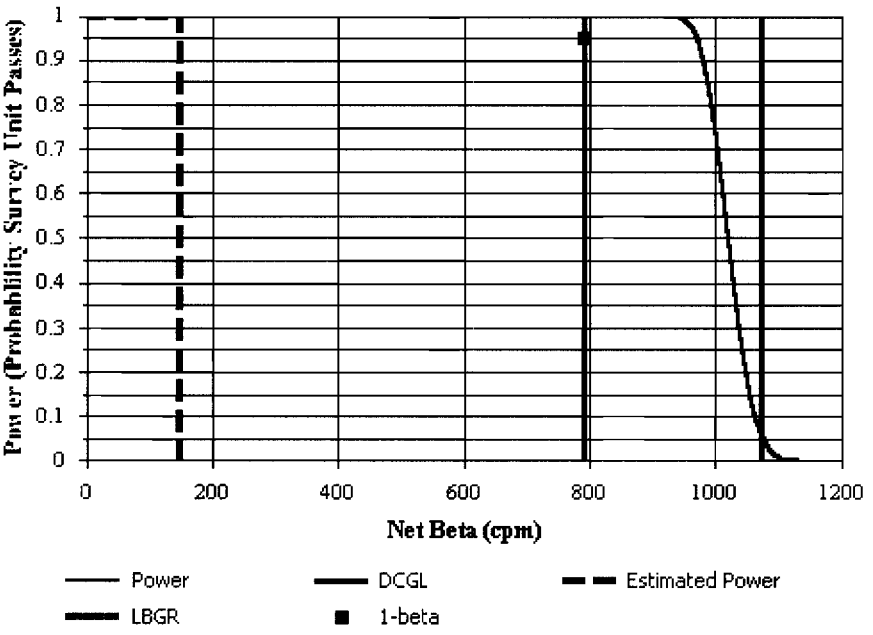


Building Surface Survey Plan

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, σ, is much smaller than the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, Δ/σ, is about 3.

Package A1600, A1610 & A1620

σ =	94.0	cpm (Calculated by COMPASS)
DCGLW =	1,074	cpm (Calculated by COMPASS)
$DCGL_W/\sigma$ =	11.4	>3
Δ/σ =	$(DCGL_W - LBGR) / \sigma$ =	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

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

N A

Remarks-

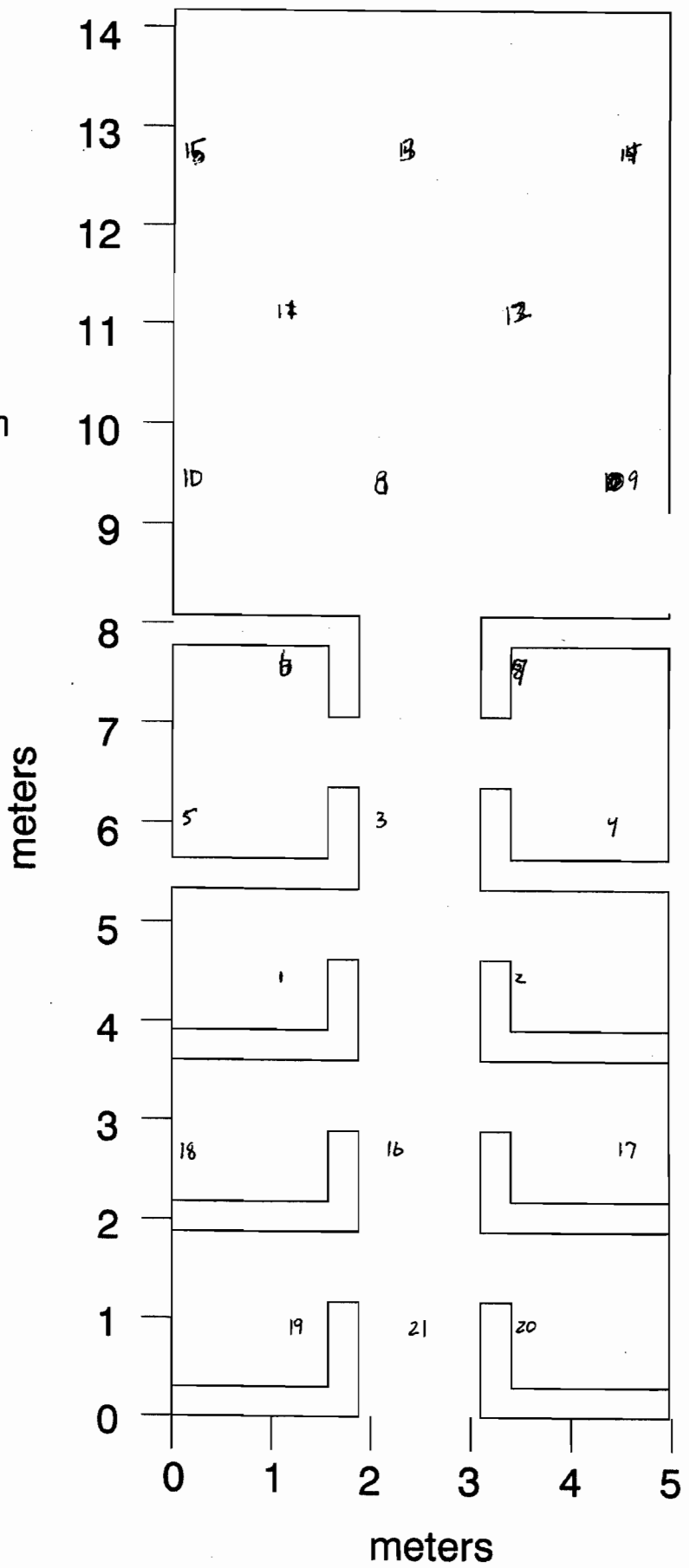
Signature- BS Kjos Reviewed by- Paul C Eg 4/28/03

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. 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 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

Package Review	
Date Package Completed:	4/28/03
Package Reviewed by and Date:	Paul C Elg 4/28/03

Survey Comments

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)

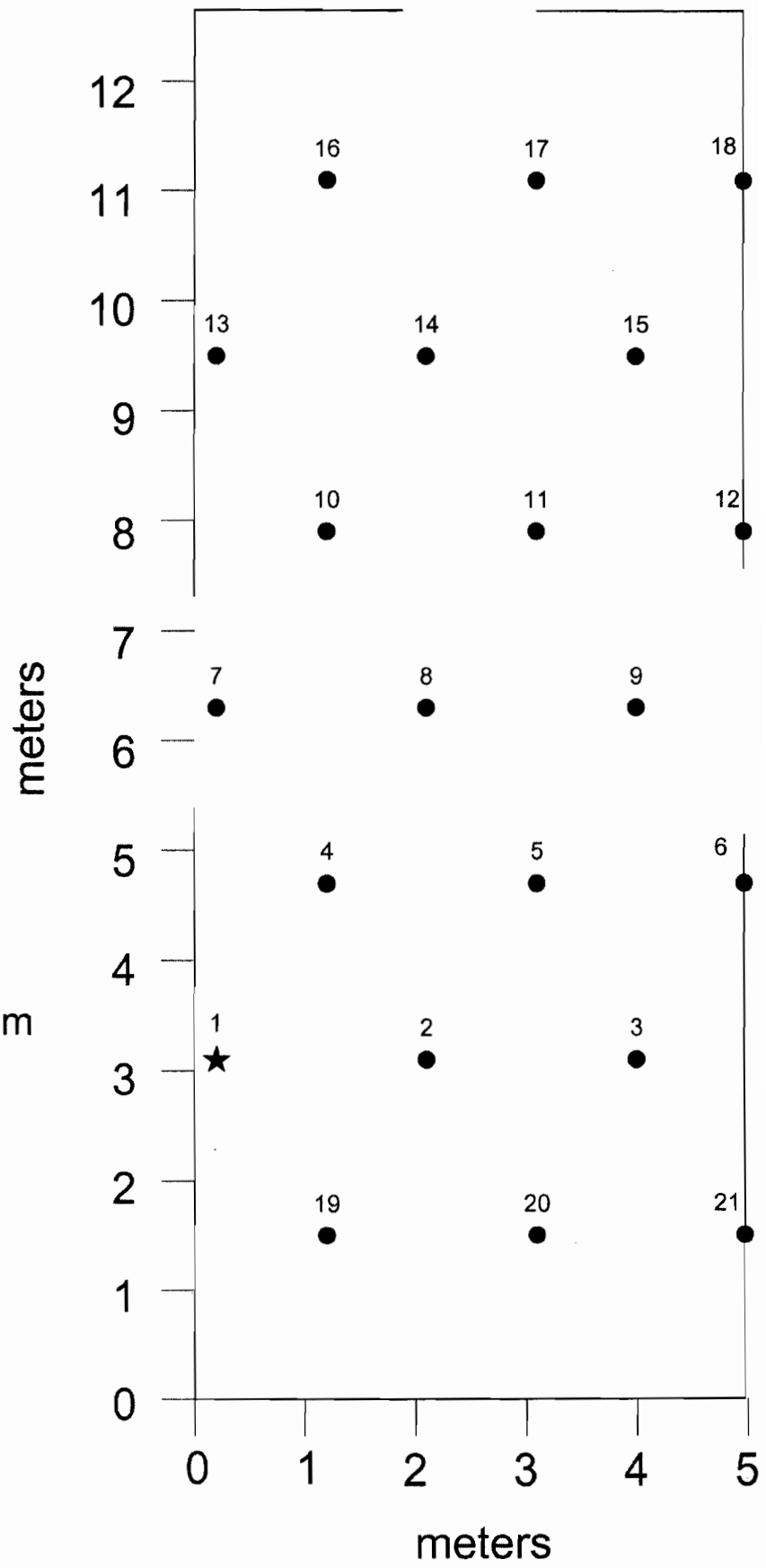
$$D = 0.866 * L$$

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



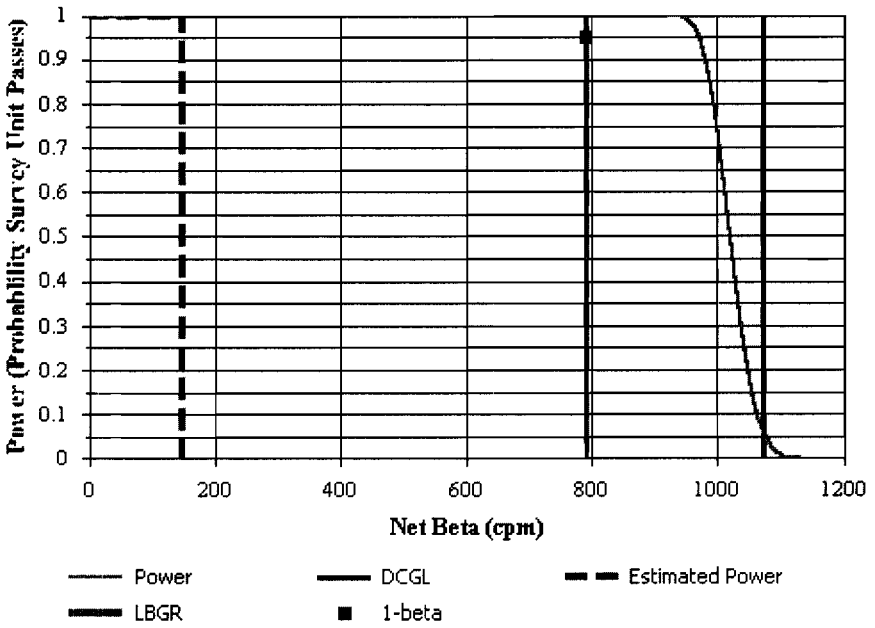
X (Max) =5.0 m
Y (Max) = 12.6 m

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, σ, is much smaller than the $DCGL_W$, the lower bound of the gray region (LBGR) should be set so that the relative shift, Δ/σ, is about 3.

Package A1600, A1610 & A1620

σ =	94.0	cpm (Calculated by COMPASS)
DCGLW =	1,074	cpm (Calculated by COMPASS)
$DCGL_W/\sigma$ =	11.4	>3
Δ/σ =	$(DCGL_W - LBGR) / \sigma$ =	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

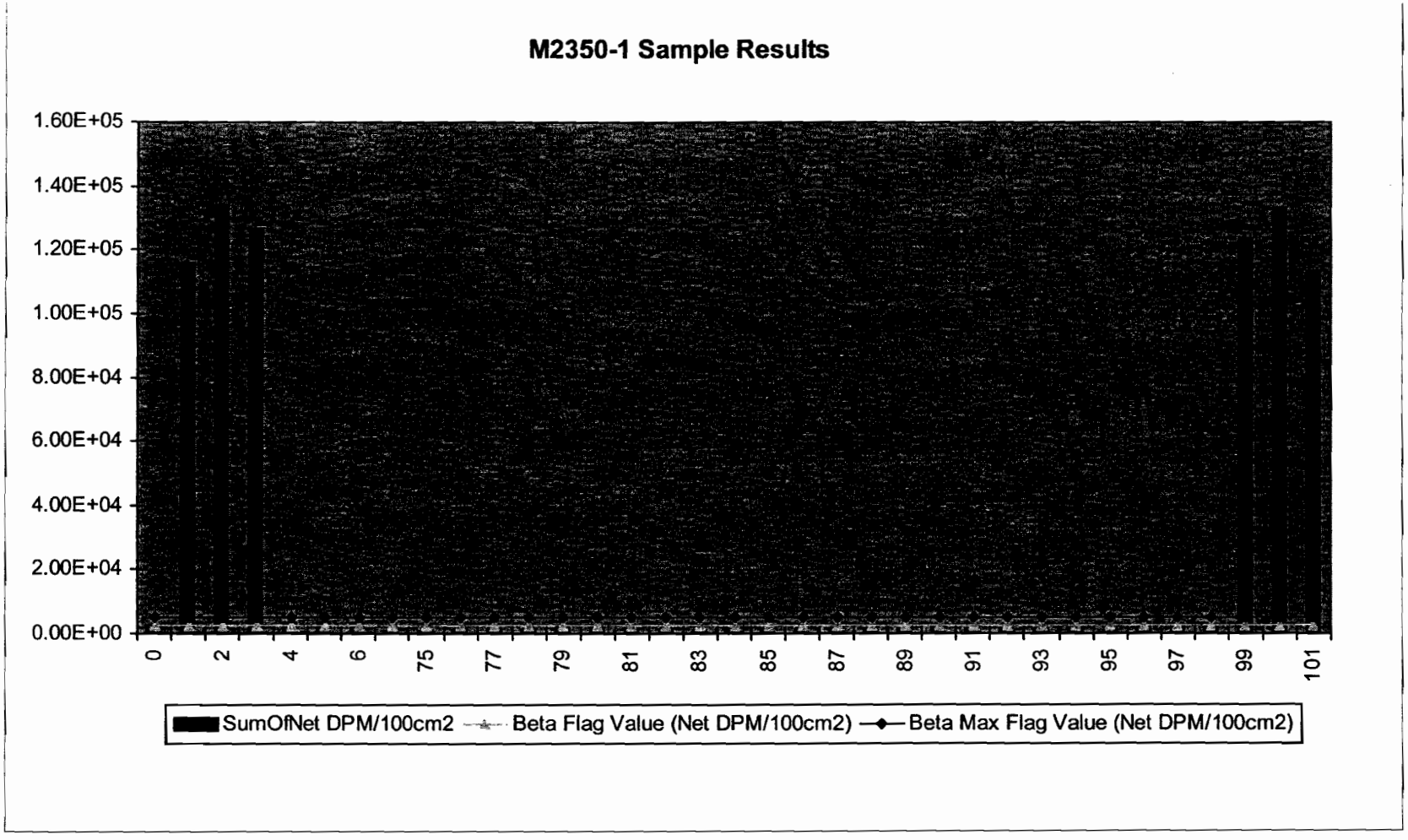
M2350-1 Download Beta Report

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

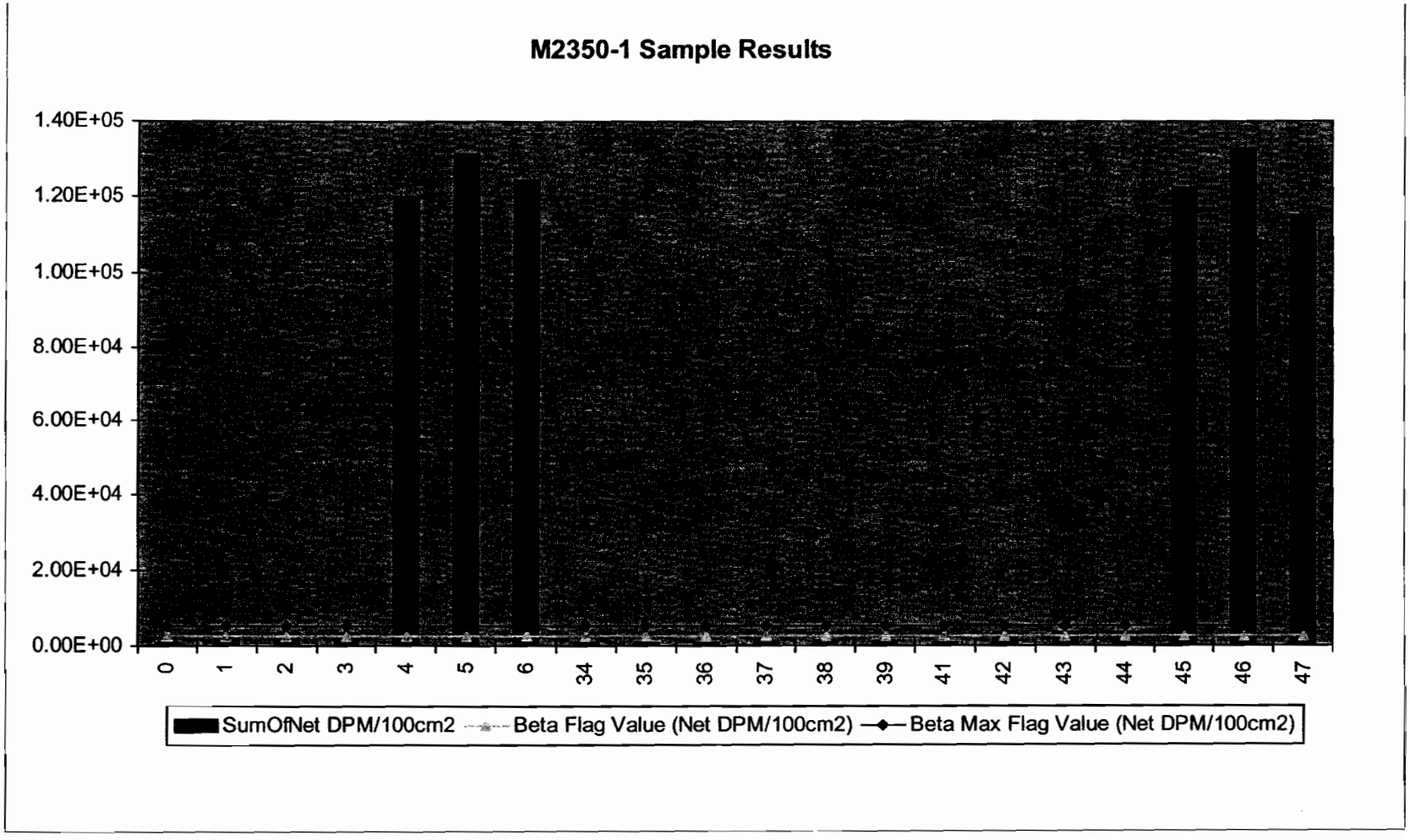
File Name : 00000074	Survey Description :Package A1620, Room 222, Points 19,20 and 21	
Survey Reason : Termination		
User ID : BSK0490	Technician Name : Betty Kjos	
Instrument Model : 2350-1	Instrument S/N : 126197	Instrument Cal. Due : 6/30/03
Detector Model : 43-68B	Detector S/N : 092524	Detector Cal. 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. 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 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. 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, 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:

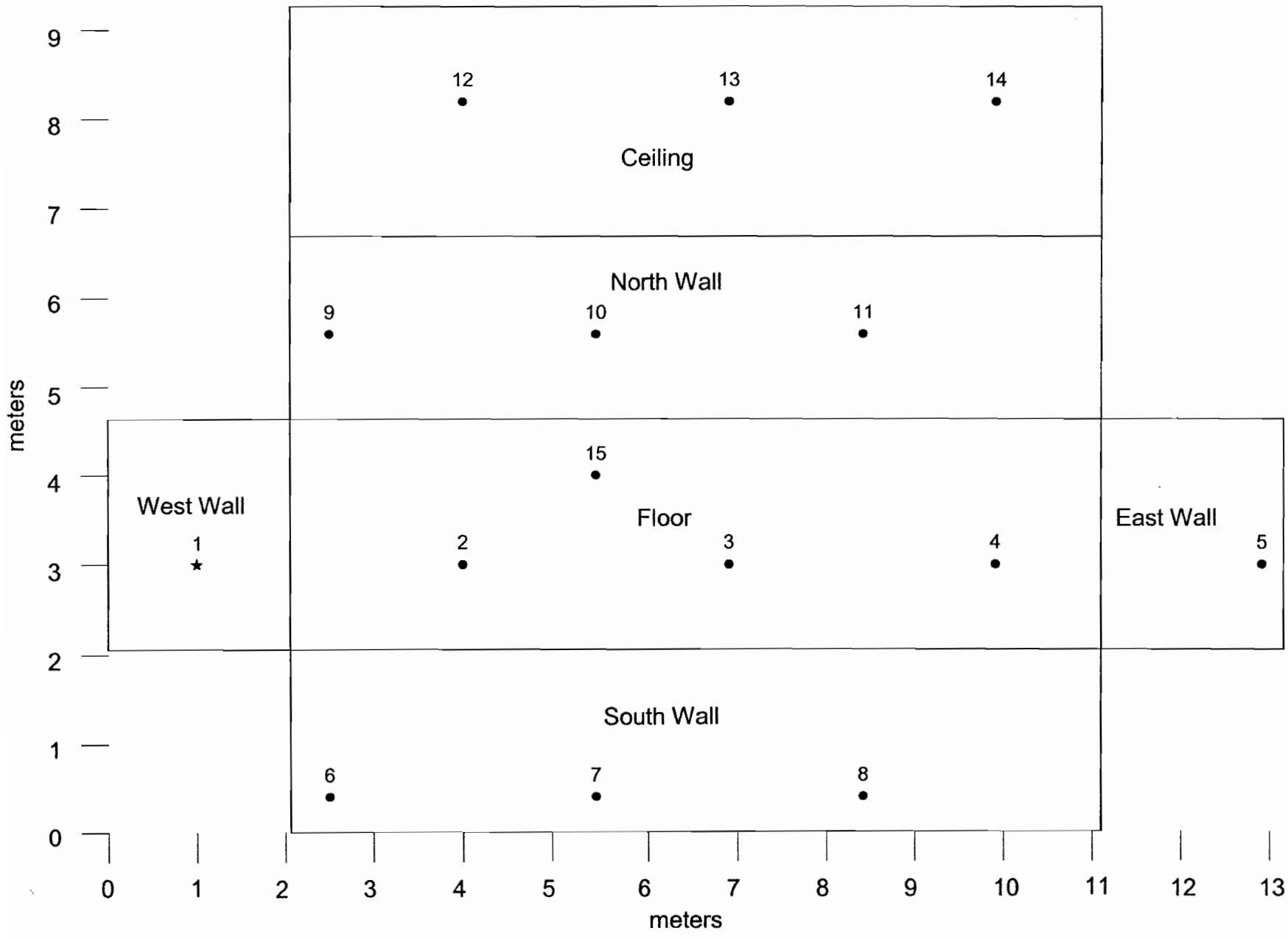
$$D = 0.866 * L$$
$$= 2.6 \text{ m}$$

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

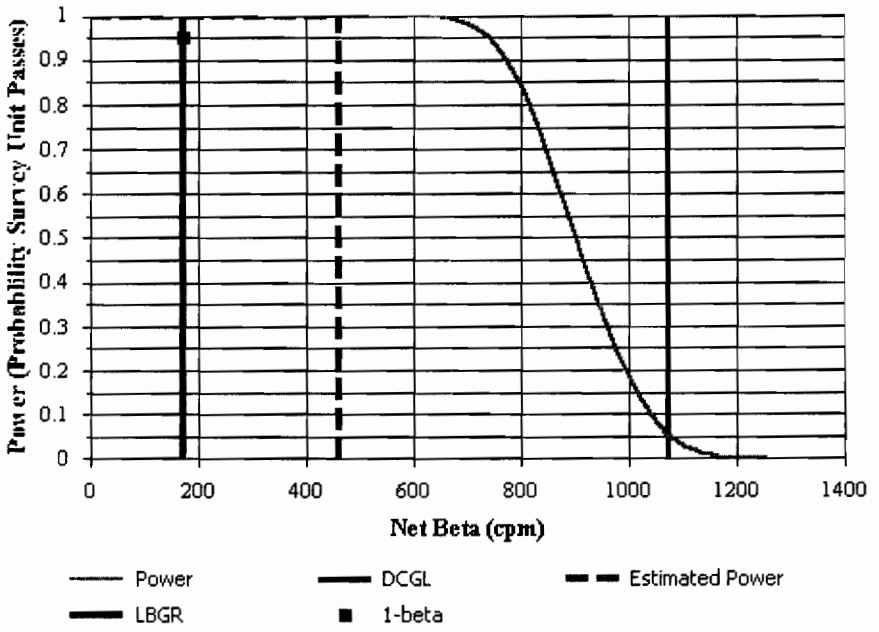


Building Surface Survey Plan

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

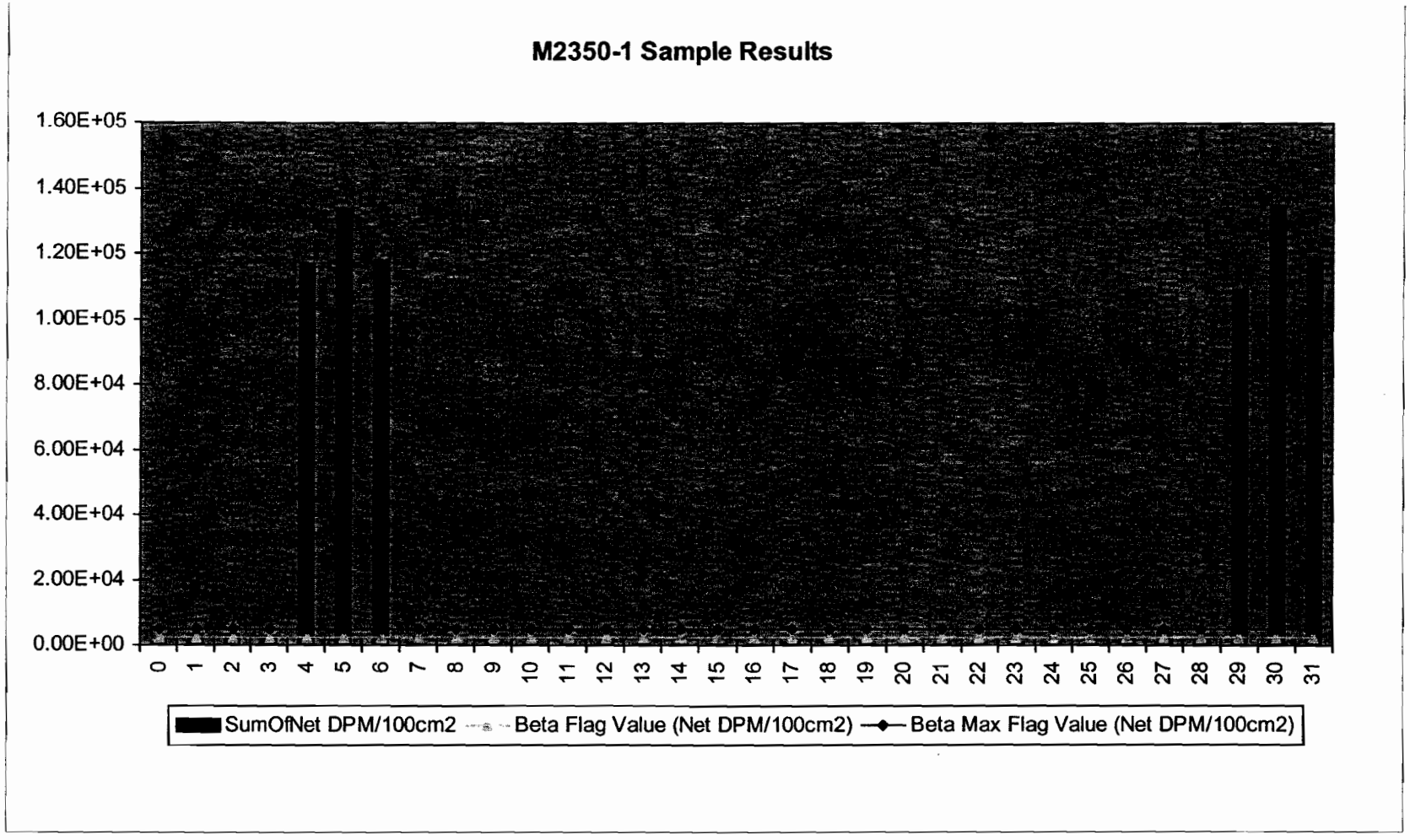
M2350-1 Download BETA Report

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