Rocky Mountain
Remediation Services, L L C
protecting the environment

RF/RMRS-99-358.UN

Closeout Radiological Survey Report

For Building 729

Rocky Mountain Remediation Services, L.L.C.

Millennium Services Inc

Revision 1

July 1999

Volume 3

ADMIN RECORD

1/239

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ATTACHMENT E

Source Certificate – NIST Traceability

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16 August 1995 Men/wo
Page 1 of 2 pages, Issue 07/95

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Amersham
The Health Science Group

CERTIFICATE

No. 109597-2

for a Sealed Radioactive Source

Source Type: Alpha Wide Area Reference Source

Product Code	PPRX1754
Drawing	VZ-1246
Dimensions of Active Surface	71 mm x 71 mm
Overall Dimensions	87 mm x 87 mm x 7 mm
Source No.	ER 716
Nuclide	Plutonium-238

Measurement Data

Activity	3.24 kBq
Overall Uncertainty*	± 10 %
Alpha Surface Emission Rate	1.54E03 s^{-1} ± 5 % in 2π steradian
Reference Date	1 August 1995
Traceability*	Defined on page 2

Leakage and Contamination Test(s)

Test Method(s)*	I
Test(s) passed on	15 August 1995

Additional Information

ISO Classification*	C.11111
Recommended Working Life*	10 years
Remark	---

* see page 2 for explanation

Amersham Buchler

i.A. Pat

(Production Manager)

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Explanations for Certificates (Page 2 of Certificates)

Overall uncertainty

The reported uncertainty is based on standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % (ISO Guide, 1995)

Traceability

This certificate documents the traceability of measurement results to national standards, standard measuring equipment and methods for the realisation of physical units of measurement according to the International System of Units (SI).
Traceability is defined as 'the property of a result of a measurement whereby it can be related to appropriate standards, generally international or national standards, through an unbroken chain of comparisons'.

AEA Technology QSA GmbH has been accredited as DKD (Deutscher Kalibrierdienst) calibration laboratory by the Physikalisch-Technische Bundesanstalt (PTB) and is authorized to issue reference sources which are traceable to national standards held at the PTB in Germany
Because of the European Cooperation for Accreditation of Laboratories (EAL) mutual recognition agreement the certificates are also accepted by all EAL-members (e. g. NAMAS, UK).

This product complies with the requirements for traceability to NIST specified in the American National Standard "Traceability of Radioactive Sources to the NIST and Associated Instrument Quality Control (ANSI N42.22-1995)"
As a requirement for the ANSI N42.22-1995 AEA Technology QSA participates in the NB/NIST Measurements Assurance Program of the Nuclear Power Industry

Leakage and contamination tests

Stringent tests for leakage are an essential feature of radioactive sources production. They are based on ISO 9978. Some standard methods used for testing radiation sources are listed below

Wipe test I

The source is wiped with a swab or tissue, moistened with ethanol or water, the activity removed is measured.
Limit: 185 Bq

Immersion test II

The source is immersed in a suitable liquid at 50 °C for at least 4 hours and the activity removed is measured.
Limit: 185 Bq

Bubble test III

The source is immersed in water or a suitable liquid and the pressure in the vessel reduced to 13 kPa (100 mm Hg). No bubbles must be observed.
(This test conforms to ISO 9978 except that for some sources, the 100 mm³ free volume requirement is not met.)

Emanation test IV

The source is placed in a gas tight enclosure with activated carbon as absorber and is left there for at least 3 h. The source is considered leak tight when not more than 185 Bq Radon related to a collection time of 12 h can be measured afterwards.

ISO classification

The International Organization for Standardization (ISO) has proposed a system of classification of sealed radioactive sources based on safety requirements for typical uses (see ISO 2919). This system provides a manufacturer of sealed radioactive sources with a set of tests to evaluate the safety of his products. It also assists a user of such sealed sources to select types which suit the application he has in mind. The tests to which specimen sources are subjected are listed in the following table.

Classification of sealed source performance standard according to ISO 2919

	Class 1	2	3	4	5	6
Temperature	No test	- 40 °C (20 min) + 80 °C (1 h)	- 40 °C (20 min) + 180 °C (1 h)	- 40 °C (20 min) + 400 °C (1 h) and thermal shock 400 °C to 20 °C	- 40 °C (20 min) + 600 °C (1 h) and thermal shock 600 °C to 20 °C	- 40 °C (20 min) + 800 °C (1 h) and thermal shock 800 °C to 20 °C
External Pressure	No test	25 kPa absolute	25 kPa absolute to 2 MPa absolute	25 kPa absolute to 7 MPa absolute	25 kPa absolute to 70 MPa absolute	25 kPa absolute to 170 MPa absolute
Impact	No test	50 g from 1 m	200 g from 1 m	2 kg from 1 m	5 kg from 1 m	20 kg from 1 m
Vibration	No test	3 x 10 min 25 - 500 Hz at 5 g peak amplitude	3 x 10 min 25 - 50 Hz at 5 g peak amplitude and 50 - 90 Hz at 0.635 mm amplitude peak to peak and 90 - 500 Hz at 10 g peak amplitude	3 x 30 min 25 - 80 Hz at 1.5 mm amplitude peak to peak and 80 - 2000 Hz at 20 g peak amplitude		
Puncture	No test	1 g from 1 m	10 g from 1 m	50 g from 1 m	300 g from 1 m	1 kg from 1 m

Special applications

No test programme can cover all possible combinations of environments to which a source may be exposed.
Users should therefore consult our experts before using sources in potentially adverse environments.

IAEA Special Form

'Special Form' is a test specification for sealed sources given in the IAEA transport regulations (IAEA Safety Series No. 6, 1985, revised edition).
It is used in determining the maximum acceptable activities for various types of transport containers.

AEA TECHNOLOGY

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ATTACHMENT F

Survey Investigation Results

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 729011F Date of SCM Survey 3.25.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
	~~342~~ 440					
2, 3	274	N/A	274	16.0	2.0	67.0

Survey Technician. Dave Pillington Survey Date: 4.22.99
Signature

SURVEY TYPE: ☑ Alpha ☐ Beta ☐ Other

☑ NE Electra ☐ Other S/N: 2376

Cal Due Date. 9.8.99 Efficiency (c/d): 0.2084

MDA (dpm/100cm²): 46

DISPOSITION:

☑ No Further Action Necessary. Investigative measurement results < action level
☐ Further Action Required:

Approved By [signature] Date 4.22.99
Signature MG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

3 18.99

SIMS Survey Sub-Unit 729011N Date of SCM Survey ~~3.19.99~~ CAO

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
4, 1	235	79	157	N/A	→	→
14, 1	251	225	238	2	0	10
12, 2	239	138	189	N/A	→	→
13, 2	227	175	201	N/A	→	→
14, 2	246	169	208	N/A	→	→

Survey Technician [signature] Survey Date 4.23.99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☐ NE Electra ☐ Other _____ S/N 2374

Cal Due Date 6.15.99 Efficiency (c/d) 0.2088

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required _____

Approved By [signature] Date 4.23.99
Signature mG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 729011TC Date of SCM Survey 4.2.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
1, 1	257	N/A	257	24	1	105
1, 2	265		265	20	1	87
1, 3	378		378	15	1	64
1, 3	276		276	11	1	46
1, 4	276		276	32	1	142
1, 4	293		293	22	1	96

Survey Technician Dave Pulliington Survey Date. 4.2.99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2375

Cal Due Date 9.3.99 Efficiency (c/d) 0.2188

MDA (dpm/100cm²) 35

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required _____

Approved By _____ Date 4.22.99
Signature

r-G 4/22/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 7290120p Date of SCM Survey 3.17.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm^2)		Calculated Average (dpm/100cm^2)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm^2
17, 11	241	N/A	241	9.0	2.0	34.0

Survey Technician [signature] Survey Date. 4.22.99
Signature

SURVEY TYPE: ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other. _____ S/N 2376

Cal Due Date 9.8.99 Efficiency (c/d) 0.2084

MDA (dpm/100cm^2) 46

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required _____

Approved By: [signature] Date 4.22.99
Signature MG 4/25/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 7290121F Date of SCM Survey 3.18.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
3,2	255	172	214	N/A	→	
2,1	244	239	242	* see	Note	
3,1	244	88	166	N/A	→	
5,1	248	131	190	N/A	→	
*Grid location 2,1 was on a portion of the concrete pedestal that was later removed. Re-survey 7290155F was performed after pedestal removal.						

Survey Technician. _____ Survey Date. _____
Signature

SURVEY TYPE: ☐ Alpha ☐ Beta ☐ Other _____

☐ NE Electra ☐ Other: _____ S/N: _____

N Cal Due Date _____ Efficiency (c/d) _____

A MDA (dpm/100cm²) _____

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By CAV Date: 4.22.99
Signature

MC 4/22/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 729015 ~~N~~ F CAO Date of SCM Survey ~~2 26.99~~ 3.23 99 CAO 4 26 99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
3,5	308	N/A	308	6	2	19

Survey Technician [signature] Signature Survey Date 4.26 99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2372

Cal Due Date 10 6 99 Efficiency (c/d) 0 2124

MDA (dpm/100cm²) 45

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By [signature] Signature MG 4/26/99 Date 4.26.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 7290156F Date of SCM Survey 3 27.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm^2)		Calculated Average (dpm/100cm^2)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm^2
(1,4)	240	N/A	240	9.0	20	340

Survey Technician [signature] Survey Date 4. 22.99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2376

Cal Due Date 9.8 99 Efficiency (c/d) 0.2084

MDA (dpm/100cm^2) 46

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required _____

Approved By [signature] MG 4/26/99 Date 4.22.99
Signature

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72901300 Date of SCM Survey 4/1/99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results			Investigation Date
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²	
4, 1	310	101	205	6	1	24	4/15/99
4, 2	190	389	290	6	1	24	4.15.99
6, 2	294	109	202	N/A	→	→	~~7.15.99~~ 4.
1, 2	289	186	238	10	2	38	4 22 99
2, 1	203	294	249	8	2	29	4.22 99
3, 2	100	289	195	N/A	→	→	
4, 2	190	389	290	6	2	19	4 22.99
9, 1	196	290	243	4	2	10	4 22.99
8, 2	111	242	177	N/A	→	→	

Survey Technician: David Pilkington (Signature) Survey Date 4/15/99 4-22-99

SURVEY TYPE: ☒ Alpha ☐ Beta ☐ Other _____

☒ NE Electra ☐ Other _____ S/N 2181 2376

Cal Due Date 7/15/99 9-8-99 Efficiency (c/d) 0.208 0.2084

MDA (dpm/100cm²) 36. ~~64~~ 46

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ (Signature) Date 4.22.99

MG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72901301 Date of SCM Survey 4/1/99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results			Investigat Date
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²	
1, 2	101	374	238	5	1	19	4/15/99
5, 1	80	309	195	6	1	24	4/15/99
1, 2	208	310	259	7	2	24	4/22/99
9, 1	273	188	231	10	2	38	
10, 1	280	188	234	2	2	0	
8, 2	294	182	238	7	2	24	
9, 2	284	182	233	3	2	5	

Survey Technician. [signature] Signature Survey Date 4/15/99 4.22.99

SURVEY TYPE: ☒ Alpha ☐ Beta ☐ Other

☒ NE Electra ☐ Other. S/N 2181 2376

Cal Due Date 7/15/99 9.8.99 Efficiency (c/d) 0.208 0.2084

MDA (dpm/100cm²). 36 46

DISPOSITION:

☒ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required.

Approved By [signature] Signature Date 4.22.99

MG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72901800 Date of SCM Survey 4/1/99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
1, 13	261	238	250	3	1	9
1, 9	161	237	199	N/A	→	→
1, 8	152	234	193	N/A	→	→
2, 2	225	210	218	N/A	→	→
1, 4	265	150	208	N/A	→	→
2, 10	238	195	217	N/A	→	→
1, 14	264	107	186	N/A	→	→
2, 14	268	174	221	N/A	→	→

Survey Technician [signature] Signature Survey Date 4/9/99

SURVEY TYPE ☒ Alpha ☐ Beta ☐ Other _____

☒ NE Electra ☐ Other _____ S/N 2374

Cal Due Date 6/15/99 Efficiency (c/d) 0.2144

MDA (dpm/100cm²) 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By [signature] Signature mG 4/26/99 Date 4.22.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72902300 Date of SCM Survey 3.31.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results			Investigator DATE
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²	
2, 2	323	232	278	5	1	19	4/15/99
2, 2	256	232	244	3	0	14	4/23/99
2, 2	313	149	231	3	0	14	4/23/99

Survey Technician [signature] Survey Date 4.23 99 4.15.99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2374 2181

Cal Due Date 6 15 99 7.15.99 Efficiency (c/d) 0.2088 0.208

MDA (dpm/100cm²) 14 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By [signature] Date 4.23.99
Signature MG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72902301 Date of SCM Survey 3.31.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results			Investigation Date
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²	
2, 2	330	97	214	5	1	24	4/15/99
*2, 1	55	240	148	1	0	~~14~~ 5	4/23/99

Survey Technician [signature] Signature Survey Date * 4-23-99 4 15 99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N * 2374 2181

Cal Due Date 6 15.99 7.15 99 Efficiency (c/d) 0.2088 0.208

MDA (dpm/100cm²) * 14 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By [signature] Signature mG 4/26/99 Date 4.23.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72902 302 Date of SCM Survey 3 31 99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
2, 1	289	162	226	6	0	29
3, 2	0	251	126	N/A		
3, 1	249	81	165			
1, 1	0	225	113			
mc s/4 ~~X~~ 4, 1	0	241	121			
mc s/4 ~~X~~ 4, 1	48	236	142			

Survey Technician: Wave Pilbington Survey Date: 4.23.99
Signature

SURVEY TYPE: ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2374

Cal Due Date 6.15.99 Efficiency (c/d) 0 2088

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required _____

Approved By CAO Date 4.23.99
Signature
mc 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72902303 Date of SCM Survey 3.31 99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm^2)		Calculated Average (dpm/100cm^2)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm^2
2, 1	0	294	147	N/A		

Survey Technician _____ Survey Date _____
Signature

SURVEY TYPE ☐ Alpha ☐ Beta ☐ Other _____

☐ NE Electra ☐ Other _____ S/N _____

N/A Cal Due Date _____ Efficiency (c/d) _____

MDA (dpm/100cm^2) _____

DISPOSITION:

☐ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By: _____ Date 4 23.99
Signature MG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72902305 Date of SCM Survey 3.31.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm^2)		Calculated Average (dpm/100cm^2)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm^2
1,1	289	0	145	N/A	→	

Survey Technician _____ Survey Date _____
Signature

SURVEY TYPE ☐ Alpha ☐ Beta ☐ Other _____

☐ NE Electra ☐ Other _____ S/N _____

N/A

Cal Due Date _____ Efficiency (c/d) _____

MDA (dpm/100cm^2) _____

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ Date 4.23.99
Signature MG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72902306 Date of SCM Survey 3.31.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm^2)		Calculated Average (dpm/100cm^2)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm^2
1,1	310	101	206	5	1	19

Survey Technician Wave Pullington (Signature) Survey Date. 4.15.99

Scott

SURVEY TYPE ☒ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2181

Cal Due Date 7.15.99 Efficiency (c/d) 0.208

MDA (dpm/100cm^2) 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By CAP (Signature) MG 4/26/99 Date 4.23.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 729031 NA Date of SCM Survey 3 3 99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm^2)		Calculated Average (dpm/100cm^2)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm^2
10, 2	257	N/A	257	10	1	42

Survey Technician: [signature] Signature Survey Date: 4/9/99

SURVEY TYPE: ☒ Alpha ☐ Beta ☐ Other

☒ NE Electra ☐ Other: S/N: 2374

Cal Due Date: 6/15/99 Efficiency (c/d): 0.2174

MDA (dpm/100cm^2). 36

DISPOSITION:

☑ No Further Action Necessary. Investigative measurement results < action level.

☐ Further Action Required:

Approved By [signature] Signature Date 4.23.99

mG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 729032 sa Date of SCM Survey 3 8.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
2,1	295	N/A	295	4	2	9
2,1	257		257	7	2	23
3,1	385		385	0	2	0
3,1	342		342	6	2	18
3,1	343		343	7	2	23
5,1	257		257	9	2	32
11,1	257		257	3	2	5
1,2	299		299	5	2	14
2,2	249		249	6	2	18
3,2	257		257	7	2	23
6,2	255		255	7	2	23

Survey Technician Dave Pilkington Survey Date 4.24 99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other

☑ NE Electra ☐ Other S/N 2181

Cal Due Date 7 15 99 Efficiency (c/d) 0.2164

MDA (dpm/100cm²) 44

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required

Approved By Signature MG 4/26/99 Date 4.24.99

25

/

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 7290325B Date of SCM Survey 3.8.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results			Investigation Date
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²	
2,1	257	N/A	257	4	2	9	4/24/99
3,1	257		257	5	2	14	
4,1	257		257	6	2	18	
5,1	238		238	5	2	14	
7,1	257		257	3	2	5	
3,2	254		254	5	2	14	
8,2	257		257	6	2	18	
8,2	257		257	4	2	9	
8,4	300		300	9	1	38	4/15/99
8,4	251		251	4	2	9	4/24/99

Survey Technician [signature] Survey Date 4.15.99 4.24 99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2181 2181

Cal Due Date 7.15.99 7.15.99 Efficiency (c/d) 0 208 0.2164

MDA (dpm/100cm²) 36 44

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By [signature] Date ~~4.23.99~~ CAO 4.24-99
Signature MG 4/26/99

26

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 7290354 Date of SCM Survey 3.15.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
		AO 4.27.99	AO 4.27.99			
2, 1	~~240~~ 257	N/A	~~240~~ 257	12	0	59

Survey Technician Dave Pallington (Signature) Survey Date: 4 5.99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N. 2371

Cal Due Date 7 31.99 Efficiency (c/d) 0 2020

MDA (dpm/100cm²): 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ (Signature) Date 4.24 99

MG 4/26/99

MG 4/27/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903001 Date of SCM Survey 4.5.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
1,2	274	N/A	274	17	1	74
1,2	228	↓	228	10	1	42
1,1	236	↓	236	11	1	46
	N					
		A			N	
					A	

Survey Technician: Dave Pilkington (Signature) Survey Date: ~~4.24.99~~ DP 4.24.99 4.7.99

SURVEY TYPE: ☑ Alpha ☐ Beta ☐ Other

☑ NE Electra ☐ Other: S/N: 2181

Cal Due Date: 7.15.99 Efficiency (c/d): 0.2164

MDA (dpm/100cm²): 35

DISPOSITION:

☑ No Further Action Necessary. Investigative measurement results < action level.

☐ Further Action Required:

Approved By: (Signature) Date: 4.24.99

MG 4/26/99

28

779 Cluster Final Survey

Investigation of SIMS Flagged Values

4.5.99

SIMS Survey Sub-Unit 72903001 Date of SCM Survey NA ~~4-7-99~~ CAO ~~4-7-99~~ ~~4-24-99~~ CAO

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²) SURVEY POINT #	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
			1	14	0	69
			2	12	0	59
			3	9	0	44
			4	10	0	49
			5	8	0	39
			6	9	0	44
			7	9	0	44
			8	5	0	25
			9	3	0	15
			10	17	0	84
			11	11	0	54

N

A

Survey Technician: [signature] Signature Survey Date: 4-7-99

Time: 15:30

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other: _____ S/N 2380

Cal Due Date 6-4-99 Efficiency (c/d) 20.29 %

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required: _____

Approved By [signature] Signature MG 4/26/99 Date 4.24.99

29

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903001 Date of SCM Survey ~~4-7-99~~ NA 4-28-99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount	Survey Point #	cpm	Local Area Bkg (cpm)	dpm/100cm²
			12	11	0	54
			13	16	0	79
			14	4	0	20
			15	8	0	39
	NA		16	5	0	25
			17	6	0	30
			18	14	0	20
			19	10	0	49
			20	8	0	39
			21	18	0	89
			22	8	0	39

Survey Technician: [signature] Signature Survey Date: 4-7-99

Time: 15:30

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other 2380

☑ NE Electra ☐ Other: _____ S/N: _____

Cal Due Date 6-4-99 Efficiency (c/d) 20.29 %

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By [signature] Signature MG 4/26/99 Date 4.24.99

30

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903001 Date of SCM Survey ~~4-7-99~~ NA 4-24-99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount	Survey Point*	cpm	Local Area Bkg (cpm)	dpm/100cm²
			23	4	0	20
			24	8	0	39
			25	10	0	49
	NA		26	8	0	39
			27	3	0	44
			28	6	0	30
			29	4	0	20
			30	8	0	39
					NA	

Survey Technician [signature] Signature Survey Date: 4-7-99

Time 15:30

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other

☑ NE Electra ☐ Other S/N: 2380

Cal Due Date 6-4-99 Efficiency (c/d) 20.29%

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required

Approved By [signature] Signature MG 4/26/99 Date 4.24.99

31

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903002 Date of SCM Survey 4.5.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results			Investigation Date
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²	
5,1	240	N/A	240	13	1	55	4/24/99
4,2	308	↓	308	10	1	43	4/15/99
6,2	240	↓	240	11	1	46	4/24/99

Survey Technician: Dave Pilkington (Signature) Survey Date 4.15.99 4.24 99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2181 2181

Cal Due Date 7.15.99 7.15.99 Efficiency (c/d) 0.2164 0 208

MDA (dpm/100cm²) 35 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By CAB (Signature) MG 4/26/99 Date 4.24.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

4.5.99

SIMS Survey Sub-Unit 72903002 Date of SCM Survey NA ~~4-7-99~~ ~~4-24-99~~ CAO

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount	Survey Point #	cpm	Local Area Bkg (cpm)	dpm/100cm²
			1	8	0	39
			2	10	0	49
	N		3	6	0	30
	A		4	13	0	64
			5	13	0	64
			6	12	0	59
			7	9	0	44
			8	6	0	30
			9	7	0	35
			10	7	0	35
			11	4	0	20

Survey Technician [signature] Signature Survey Date: 4-7-99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2380

Cal Due Date 6-4-99 Efficiency (c/d) 20.29 %

MDA (dpm/100cm²). 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By [signature] Signature MG 4/26/99 Date 4.24.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903002 Date of SCM Survey 4-7-99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²) Survey Point #	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
			12	13	0	64
			13	11	0	54
			14	8	0	39
	NA		15	10	0	49
			16	9	0	44
			17	8	0	39
			18	9	0	44
			19	8	0	39
			20	8	0	39
			21	7	0	35
			22	8	0	39

Survey Technician [signature] Survey Date 4-7-99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other: _____ S/N 2380

Cal Due Date 6-4-99 Efficiency (c/d) 20.29 ±0

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required _____

Approved By [signature] Date 4 24.99
Signature mG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 7290302 Date of SCM Survey NA

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²) Survey Point #	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
			23	12	0	59
			24	11	0	54
			25	8	0	39
	NA		26	4	0	20
			27	7	0	35
			28	7	0	35
			29	6	0	30
			30	6	0	30
				NA		

Survey Technician [signature] Signature Survey Date 4-7-99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other

☑ NE Electra ☐ Other S/N 2380

Cal Due Date 6-4-99 Efficiency (c/d) 20.29%

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required

Approved By [signature] Signature MG 4/26/99 Date 4.24.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903003 Date of SCM Survey 4 5 99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
2,2	239	N/A	239	14	1	60
1,2	226	N/A	226	9	1	37
		N				
		A			N	
						A

Survey Technician: [signature] Survey Date: 4.24 99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other: _____ S/N 2181

Cal Due Date 7.15.99 Efficiency (c/d). 0 2164

MDA (dpm/100cm²): 35

DISPOSITION:

☑ No Further Action Necessary. Investigative measurement results < action level
☐ Further Action Required. _____

Approved By [signature] Date 4.24.99
Signature MG 4/26/99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903003 Date of SCM Survey ~~4.7.99~~ 4.5.99 04.24.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²) Primary	Flagged Values (dpm/100cm²) Recount	~~Calculated Average (dpm/100cm²)~~ Survey Point #	Investigative Survey Results cpm	Investigative Survey Results Local Area Bkg (cpm)	Investigative Survey Results dpm/100cm²
			1	16	0	79
			2	12	0	59
			3	11	0	54
			4	11	0	54
	N		5	9	0	44
	A		6	12	0	59
			7	10	0	49
			8	10	0	49
			9	12	0	59
			10	19	0	94
			11	13	0	64

Survey Technician Wave Pilbington (Signature) Survey Date 4.7.99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2380

Cal Due Date 6.4.99 Efficiency (c/d) 0.2029

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ (Signature) MG 4/26/99 Date 4.24.99

37

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903003 Date of SCM Survey ~~4 7 99~~ 4.5.99 DP 4.27.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²) Primary	Recount	~~Calculated Average (dpm/100cm²)~~ Survey Point #	Investigative Survey Results cpm	Local Area Bkg (cpm)	dpm/100cm²
			12	17	0	84
			13	10	0	49
			14	11	0	54
	N		15	14	0	69
	A		16	9	0	44
			17	11	0	54
			18	10	0	49
			19	4	0	20
			20	5	0	25
			21	6	0	30
			22	12	0	59

Survey Technician Dave Pilkington (Signature) Survey Date 4 7.99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2380

Cal Due Date 6.4.99 Efficiency (c/d) 0 2029

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ (Signature) mG 4/26/99 Date 4.24.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 7290300C3 Date of SCM Survey 4.5.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount	Survey Point #	cpm	Local Area Bkg (cpm)	dpm/100cm²
			23	10	0	49
			24	12	0	59
			25	16	0	79
	N		26	8	0	39
	A		27	11	0	54
			28	10	0	49
			29	9	0	44
			30	3	0	15

Survey Technician Dave Pilbington (Signature) Survey Date: ~~4.5.99~~ 8P 4.28.99 4.7.99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2380

Cal Due Date 6.4.99 Efficiency (c/d) 0.2029

MDA (dpm/100cm²) 14

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ (Signature) mG 4/26/99 Date 4.24.99

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Note: The 240 dpm/100cm² survey point in grid 2,2 was not specifically resurveyed. However, the general vicinity around grid locations 1,1, 2,1, and 2,2 had uniformly elevated SCM values. The general area containing these grids were investigated by obtaining 30 Electra survey measurements, all of which were less than the DCGLEMC, including the three points containing values of 240 dpm/100cm² in grids 1,1 and 2,1. Therefore, the investigation of the 240 dpm/100cm² survey point is considered adequate and no further action is required. CAO 5.4.99 mG 5/4/99

1779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903008 Date of SCM Survey 4.5.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount		cpm	Local Area Bkg (cpm)	dpm/100cm²
1,1	240	N/A	240	11	1	47
2,1	240	N/A	240	13	1	56
2,1	240	N/A	240	12	1	51
		N			N	
		A				A

Survey Technician Dave Pilkington (Signature) Survey Date 4 9.99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other

☑ NE Electra ☐ Other S/N 2374

Cal Due Date 6.15.99 Efficiency (c/d) 0.2144

MDA (dpm/100cm²) 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required

Approved By CAO (Signature) mG 4/27/99 Date 4.24.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903008 Date of SCM Survey 4.5.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount	Survey Point #	cpm	Local Area Bkg (cpm)	dpm/100cm²
			1	11	1	47
			2	5	1	19
			3	4	1	14
			4	9	1	37
	N A		5	11	1	47
			6	6	1	23
			7	4	1	14
			8	8	1	33
			9	13	1	56
			10	11	1	47
			11	10	1	42

Survey Technician: Dave Pilbington (Signature) Survey Date: 4.9.99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2374

Cal Due Date 6.15.99 Efficiency (c/d) 0.2144

MDA (dpm/100cm²) 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ (Signature) Date 4.24.99

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779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903008 Date of SCM Survey 4 5.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount	Survey Point #	cpm	Local Area Bkg (cpm)	dpm/100cm²
			12	5	1	19
			13	8	1	33
			14	8	1	33
			15	6	1	23
	N/A		16	12	1	51
			17	7	1	28
			18	6	1	23
			19	3	1	9
			20	5	1	19
			21	8	1	33
			22	2	1	5

Survey Technician: Dave Pilkington (Signature) Survey Date: 4 9.99

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2374

Cal Due Date: 6.15.99 Efficiency (c/d) 0.2144

MDA (dpm/100cm²) 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level

☐ Further Action Required _____

Approved By _____ (Signature) Date 4.24.99

779 Cluster Final Survey

Investigation of SIMS Flagged Values

SIMS Survey Sub-Unit 72903008 Date of SCM Survey 4 5.99

Grid (X, Y) Coordinates	Flagged Values (dpm/100cm²)		Calculated Average (dpm/100cm²)	Investigative Survey Results		
	Primary	Recount	Survey Point #	cpm	Local Area Bkg (cpm)	dpm/100cm²
			23	8	1	33
			24	5	1	19
			25	13	1	56
			26	8	1	33
	N	A	27	7	1	28
			28	7	1	28
			29	6	1	23
			30	8	1	33
			N A		N A	

Survey Technician Dave Pilkington Survey Date 4.9 99
Signature

SURVEY TYPE ☑ Alpha ☐ Beta ☐ Other _____

☑ NE Electra ☐ Other _____ S/N 2374

Cal Due Date 6.15 99 Efficiency (c/d) 0.2144

MDA (dpm/100cm²) 36

DISPOSITION:

☑ No Further Action Necessary Investigative measurement results < action level
☐ Further Action Required _____

Approved By _____ Date 4.24.99
Signature 4/27/99

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SafeSites

INTEROFFICE CORRESPONDENCE

DATE: April 14, 1999

TO: APO
Jeff Barroso, x8451

FROM: R. A. Henderson, Rad Labs, Bldg. 559, X5537

SUBJECT: Flashing Samples 99A6628-001 and 99A6628-002

These samples were brought to the 559 Laboratories for identification of an alpha-emitting radionuclide deposited on the surface. Two 2"-disks were delivered to the Laboratory and placed into alpha spectrometers. They were counted for 66 hours and the spectra examined for the detected alpha radiation. There was a prominent alpha peak at 5.30 MeV, consistent with ^{210}Po. This is also consistent with other materials taken from the 690 trailers two years ago. Comparisons to the spectra obtained from those samples showed that they were identical. This activity is a result of the decay of naturally occurring radionuclides. The material is volatilized when the decay chain passes through Rn, then deposited when it passes through ^{210}Pb. No evidence to support radionuclides due to RFETS activities was observed.

Signature

04/14/99
Date

cc:
M. Brugh
file

Safe Sites of Colorado, Rocky Flats Environmental Technology Site, P.O. Box 464, Golden, CO 80402-0464

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ATTACHMENT G

779 Cluster Final Survey Breakdown Structure

Rocky Mountain Remediation Services

779 Closure Project

779 Cluster Final Survey Breakdown Structure

Rocky Mountain Remediation Services, L.L.C.

Revision 0

JANUARY, 99

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779 CLUSTER FINAL SURVEY BREAKDOWN STRUCTURE

REVISION 0

JANUARY, 99

This Survey Breakdown Structure was prepared by

Michael Grube, Final Survey Radiological Engineer (GTS DURATEK) — 1/20/99 Date

This Survey Breakdown Structure has been reviewed and approved by

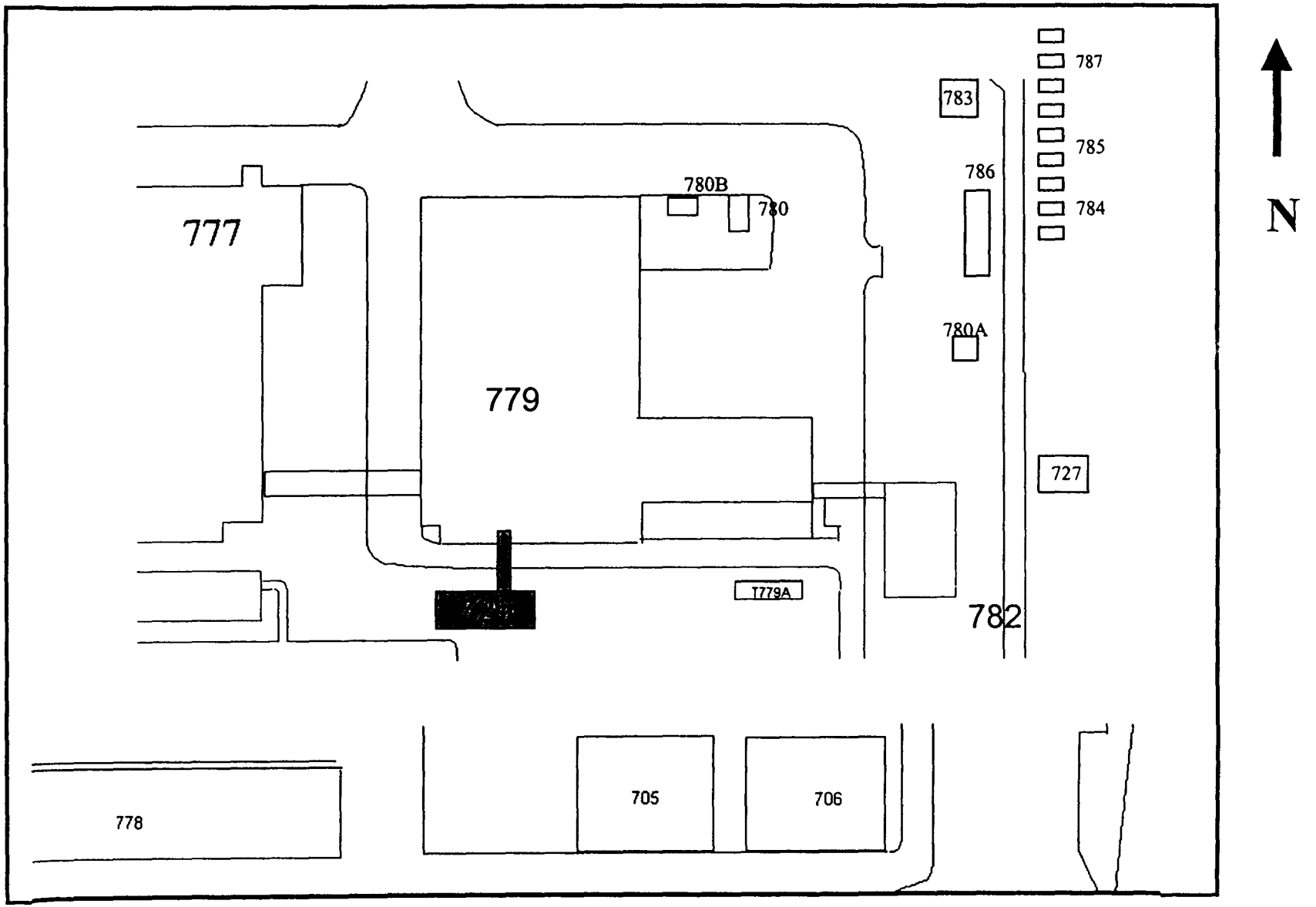
Ken Harrawood, B779 Radiological Safety Manager (RMRS) — 1/20/99 Date

Bates Estabrooks, Field Radiological Engineering Manager (RMRS) — 1/20/99 Date

Jeff Barroso, Radiological Engineering Manager (RMRS) — 1/20/99 Date

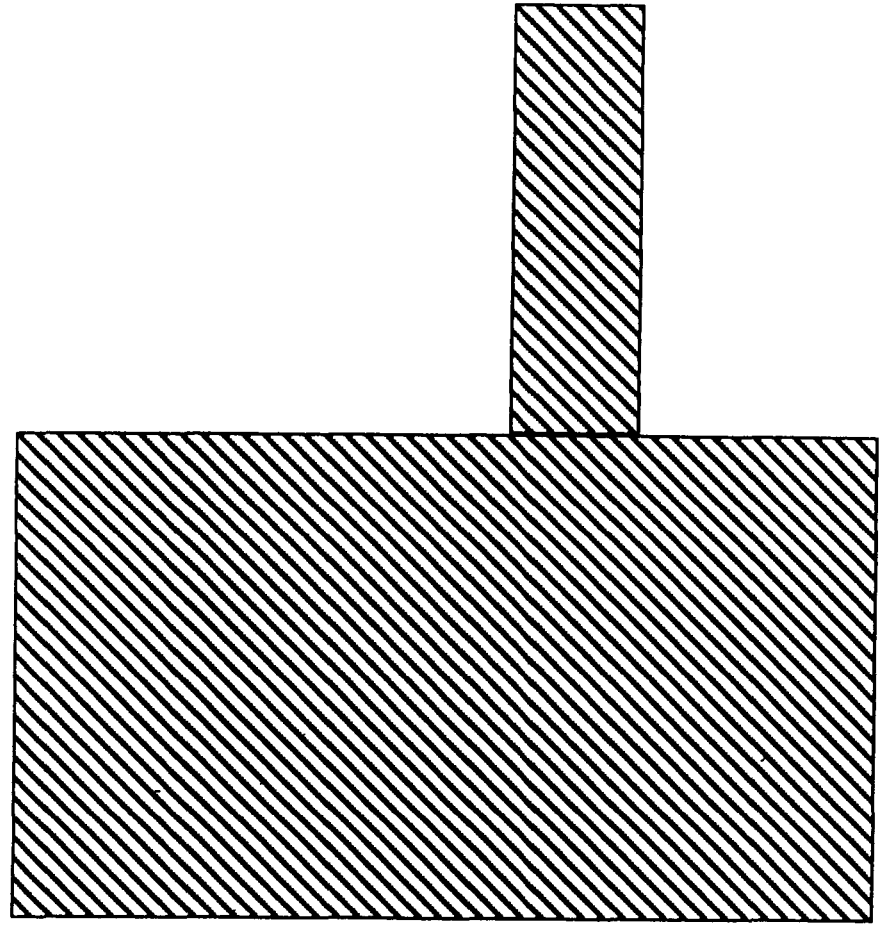
47

Survey Area A for the 779 Cluster



48

Survey Area A - Exterior of Bldg 729



Survey Unit 72903 (Class 2 - Walls & Roof)

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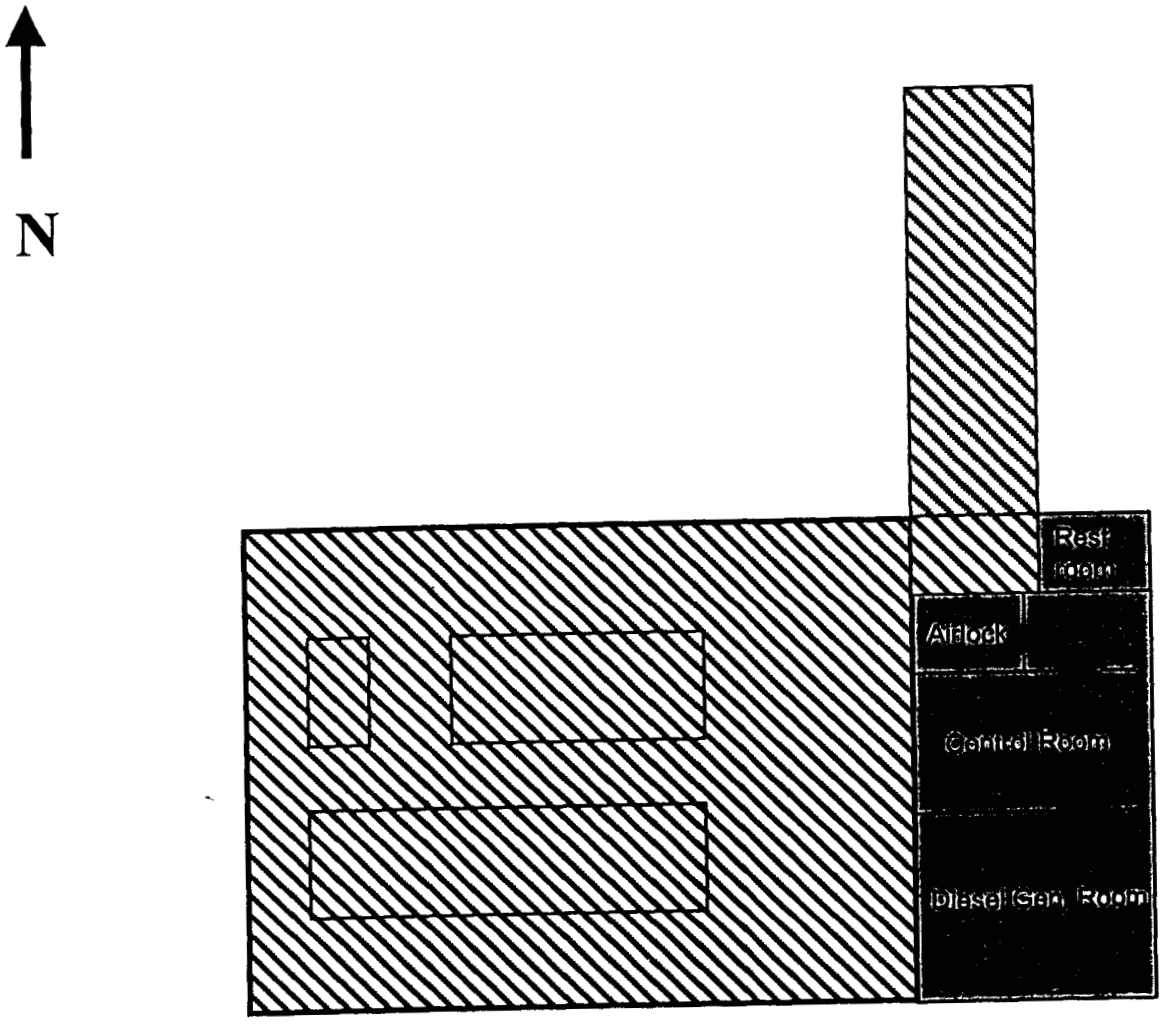
Survey Area A - Interior of Bldg 729



Survey Unit 72901 (Class 2 - Floor, Walls & Ceiling)

Survey Unit 72902 (Class 3 - Floor, Walls & Ceiling)

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779 CLUSTER FINAL SURVEY BREAKDOWN STRUCTURE

Survey Area	Survey Unit	Existing Description	Class	Justification for Classification	Estimated Surface Media Sample Points	Estimated Number of Smears	Estimated Floor Surface Area (m^2) (Class 1 only)	Estimated Total Surface Area (m^2)
A	72901	B729 Plenum Area Floor/Walls/Ceiling (Includes the Stairwell/Pipe Chase)	2	High levels of contamination are contained in the heat chamber, and within the first stage of the glove box plenum located within this area However, no contamination greater than the DCGLs for alpha has been detected outside of the plenums Since the potential for contamination exists, this area is classified as Class 2	15	15	248	901
A	72902	B729 Hallway/Control Room Restroom/Diesel Generator Room	3	No history of contamination exists for this area No contamination greater than the DCGLs for alpha has been detected in this area The area is isolated from the plenum area by an airlock	15	15	54	403
A	72903	B729 Exterior Walls and Roof	2	No contamination greater than the DCGLs for alpha has been detected on the exterior surfaces of this building, However, since the potential exists for contamination to be deposited on the building exterior surfaces as a result of releases of airborne contamination from other buildings, this area is classified as Class 2	15	15	N/A	718

ATTACHMENT H

Survey Unit 72901 Survey Package

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Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description
Bldg 729 plenum room, stairwell, and bridge

SURVEY PACKAGE COVER SHEET

Justification for Survey Unit Classification

Classification Class 1 ☐ Class 2 ☒ Class 3 ☐

The B729 plenum room, stairwell, and bridge floors, walls and ceiling have a potential for radioactive contamination since contaminated plenum exist within the area Radiological characterization data was obtained on the floor, walls, and fixed equipment from 12/29/98-5/27/98 Results of the characterization data showed all removable surface contamination levels < 20 dpm/100cm^2, all total surface contamination levels < 100dpm/100cm^2, and media sample levels (converted to surface contamination levels) from 0 2 to 6 1 dpm/100cm^2 Refer to the history files for further details of characterization survey results

Since the plenum floors, walls and ceiling have a potential for radioactive contamination, and since radiological characterization data taken on B729 interior surfaces did not indicate any measurements greater than the $DCGL_W$, this survey unit is being classified as a Class 2

Special Support Requirements

Scaffolding or man-lifts will be required to access upper walls and ceiling

Special Safety Precautions

Fall protection is required for work above 6 ft

Isolation Controls

Level 1 ☐ Level 2 ☒ **Note Isolation controls are not required prior to surface media sampling**

No use, storage or movement of radioactive material, with the exception of instrument check sources, is permitted in this survey unit
Isolation Control signs shall be posted on entrances of the survey unit. Isolation Control signs shall state that " Approval from the radiological Manager or his designee is required prior to storage or transfer of radioactive material within this area"

Grid Requirements

Gridding and labeling is to be performed as indicated on the attached survey unit map(s) If gridding and labeling cannot be performed per the survey unit map(s), contact radiological engineering for assistance Total, removable, and solid media sample numbers will be annotated on the labels at each survey location (e g , each grid intersection)

Survey Package Implementation

This survey package is ready for implementation

[redacted] 4/26/99
Date

53

Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description

Bldg 729 plenum room, stairwell, and bridge

Amplified Survey Package Design Information

When grid locations fall on areas that are not suited for paint/surface media measurements, the following guidance will be used

- An adjacent suitable location within one meter of the initial location will be used for the paint/surface media sample, and total/removable measurements
- For paint/surface media sample locations that cannot be relocated in accordance with the above guidance, (i e the entire ceiling is unpainted), a smear will be obtained, and a 2nd random start location will be used to obtain the minimum required MARSSIM sample measurements

1-meter by 1-meter grid lines are used on the survey maps for ease of locating sample measurements A 7-meter by 7-meter grid pattern is used for actual measurement density

Survey Package Closure

All required reviews are complete, and data analysis results meet acceptance criteria Survey package is authorized for closure

[redacted]	4/9/99 Date
	4/20/99 Date

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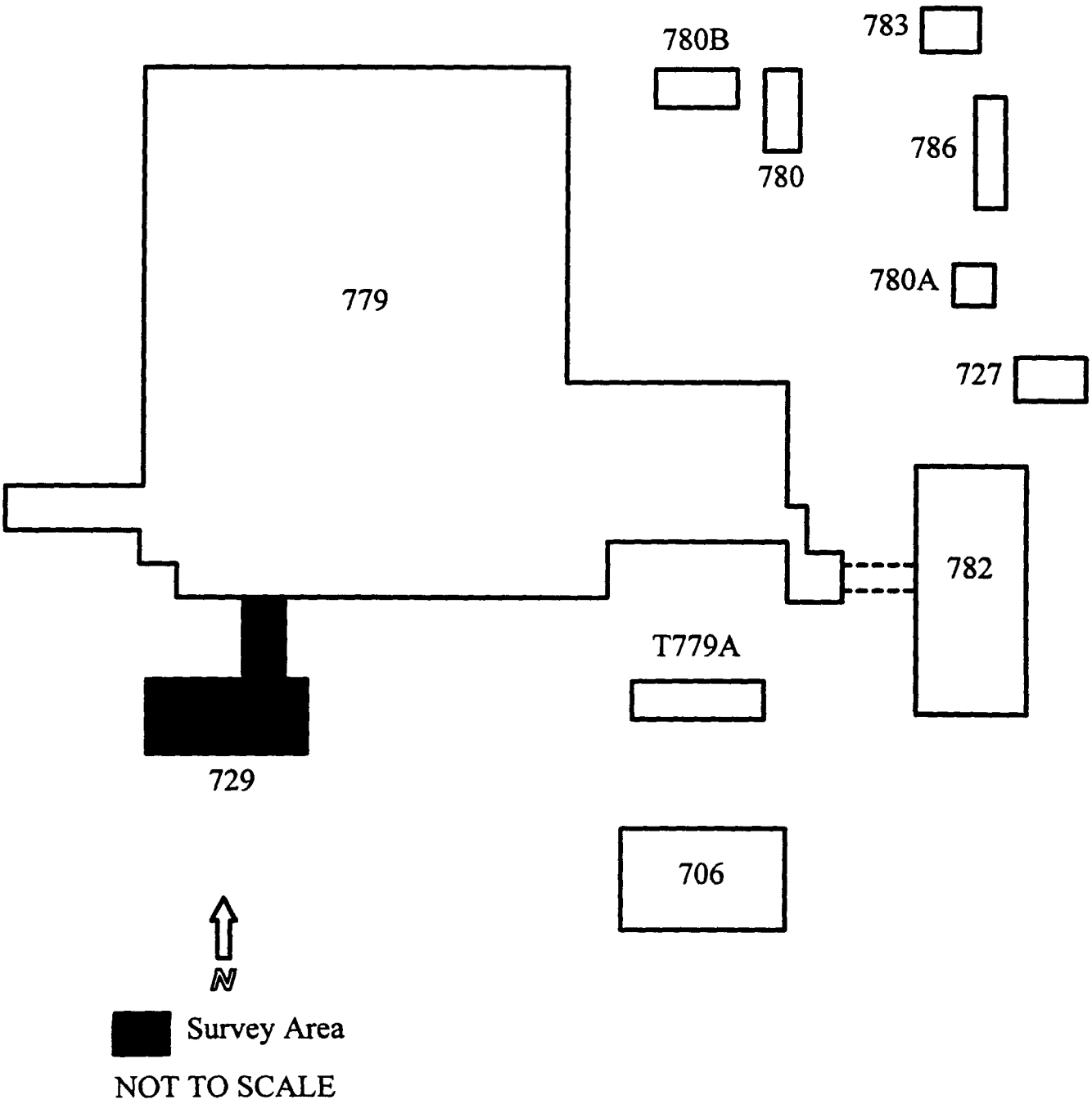
779 CLUSTER OVERVIEW MAP



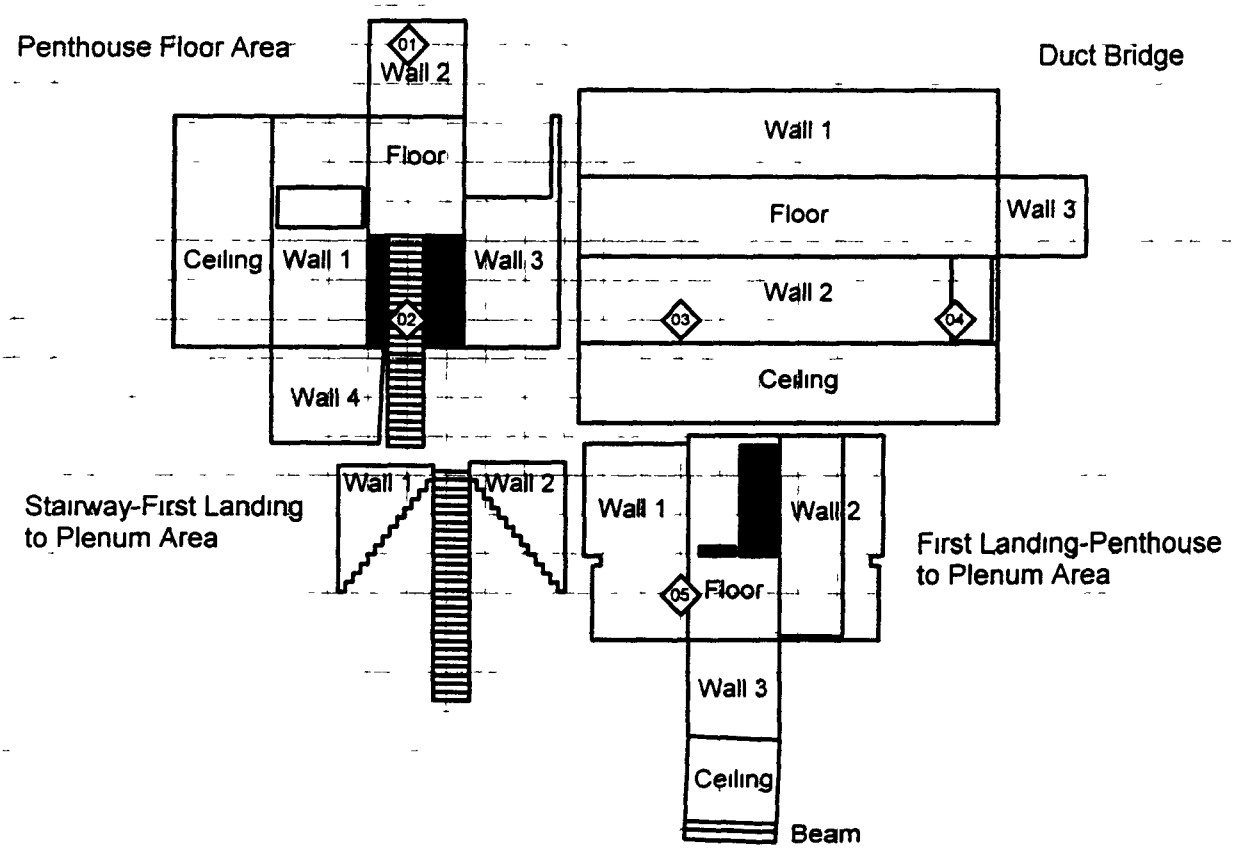
55

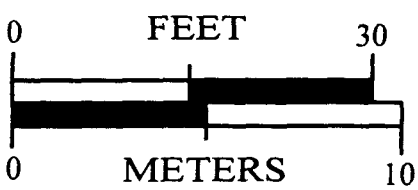
RADIOLOGICAL CLOSEOUT SURVEY PLAN FOR THE 779 CLUSTER

Survey Area A | Survey Unit 72901 | Classification 2
Building 729 | Survey Unit Description Bldg 729 Plenum Area

Total Area 837 sq m | Grid Size 7m x 7m

SURVEY UNIT 72901-MAP 1 OF 2





N

SURVEY MAP LEGEND
Smear & TSC Location
Smear TSC & Sample Location
Open/Inaccessible Area

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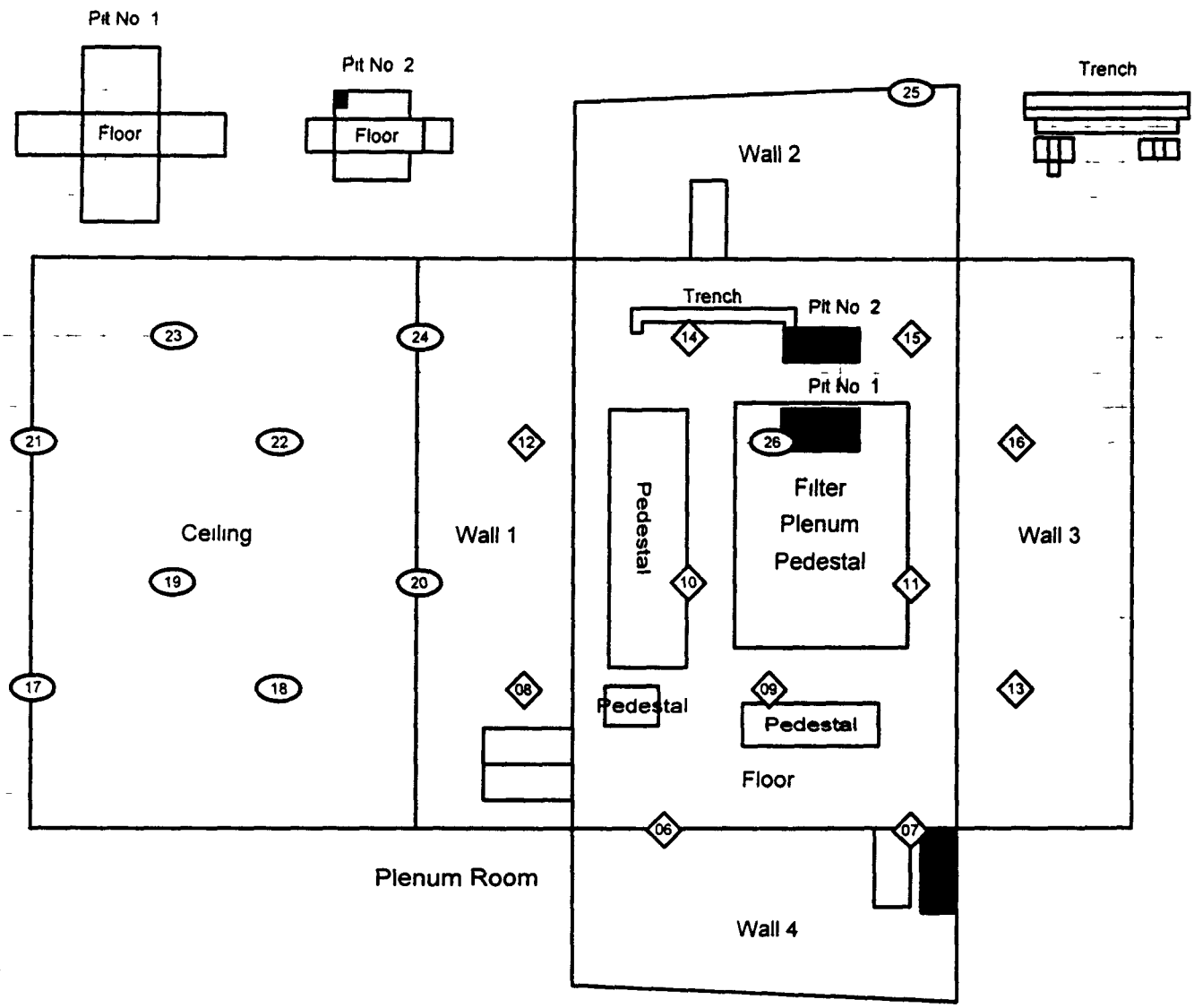
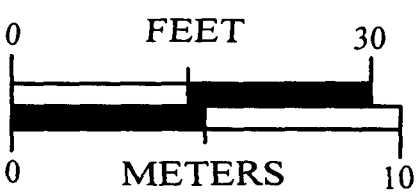
RADIOLOGICAL CLOSEOUT SURVEY PLAN FOR THE 779 CLUSTER

Survey Area A | Survey Unit 72901 | Classification 2
Building 729 | Survey Unit Description Bldg 729 Plenum Area

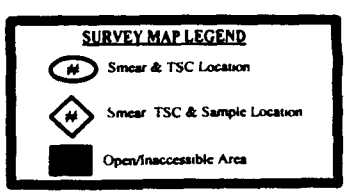
Total Area 837 sq m | Grid Size 7m x 7m

SURVEY UNIT 72901-MAP 2 OF 2





N



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Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description
Bldg 729 plenum room, stairwell, and bridge

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Sample Measurements Required

Removable Alpha (Pre & Post Media)	Total Alpha (Pre & Post Media)	Media Samples	Alpha Scan
26**/16	16*	16	100%***

Removable Contamination and Surface Media Sampling Instructions

The following steps may be performed out of sequence in order to obtain multiple samples

1 RCT – If not already completed, grid and label the survey unit surfaces per the Survey Package Cover Sheet Grid Requirements Section and the attached survey map(s)
2 RCT – If not already completed, mark an approximate 5" by 8" sample area adjacent to each grid intersection
3 RCT – If not already completed, transpose sample numbers from attached survey maps onto the labels at each corresponding grid intersection on the survey unit surfaces
4 RCT - Obtain pre-media sampling 100cm^2 removable alpha smears at each labeled measurement location (within the marked 5" by 8" sample area) *per 3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
5 RCT - Obtain pre-media sampling 100cm^2 total alpha direct measurements at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
6 Media Sampler – Affix a plastic bag, or equivalent, beneath the marked sample area
7 Media Sampler – Using an appropriate sampling tool, remove the surface material to a depth sufficient to expose the base material over the entire sample area Label the sample container and sample location with the necessary information Record the required information on the chain of custody form (COC) and the attached Surface Media Sampling form
8 Media Sampler - After each sample, wipe-down the sampling tool to remove loose sample media and prevent possible sample cross-contamination
9 Media Sampler – Repeat the above steps at each designated sample location
10 Media Sampler - After all survey unit surface media samples have been obtained, forward, the COC forms and the surface media samples to Final Survey Radiological Engineering for processing
11 RCT – Obtain a post-media sampling 100cm^2 removable alpha smear at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
12 RCT – Obtain a post-media sampling 100cm^2 total alpha direct measurement at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
13 RCT – Analyze alpha smears using a two-minute count on a Final Survey Radiological Engineer approved instrument Attach the alpha smear results to the survey package
14 RCT – Record total alpha direct measurements on the attached Surface Media Data form
15 RCT – Complete the attached Instrument Data Sheet for all instrumentation used for this final survey
16 RCT – Complete the attached Survey Signature Sheet and forward the survey package to the RCT Foreman for review
17 RCT – In the event any alpha removable measurement exceeds 20 dpm/100cm^2 or any total activity measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
18 RCT Foreman – Review the final survey package for completeness, complete the attached Survey Signature Sheet and forward the survey package to Final Survey Radiological Engineering for final disposition

* These Pre & post total activity samples are obtained to validate media sampling and are not intended to satisfy MARSSIM requirements Additional surveys will be performed for the MARSSIM total activity requirements

** Smears shall be taken on the unfinished concrete ceiling (survey measurements 17 through 26), however since no paint exists, no surface media samples will be taken at these sample points

***100% of floors and lower walls If no contamination > than 75% of the DCGL is detected, the upper walls and ceiling scans may be reduced in accordance with the CRSP

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Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description

Bldg 729 plenum room, stairwell, and bridge

Surface Contamination Monitor (SCM) Survey Instructions

1. Operate the SCM in accordance with written procedures
2. Perform total contamination scan surveys on 100% of the accessible floor and lower walls
3. Perform total contamination scan surveys on 10% of the accessible upper walls and ceiling
4. Delineated on the survey map(s) where areas cannot be scanned as required
5. In the event any alpha scan measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
6. Complete the attached Instrument Data Sheet for all instrumentation used
7. Complete the attached Survey Signature Sheet and forward the survey package to the Final Survey Radiological Engineer for review

Total Activity Measurement Survey Instructions

1. Acquire a N E Electra with an MDA of < 50-dpm/100 cm^2
2. Obtain total activity and QC measurements (1 minute PATs) at the designated survey locations Record the gross cpm for each location
3. Obtain a minimum of 26 local area backgrounds at the designated locations Record the gross cpm for the local area backgrounds
4. In the event any alpha measurement exceeds 100 dpm/100cm^2 notify the Final Survey Radiological Engineer
5. Complete the attached Instrument Data Sheet for all instrumentation used
6. Complete the attached Survey Signature Sheet and forward the survey package to the Final Survey Radiological Engineer for review

Prepared by:

[redacted]	4/14/99
	Date

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Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description
Bldg 729 plenum room, stairwell, and bridge

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	Eberline	
Model	SAC-4	
Serial #	1407	
Cal Due Date	09-25-99	N/A
Alpha Bkgd	0 0 cpm	
Alpha Eff	33 3%	
Calculated MDA (Max = 10 dpm/100 cm^2)	4 1	
Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]		

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	Electra	Electra	Electra	Electra	Electra
Serial #	1826	2380	2380	2377	2181
Cal Due Date	07-13-99	06-04-99	06-04-99	08-15-99	07-15-99
Date	03-01-99	03-02-99	03-03-99	03-04-99	03-15-99
Alpha Bkgd	0 0 cpm	0 0 cpm	0 0 cpm	0 0 cpm	1 cpm
Alpha Efficiency	21 51%	20 7%	20 7%	19 87%	22 1%
Calculated MDA	13 dpm	13 dpm	13 dpm	14 dpm	34 dpm
Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]					

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model	SCM-1	SCM-2
Serial # Detector	SRA-003, 010, 011	SRA-C-001, 004
Cal Due Date	Feb 2000	Feb 2000
Date	03-15-99	03-15-99
Alpha Bkgd 1 min Full Detector	42 cpm	37 cpm
Alpha Efficiency	28%	37%

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Survey Area: A	Survey Unit: 72901	Building 729
Survey Unit Description Bldg 729 plenum room, stairwell, and bridge		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer		
Model		
Serial #		
Cal Due Date		
Alpha Bkgd		
Alpha Eff		
Calculated MDA (Max = 10 dpm/100 cm²)		

N/A

MC 4/15/99

Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	ELECTRA				
Serial #	2181				
Cal Due Date	7-15-99				
Date	4-14-99				
Alpha Bkgd	00				
Alpha Efficiency	20.8%				
Calculated MDA	13 dpm				

N/A

Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model		
Serial # Detector		
Cal Due Date		
Date		
Alpha Bkgd 1 min Full Detector		
Alpha Efficiency		

N/A

4/15/99

MC

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Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description
Bldg 729 plenum room, stairwell, and bridge

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer		
Model		
Serial #		
Cal Due Date		
Alpha Bkgd	N/A	
Alpha Eff		
Calculated MDA (Max = 10 dpm/100 cm^2)		

Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	Eketra 1B				
Serial #	1259				
Cal Due Date	8-18-99				
Date	4-23 99			N/A	
Alpha Bkgd	1 cpm				
Alpha Efficiency	21 69				
Calculated MDA	35 dpm				

Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model		
Serial # Detector		
Cal Due Date		
Date		N/A
Alpha Bkgd 1 min Full Detector		
Alpha Efficiency		

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Survey Area: A	**Building** 729
Survey Unit (s): 72901, 72902, 72903	

Total Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift (Δ/δ) in accordance with MARSSIM, Section 5 5 2 3 as follows

$\Delta/\delta = (DCGL_{TSA} - LBGR_{TSA}) / SD_{TSA}$

$\Delta/\delta_{transuranics} = 2\ 0 = (100\ dpm/100cm^2 - 34\ dpm/100cm^2)/33\ dpm/100cm^2$

Where

Δ/δ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1 and 3)

$DCGL_{TSA}$ is the total surface activity derived concentration guideline value (DOE Order 5400 5 total surface activity limit equals 100 dpm/100cm^2 for transuranics, per the B779 Cluster Radiological Closeout Survey Plan)

$LBGR_{TSA}$ is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor The $LBGR_{TSA}$ was adjusted to obtain a relative shift between 1 and 3 (i e 34 dpm/100cm^2 for transuranics)

SD_{TSA} is the estimated standard deviation of the total surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available)

Step 2 Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, equals 0 977250 for a relative shift of 2 0

Step 3 Determine the number of total surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula that is based on Plutonium contaminants not being present in the background

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 977250 - 0\ 5)^2 = 11\ 88$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 977250

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

$N = 11\ 88 \cdot 1\ 2 = 14\ 25$

Conclusion A minimum of 15 Total Surface Activity measurements will be obtained in each of the above survey unit(s)

[redacted]

4/24/99
Date

4/24/99 *
Date

* [illegible] from originally signed. 4/14/99 [illegible]

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Survey Area: A	**Building** 729
Survey Unit (s): 72901, 72902, 72903	

Media Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift ($\Delta\delta$) in accordance with MARSSIM Section 5 5 2 3 as follows

Note Since a reference area background subtract will not be used for uranium measurements and since the equation in Section 5 5 2 3 results in a larger number of samples than the equation in Section 5 5 2 1 for a relative shift of 2 0, it is acceptable to use the equation in Section 5 5 2 3 for uranium

$\Delta\delta = (DCGL_{media} - LBGR_{media}) / SD_{media}$

$\Delta\delta_{transuranics} =$ 2 0 = (100 dpm/100cm^2 – 95 7 dpm/100cm^2)/2 15 dpm/100cm^2
$\Delta\delta_{uranium} =$ 2 0 = (5000 dpm/100cm^2 – 4819 9 dpm/100cm^2)/90 04 dpm/100cm^2

Where

$\Delta\delta$ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1and 3)

$DCGL_{media}$ is the total surface activity derived concentration guideline value (DOE Order 5400 5 total surface contamination limit equals 100 dpm/100cm^2 for transuranics and 5000 dpm/100cm^2 for uranium, per the B779 Cluster Radiological Closeout Survey Plan)

$LBGR_{media}$ is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor The $LBGR_{media}$ was adjusted to obtain a relative shift between 1 and 3 (i e 95 7 dpm/100cm^2 for transuranics and 4819 9 dpm/100cm^2 for uranium)

SD_{media} is the estimated standard deviation of the media surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available) Six paint samples (3 interior and 3 exterior) were taken during the characterization phase of B729 The six samples resulted in a standard deviation of 2 15 for transuranics and 90 04 for uranium

Step 2 Determine the Sign P value by looking up the relative shift ($\Delta\delta$) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, equals 0 977250 for a relative shift of 2 0

Step 3 Determine the number of media surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula that is based on Plutonium contaminants not being present in the background

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 977250 - 0\ 5)^2 = 11\ 88$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 977250

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

N = 11 88 * 1 2 = 14 25

Conclusion: A minimum of 15 media surface activity measurements will be obtained in each of the above survey unit(s)

[redacted]

3/9/99
Date

3/9/99
Date

Survey Area: A	**Building.** 729
Survey Unit (s): 72901, 72902, 72903	

Removable Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift ($\Delta\delta$) in accordance with MARSSIM, Section 5 5 2 3, as follows

Δ/δ = (DCGL $_{removable}$ - LBGR $_{removable}$)/ SD $_{removable}$

Δ/δ = 1 67 = (20 dpm/100cm^2 – 10 dpm/100cm^2)/6 dpm/100cm^2

Where

Δ/δ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1and 3)

DCGL $_{removable}$ is the removable surface activity derived concentration guideline value (DOE Order 5400 5 removable surface contamination limit equals 20 dpm/100cm^2 for transuranics)

LBGR $_{removable}$ is the lower bound of the gray region - the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor In order to obtain a relative shift between 1 and 3, and since the surface activity counting instrumentation has a minimum MDA of 50% of DCGL, the chosen LBGR is 50% of the DCGL (i e , 10 dpm/100cm^2 for transuranics)

SD $_{removable}$ is the estimated standard deviation of the removable surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available) Since the B729 scoping or characterization data did not contain actual values less than the MDA of the counting instrument a value of 6 dpm/100cm^2 was used (6 dpm/100cm^2 equals a 30% coefficient of variation of the DCGL $_{removable}$)

Step 2 Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, rounded conservatively, equals 0 945201 for a relative shift of 1 67

Step 3 Determine the number of removable surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula (based on Plutonium contaminants not being present in the background)

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 945201 - 0\ 5)^2 = 13\ 65$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 945201

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

N = 13 65 * 1 2 = 16 38

Conclusion **A minimum of 17 removable surface activity measurements will be obtained in each of the above survey unit(s)**

[redacted]

4/8/99
Date

4/8/99
Date

65

Survey Area: A	Survey Unit: 72901	Building 729
Survey Unit Description Bldg 729 plenum room, stairwell, and bridge		

SURVEY SIGNATURE SHEET

Removable Contamination and Surface Media Survey Performed By

[redacted]	3-1-99 Date
	3-2-99 Date
	3-3-99 Date
	3-4-99 Date
	3-15-99 Date

Surface Contamination Monitor Survey Performed By

[redacted]			4.2.99 Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date

N/A

Survey Reviewed By

[redacted]	4/12-99 Date

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Survey Area: A	Survey Unit: 72901	Building 729
Survey Unit Description Bldg 729 plenum room, stairwell, and bridge		

Total Surface Contamination Measurements Performed By

[redacted]			4-14-99 Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

N/A

Survey Reviewed By

[redacted]	4 21 99 Date

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Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description
Bldg 729 plenum room, stairwell, and bridge

SURVEY SIGNATURE SHEET

Removable Contamination and Surface Media Survey Performed By

[redacted]			4-23-99
			Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	N/A RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Surface Contamination Monitor Survey Performed By

Engineers Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
	N/A		
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date

Survey Reviewed By

[redacted]	4 24 99
	Date

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Survey Area: A	Survey Unit: 72901	Building 729

Survey Unit Description
Bldg 729 plenum room, stairwell, and bridge

SURFACE MEDIA DATA FORM

Lab Sample Number	Sample Location Number	Sample Surface Area (in^2)	Pre-Sample Total Activity Measurement ($dpm/100\ cm^2$)	Pre Sample Removable Activity Number	Post Sample Total Activity Measurement ($dpm/100\ cm^2$)	Post Sample Removable Activity Number
99A5050-034 001	1	40	<13	1A	<13	1B
99A5050-035.001	2	40	<13	2A	<13	2B
99A5050-036 001	3	40	<13	3A	<13	3B
99A5050-037 001	4	40	<13	4A	<13	4B
99A5050-038 001	5	40	<13	5A	<13	5B
99A5050-039 001	6	40	<13	6A	<13	6B
99A5050-040 001	7	40	13	7A	<13	7B
99A5050-041 001	8	40	13	8A	<13	8B
99A5050-042 001	9	40	<13	9A	<13	9B
99A5050-047 001	10	40	<34	10A	<34	10B
99A5050-044 001	11	40	<13	11A	<13	11B
99A5050-045 001	12	40	<13	12A	<13	12B
99A5050-043 001	13	40	13	13A	<13	13B
99A5050-048 001	14	40	<34	14A	<34	14B
99A5050-049 001	15	40	<34	15A	<34	15B
99A5050-046 001	16	40	14	16A	14	16B

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Remarks Sample location numbers 17 through 26 were smears only No solid media samples were obtained due to unpainted concrete surfaces

Sampling Performed By

[redacted]	3/19/99 Date
	Date

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Surface Med[illegible]rvey Results

Survey Unit	Sample Location	Pre-Sample Results			Post-Sample Results		
		Total Activity (dpm/100 cm²)	Removable Activity (dpm/100 cm²)	MDA	Total Activity (dpm/100 cm²)	Removable Activity (dpm/100 cm²)	MDA
72901	1	< 13	0 0	4.1	< 13	0 0	4 1
72901	2	< 13	1 5	4 1	< 13	0 0	4.1
72901	3	< 13	0 0	4 1	< 13	3.0	4.1
72901	4	< 13	0 0	4 1	< 13	0 0	4 1
72901	5	< 13	0.0	4 1	< 13	0 0	4 1
72901	6	< 13	0 0	4 1	< 13	0 0	4 1
72901	7	13	1.5	4 1	< 13	0 0	4 1
72901	8	13	0 0	4 1	< 13	1.5	4 1
72901	9	< 13	0.0	4 1	< 13	0 0	4 1
72901	10	< 34	0.0	4 1	< 34	0.0	4 1
72901	11	< 13	0 0	4 1	< 13	0 0	4 1
72901	12	< 13	0.0	4 1	< 13	1 5	4 1
72901	13	13	0 0	4 1	< 13	0 0	4 1
72901	14	< 34	0 0	4.1	< 34	0 0	4 1
72901	15	< 34	1.5	4 1	< 34	0 0	4 1
72901	16	14	0 0	4 1	14	0 0	4 1
72901	17		1 5	4 1			
72901	18		0 0	4 1			
72901	19		0.0	4 1			
72901	20		0 0	4 1			
72901	21		0 0	4 1			
72901	22		0 0	4 1			
72901	23		0 0	4.1			
72901	24		0 0	4 1			
72901	25		0.0	4.1			
72901	26		1 0 0	4 1			

QC #1C - 0 DPM/100cm
QC #2C 4 5 "
QC #3C - 0 "
QC #6C - 1 5 "
QC #8C - 28 5 "
QC #10C - 57 "
4 5 99
Superceded New QC Data obtained mo 4/26/99

[redacted] T = 100

Data Entered By 4-2-99
Date

Data Reviewed By 4/5/99
Date

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GRIDDING METHODOLOGY/CALCULATION DATA SHEET

Survey Unit: 72901

Grid Spacing Equations

For Triangular Grids

$$L = SQRT\ (A/0.866*n)$$

Where *A = total surface area of survey unit m^2*
n = number of measurements as calculated using the one sample statistical test
0 866 = constant provided by MARSSIM for triangular gridding
L = calculated distance between grid points, m

For Rectangular Grids

$$L = SQRT\ (A/n)$$

Where *A = total surface area of survey unit, m^2*
n = number of measurements as calculated using the one sample statistical test
L = calculated distance between grid points, m

Grid Calculations

Grid Type Selection ____ Triangular ✓ Rectangular

Total Area in Survey Unit 837 m^2

$$L = SQRT\ (837\ /\ 16)$$

$$L = 723\ m$$

Actual Grid Size (rounded down to nearest whole number) 70 m

Calculations Performed By

[redacted] 3/9/99 *
Date

Calculations Reviewed By

[redacted] 3/9/99 *
Date

* Calculations performed and reviewed on 2/25/99 MG

Total Activity

Survey Area 'A' Building 729 Surface ~~Media~~ Survey Results

MC 4/27/99

Survey Unit	Measurement ~~Sample~~ Location (MC 4/27/99)	~~Sample Results~~ Total Activity (cpm) (MC 4/27/99)	Local Area Background (CPM)	QC CPM
72901	1	5		
72901	2	6		
72901	3	1	2/1/5/4/4/4/2/1/4/4/3/4/2/1/2/2	
72901	4	5		
72901	5	3		
72901	6	5		
72901	7	5		
72901	8	5		
72901	9	1		
72901	10	3	4/3/3/2/2/0/4/4/2/2/6/7/4/7/6/1	3 #10
72901	11	5	1/5/1/4/0/0/3/0/2/3/4/3/3/2/3/2	
72901	12	7		
72901	13	2		
72901	14	5		
72901	15	3		
72901	16	6		
72901	17	8		
72901	18	6		
72901	19	7	4/0/6/1/4/4/1/4/4/1/7/5/2/4/4/4	7 #19
72901	20	4		
72901	21	3		
72901	22	4		
72901	23	7		
72901	24	4		
72901	25	8		
72901	26	6		

Data Entered By [redacted] 4/14/99
Printed Name Employee # Signature Date

Data Reviewed By [redacted] 4/19/99
Printed Name Employee # Signature Date

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Total Activity

Survey Area 'A' Building 729 rface ~~Media~~ Survey Results

MG 4/27/99

Survey Unit	Sample Location	Total Activity Measurements (cpm)	Total Activity Quality Control Measurements (cpm)	Local Area Background (cpm)
72901	1			
72901	2			
72901	3			
72901	4			
72901	5			N/A MG 4/24/99
72901	6		N/A MG 4/24/99	
72901	7			
72901	8			
72901	9			
72901	10			
72901	11	N/A MG 4/24/99		
72901	12		4	2
72901	13			
72901	14			
72901	15			
72901	16			
72901	17			
72901	18			N/A MG 4/24/99
72901	19			
72901	20			
72901	21			
72901	22			
72901	23			
72901	24		N/A MG 4/24/99	
72901	25			
72901	26		3	2

Measurements Obtained By [redacted] 4-23 99 Date

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SURVEY UNIT 72901-01
RANDOM START DATA SHEET

Measurement Location	X-Coordinate	Y-Coordinate	Measurement Location	X-Coordinate	Y-Coordinate
#01	7	22		4	20
	11	6		20	19
	10	2		22	12
	15	11		19	12
	22	22		3	13
	14	0		3	20
	22	4		18	16
	8	17		17	19
	16	5		15	22
	12	8		20	7
	13	0		21	5
	6	22		23	2
	4	1		20	15
	20	14		7	2
	3	4		2	0
	23	22		16	5
	3	4		13	5
	5	8		7	15
	16	9		2	2
	3	2		7	13
	1	13		5	5
	1	19		16	22
	14	0		12	11
	5	13		12	1
	9	8		22	8
	6	4		4	13
	6	10		22	23
	22	7		15	9
	18	15		1	11
	0	3		4	7
	8	20		1	23
	13	2		15	19
	6	6		2	3
	13	2		18	13
	14	11		11	13
	8	20		9	9
	6	7		11	1
	9	22		14	11
	19	12		0	15
	11	18		16	18

LEGEND 2/25/99

C-N/A = UNPAINTED CEILING
X-N/A = > NUMBER OF SAMPLES REQUIRED

REVIEWED BY SIGNATURE 2/26/99
2/25/99

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COVER PAGE (Continued)

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Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code SCA Subcontract Number KH700325EP6

RIN 99A5050
LIC RC01B004
Laboratory Report Identification Code 1480, 1481, 1482, 1483, 1488, 1489, 1500

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-034 001 Bldg 729	KH199-1488-01	KH199-1488-01	KH199-1488-01
99A5050-035 001 Bldg 729	KH199-1488-02	KH199-1488-02	KH199-1488-02B
99A5050-036 001 Bldg 729	KH199-1488-03	KH199-1488-03	KH199-1488-03
99A5050-037 001 Bldg 729	KH199-1488-04	KH199-1488-04	KH199-1488-04D
99A5050-038 001 Bldg 729	KH199-1488-05	KH199-1488-05	KH199-1488-05
99A5050-039 001 Bldg 729	KH199-1488-06	KH199-1488-06	KH199-1488-06B
99A5050-040 001 Bldg 729	KH199-1488-07	KH199-1488-07	KH199-1488-07B
99A5050-041 001 Bldg 729	KH199-1488-08	KH199-1488-08	KH199-1488-08
99A5050-042 001 Bldg 729	KH199-1488-09	KH199-1488-09	KH199-1488-09
99A5050-043 001 Bldg 729	KH199-1488-10	KH199-1488-10	KH199-1488-10
Laboratory Control Sample (LC)	SCAQC-1488-LC1	SCAQC-1488-LC1	SCAQC-1488-LC1
Duplicate (LD)	SCAQC-1488-LD1	SCAQC-1488-LD1	SCAQC-1488-LD1
Preparation Blank (PB)	SCAQC-1488-PB	SCAQC-1488-PB	SCAQC-1488-PB

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-044 001 Bldg 729	KH199-1489-01	KH199-1489-01	KH199-1489-01
99A5050-045 001 Bldg 729	KH199-1489-02	KH199-1489-02	KH199-1489-02
99A5050-046 001 Bldg 729	KH199-1489-03	KH199-1489-03	KH199-1489-03
Laboratory Control Sample (LC)	SCAQC-1483-LC1	SCAQC-1483-LC1	SCAQC-1483-LC1
Duplicate (LD)	SCAQC-1483-LD1	SCAQC-1483-LD1	SCAQC-1483-LD1B
Preparation Blank (PB)	SCAQC-1483-PB	SCAQC-1483-PB	SCAQC-1483-PB

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-048 001 Bldg 729	KH199-1500-01	KH199-1500-01	KH199-1500-01
99A5050-049 001 Bldg 729	KH199-1500-02	KH199-1500-02	KH199-1500-02
99A5050-047 001 Bldg 729	KH199-1500-03	KH199-1500-03	KH199-1500-03
Laboratory Control Sample (LC)	SCAQC-1483-LC1	SCAQC-1483-LC1	SCAQC-1483-LC1
Duplicate (LD)	SCAQC-1483-LD1	SCAQC-1483-LD1	SCAQC-1483-LD1B
Preparation Blank (PB)	SCAQC-1483-PB	SCAQC-1483-PB	SCAQC-1483-PB

Comments There were no problems encountered during sample receiving

'I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above Release of the data contained in this hard-copy sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the laboratory Manager or the Manager's designee, as verified by the following signature "

Joe Stinson
Signature

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Joe Stinson
Name

Laboratory Manager
Title

3/26/99
Date

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	034 001				
Other Sample ID	BLDG 729	Collection Date	3/2/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-01	0 856	0 248	0 301	0 071
ACW03	U-235	KH199-1488-01	0 036	0 051	0 052	0 049
ACW03	U-238	KH199-1488-01	0 829	0 242	0 293	0 039
ACW03	PU-239/240	KH199-1488-01	0 034	0 058	0 059	0 091
ACW03	AM-241	KH199-1488-01	0 116	0 141	0 143	0 186

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	035 001				
Other Sample ID	BLDG 729	Collection Date	3/2/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-02	0 624	0 192	0 229	0 061
ACW03	U-235	KH199-1488-02	0 047	0 054	0 056	0 042
ACW03	U-238	KH199-1488-02	1 01	0 253	0 324	0 061
ACW03	PU-239/240	KH199-1488-02	3 84	0 787	1 10	0 036
ACW03	AM-241	KH199-1488-02B	0 447	0 240	0 256	0 123

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	036 001				
Other Sample ID	BLDG 729	Collection Date	3/2/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-03	0 588	0 210	0 240	0 044
ACW03	U-235	KH199-1488-03	0 012	0 044	0 044	0 097
ACW03	U-238	KH199-1488-03	0 618	0 215	0 248	0 044
ACW03	PU-239/240	KH199-1488-03	0 000	0 000	0 000	0 039
ACW03	AM-241	KH199-1488-03	-0 002	0 067	0 067	0 148

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	037 001				
Other Sample ID	BLDG 729	Collection Date	3/2/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-04	0 147	0 090	0 095	0 036
ACW03	U-235	KH199-1488-04	0 016	0 033	0 033	0 045
ACW03	U-238	KH199-1488-04	0 080	0 066	0 068	0 036
ACW03	PU-239/240	KH199-1488-04	0 003	0 036	0 036	0 088
ACW03	AM-241	KH199-1488-04D	0 090	0 194	0 195	0 234

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number: 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number:	99A5050#002	Matrix	Waste
Site Sample ID	038 001				
Other Sample ID	BLDG 729	Collection Date	3/2/99	Date Received	3/11/99
		Batch Number:	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-05	0 625	0 210	0 244	0 073
ACW03	U-235	KH199-1488-05	0 019	0 037	0 038	0 050
ACW03	U-238	KH199-1488-05	0 973	0 269	0 332	0 041
ACW03	PU-239/240	KH199-1488-05	-0 016	0 019	0 019	0 082
ACW03	AM-241	KH199-1488-05	0 027	0 062	0 063	0 105

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	039 001				
Other Sample ID	BLDG 729	Collection Date	3/3/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-06	0 894	0 264	0 319	0 076
ACW03	U-235	KH199-1488-06	0 078	0 079	0 082	0 053
ACW03	U-238	KH199-1488-06	0 912	0 266	0 322	0 043
ACW03	PU-239/240	KH199-1488-06	0 009	0 032	0 033	0 072
ACW03	AM-241	KH199-1488-06B	0 000	0 000	0 000	0 065

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	040 001				
Other Sample ID	BLDG 729	Collection Date	3/3/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-07	0 781	0 238	0 285	0 073
ACW03	U-235	KH199-1488-07	0 075	0 075	0 079	0 051
ACW03	U-238	KH199-1488-07	0 739	0 229	0 273	0 041
ACW03	PU-239/240	KH199-1488-07	0 041	0 048	0 049	0 037
ACW03	AM-241	KH199-1488-07B	0 134	0 160	0 162	0 121

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	041 001				
Other Sample ID	BLDG 729	Collection Date	3/3/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-08	0 486	0 191	0 214	0 092
ACW03	U-235	KH199-1488-08	0 000	0 000	0 000	0 054
ACW03	U-238	KH199-1488-08	0 481	0 186	0 209	0 043
ACW03	PU-239/240	KH199-1488-08	0 036	0 052	0 053	0 049
ACW03	AM-241	KH199-1488-08	0 022	0 043	0 044	0 059

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	042 001				
Other Sample ID	BLDG 729	Collection Date	3/3/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-09	0 217	0 115	0 123	0 039
ACW03	U-235	KH199-1488-09	0 072	0 072	0 075	0 048
ACW03	U-238	KH199-1488-09	0 361	0 151	0 167	0 039
ACW03	PU-239/240	KH199-1488-09	0 102	0 093	0 096	0 089
ACW03	AM-241	KH199-1488-09	0 097	0 118	0 120	0 156

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	043 001				
Other Sample ID	BLDG 729	Collection Date	3/3/99	Date Received	3/11/99
		Batch Number	1488	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1488-10	0 717	0 227	0 269	0 041
ACW03	U-235	KH199-1488-10	0 022	0 058	0 058	0 108
ACW03	U-238	KH199-1488-10	0 617	0 209	0 243	0 073
ACW03	PU-239/240	KH199-1488-10	0 012	0 024	0 024	0 033
ACW03	AM-241	KH199-1488-10	0 042	0 071	0 071	0 108

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Pu	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB
Am	SCAQC-1488-LC1	SCAQC-1488-LD1	SCAQC-1488-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	044 001				
Other Sample ID	BLDG 729	Collection Date	3/3/99	Date Received	3/11/99
		Batch Number	1489	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1489-01	0 212	0 120	0 128	0 075
ACW03	U-235	KH199-1489-01	0 000	0 000	0 000	0 052
ACW03	U-238	KH199-1489-01	0 242	0 128	0 137	0 075
ACW03	PU-239/240	KH199-1489-01	0 087	0 079	0 081	0 075
ACW03	AM-241	KH199-1489-01	-0 008	0 015	0 015	0 088

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	045 001				
Other Sample ID	BLDG 729	Collection Date	3/3/99	Date Received	3/11/99
		Batch Number	1489	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1489-02	1 25	0 300	0 391	0 077
ACW03	U-235	KH199-1489-02	0 050	0 058	0 060	0 045
ACW03	U-238	KH199-1489-02	1 12	0 279	0 357	0 065
ACW03	PU-239/240	KH199-1489-02	0 002	0 033	0 033	0 080
ACW03	AM-241	KH199-1489-02	-0 003	0 123	0 123	0 218

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002	Matrix	Waste
Site Sample ID	046 001				
Other Sample ID	BLDG 729	Collection Date	3/4/99	Date Received	3/11/99
		Batch Number	1489	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1489-03	0 846	0 253	0 304	0 042
ACW03	U-235	KH199-1489-03	0 069	0 079	0 082	0 093
ACW03	U-238	KH199-1489-03	0 764	0 238	0 283	0 042
ACW03	PU-239/240	KH199-1489-03	0 056	0 075	0 075	0 101
ACW03	AM-241	KH199-1489-03	0 018	0 036	0 036	0 048

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002/003	Matrix	Waste
Site Sample ID	047 001				
Other Sample ID	BLDG 729	Collection Date	3/18/99	Date Received	3/19/99
		Batch Number	1500	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1500-03	0 443	0 179	0 200	0 044
ACW03	U-235	KH199-1500-03	-0 008	0 017	0 017	0 098
ACW03	U-238	KH199-1500-03	0 294	0 143	0 155	0 044
ACW03	PU-239/240	KH199-1500-03	0 142	0 098	0 102	0 043
ACW03	AM-241	KH199-1500-03	0 059	0 085	0 086	0 122

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002/003	Matrix	Waste
Site Sample ID	048 001				
Other Sample ID	BLDG 729	Collection Date	3/18/99	Date Received	3/19/99
		Batch Number	1500	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1500-01	0 162	0 100	0 105	0 068
ACW03	U-235	KH199-1500-01	0 000	0 000	0 000	0 047
ACW03	U-238	KH199-1500-01	0 148	0 095	0 099	0 067
ACW03	PU-239/240	KH199-1500-01	0 253	0 154	0 162	0 110
ACW03	AM-241	KH199-1500-01	0 049	0 068	0 069	0 092

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#002/003	Matrix	Waste
Site Sample ID	049 001				
Other Sample ID	BLDG 729	Collection Date	3/18/99	Date Received	3/19/99
		Batch Number	1500	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1500-02	0 164	0 093	0 099	0 058
ACW03	U-235	KH199-1500-02	0 015	0 030	0 030	0 040
ACW03	U-238	KH199-1500-02	0 176	0 096	0 102	0 058
ACW03	PU-239/240	KH199-1500-02	0 045	0 070	0 071	0 104
ACW03	AM-241	KH199-1500-02	0 024	0 048	0 048	0 065

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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RMRS

CHAIN OF CUSTODY/SA. LE ANALYSIS REQUEST

LOC.# 99A518

Collector: J. HORTON x 3789	Contact/Requester: SCHLITERBUSCH, MIKE / MIKE GRUBE	Telephone No.: 4215 / 2863 MSIN FAX: 303 966 2864
RIN: 99A5187	Sampling Origin: Bldg 729	Purchase Order/Charge Code: KT95AA00
Project Title: BLDG 779 FINAL SURVEY	Logbook No.	Ice Chest No. Temp.
To (Lab): Thermo NuTech	Method of Shipment	Bill of Lading/Air Bill No.
Protocol		Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐
WEIGH PORTION OF SAMPLE REMOVED FOR SCREENING TO NEAREST 0.1g OR BETTER. REPORT WEIGHT WITH RESULTS Fax to Joe 2864

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
99A5187-034.001		SOLID	3/2/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-035.001		SOLID	3/2/99	0930	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-036.001		SOLID	3/2/99	1000	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-037.001		SOLID	3/2/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-038 001		SOLID	3/2/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-039 001		SOLID	3/3/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-040.001		SOLID	3/3/99	0930	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None

Relinquished By / Date/Time	Received By / Date/Time	Relinquished By / Date/Time	Received By / Date/Time
3/4/99 1052	Molly Bak 3/4/99 1055	Molly Bak 3/4/99 1100	TNU 110 C3 3/4/99 1100
C3 3/9/99 1200	J. Goelder 3/9/99 1200	J. Goelder 3/9/99 1245	3/9/99 1245
3/9/99 1328	L. Miller 3/9/99 1330		

FINAL SAMPLE DISPOSITION: Disposal Method (e.g. Return to customer, per lab procedure, used in process) Disposed By Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C # 99A518

RIN 99A5187

Contact/Requestor SCHLUTERBUSCH, MIKE / MIKE GRUBE

Telephone No. 4215 / 2863

MSIN

FAX 303 966 2864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5187-041 001		SOLID	3/3/99	1000	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-042 001		SOLID	3/3/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-043 001		SOLID	3/3/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-044 001		SOLID	3/3/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-045 001		SOLID	3/3/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-046 001		SOLID	3/4/99	0800	BLDG 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-047 001		SOLID N				10-G P/G N	OS01A003 (Rad-Screen - Soil) [Routine-r screen] N	None None A
99A5187-048 001		SOLID A				10-G P/G A	OS01A003 (Rad-Screen - Soil) [Routine-r screen] A	None None
3/4/99	3/4/99				3/4/99		3/4/99	3/4/99

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
	3/4/99 1052		3/4/99 1055		3/4/99 1100	TNU/110/C3	3/4/99 1100
C3	3/9/99 1200		3/9/99 1200		3/9/99 1245		3/9/99 1245
	3/9/99 1328		3/9/99 1330				

FINAL SAMPLE DISPOSITION — Disposal Method (e.g., Return to customer, per lab procedure, used in process) — Disposed By — Date/Time

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COPY

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.# 99A5187h

Collector: J. HORTON x 3789	Contact/Requester: SCHLUTERHUSCH, MIKE / MIKE GRUBE	Telephone No.: 4215 / 2863 MSIN: 303 FAX: 966 2864	
RIN: 99A5187	Sampling Origin: Bldg 729	Purchase Order/Charge Code: KT93AA00	
Project Title: BLDG 779 FINAL SURVEY	Logbook No.	Ice Chest No. Temp.	
To (Lab): Thermo NuTech	Method of Shipment	Bill of Lading/Air Bill No.	
Protocol		Offsite Property No.	

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐
WEIGH PORTION OF SAMPLE REMOVED FOR SCREENING TO NEAREST 0.1g OR BETTER. REPORT WEIGHT WITH RESULTS

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5187-034.001		SOLID	3/2/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-035.001		SOLID	3/2/99	0930	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-036.001		SOLID	3/2/99	1000	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-037.001		SOLID	3/2/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-038.001		SOLID	3/2/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-039.001		SOLID	3/3/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-040.001		SOLID	3/3/99	0930	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/4/99 1052	Molly Bal	3/4/99 1055				

FINAL SAMPLE DISPOSITION: Disposal Method (e.g. Return to customer, per lab procedure, used in process) Disposed By Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 99A5187

RIN 99A5187

Contact/Requestor: SCHLUTERBUSCH, MIKE / MIKE GRUBE

Telephone No.: 4215 / 2863

MSIN

FAX: 303 966 2864

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5187-041 001		SOLID	3/3/99	1000	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-042.001		SOLID	3/3/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-043.001		SOLID	3/3/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-044.001		SOLID	3/3/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-045.001		SOLID	3/3/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-046 001		SOLID	3/4/99	0800	BLDG 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
~~99A5187-047.001~~ N		~~SOLID~~ N				~~10-G P/G~~ N	~~OS01A003 (Rad-Screen - Soil) [Routine-r screen]~~ N	~~None~~ N ~~None~~ A
~~99A5187-048.001~~ A		~~SOLID~~ A				~~10-G P/G~~ A	~~OS01A003 (Rad-Screen - Soil) [Routine-r screen]~~ A	~~None~~ ~~None~~
3/4/99	3/4/99				3/4/99	3/4/99	3/4/99	3/4/99

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
3/4/99	1052	Molly Bach	3/4/99 1055				

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

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RMRS

CHAIN OF CUSTODY/ [illegible]PLE ANALYSIS REQUEST

COC # 99 [illegible]0#002

RIN 99A5050

Contact/Requestor SCHLUTERBUSCH, MIKE / GRUBE, MIKE

Telephone No 4215 / 2863

MSIN

FAX 303 966 2864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5050-041 001		WASTE	3/3/99	1000	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-042 001		WASTE	3/3/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-043 001		WASTE	3/3/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-044 001		WASTE	3/3/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-045 001		WASTE	3/3/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-046 001		WASTE	3/4/99	0800	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-047 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-048 001		WASTE	N/A		Bldg 729 N/A	10-G P/G N/A	RC01B004 (Isotopic Waste) [Priority] N/A	None 4 degrees C N/A
99A5050-049 001		WASTE				10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
JPA 3/9/99		[illegible]	3/9/99		[illegible] 3/9/99	[illegible] 3/9/99	[illegible] 3/9/99	[illegible] 3/9/99

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/9/99 1328	[signature]	3/9/99 1330				

FINAL SAMPLE DISPOSITION — Disposal Method (e.g., Return to customer, per lab procedure, used in process) — Disposed By — Date/Time

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RMRS

CHAIN OF CUSTODY/ SAMPLE ANALYSIS REQUEST

COC # 9 50#002

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Collector J. HORTON x 3789	Contact/Requester SCHLUTERBUSCH, MIKE / GRUBE, MIKE	Telephone No 4215 / 2863 MSIN FAX 303 966 2864
RIN 99A5050	Sampling Origin Bldg 729	Purchase Order/Charge Code KT95AA00
Project Title 779 CLUSTER FINAL SURVEY	Logbook No	Ice Chest No Temp
To (Lab) S Cohen & Associates	Method of Shipment	Bill of Lading/Air Bill No
Protocol		Offsite Property No

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐
WEIGH SAMPLES TO NEAREST 0.1g BEFORE ANALYSIS. REPORT TOTAL WEIGHT WITH RESULTS.

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5050-034 001		WASTE	3/2/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-035 001		WASTE	3/2/99	0930	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-036 001		WASTE	3/2/99	1000	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-037 001		WASTE	3/2/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-038 001		WASTE	3/2/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-039 001		WASTE	3/3/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees
99A5050-040 001		WASTE	3/3/99	0930	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/9/99 1328	L. Miller	3/9/99 1330				

FINAL SAMPLE DISPOSITION — Disposal Method (e.g., Return to customer, per lab procedure, used in process) — Disposed By — Date/Time

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Thermo NUtech - Rocky Flats
Radscreen Results

RIN: 99A5187
Analysis: Radscreen
Report Date: 02/23/99

Distribution/Fax: ASD/ 4565

Laboratory Sample ID	APO Sample ID RIN	Event	Bottle	Matrix	Gross Alpha pCi/g	2σ	Gross Beta pCi/g	2σ	Total Activity pCi/g	DOT Class	Refer to Note #2 Approx. Sample Received (g)	Analysis Aliquot (g)
99020238-01	99A5187	001	001	Solid	0.5	4.0	1.0	4.8	10.30	NONRAD	65	1.0060
99020238-02	99A5187	002	001	Solid	4.5	4.8	5.6	4.6	19.50	NONRAD	33	1.0027
99020238-03	99A5187	003	001	Solid	3.6	4.5	8.3	4.6	21.00	NONRAD	53	1.0070
99020238-04	99A5187	004	001	Solid	3.4	4.3	5.9	4.4	18.00	NONRAD	66	1.0154
99020238-05	99A5187	005	001	Solid	3.5	2.1	4.0	2.2	11.60	NONRAD	5	1.0002
99020238-06	99A5187	006	001	Solid	2.6	4.3	12	5	23.90	NONRAD	87	1.0104
99020238-07	99A5187	007	001	Solid	1.9	1.8	3.4	2.1	9.20	NONRAD	8	1.0074
99020238-08	99A5187	008	001	Solid	3.1	2.1	3.4	2.1	10.70	NONRAD	5	1.0050
99020238-09	99A5187	009	001	Solid	3.1	4.6	8.0	5.2	20.90	NONRAD	29	1.0025
99020238-10	99A5187	010	001	Solid	1.9	3.9	4.9	4.5	15.20	NONRAD	23	1.0212
99020238-11	99A5187	011	001	Solid	4.9	4.6	12	4	25.50	NONRAD	35	1.0159
99020238-12	99A5187	012	001	Solid	0.0	0.2	0.3	0.5	1.00	NONRAD	259	1.0586
99020238-13	99A5187	013	001	Solid	1.3	0.6	1.3	0.6	3.80	NONRAD	298	1.0086
99020238-14	99A5187	014	001	Solid	0.2	0.3	0.6	0.5	1.60	NONRAD	446	1.0837
99020238-15	99A5187	015	001	Solid	1.6	0.7	0.7	0.6	3.60	NONRAD	342	1.0090
99020238-16	99A5187	016	001	Solid	0.7	0.6	2.1	0.7	4.10	NONRAD	367	1.0294
99020238-17	99A5187	017	001	Solid	0.5	0.5	0.7	0.6	2.30	NONRAD	267	1.0154

INFORMATION ONLY

DATE: 4/7/99

Reprinted to provide legible data for fax. KM Hoagland

Thermo NUtech - Rocky Flats
RFETS - Building 771/772
Golden, Colorado 80402
(303) 966-6000

RF-0002 (11/97)

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 99A5187#003

Page 1 of 1

Collector: J. HORTON x 3789	Contact/Requester: SCHLUTERBUSCH, MIKE / MIKE GRUBE	Telephone No.: 4215 MSIN: FAX: 303 966 2864
SIN: 99A5187	Sampling Origin: Bldg 779	Purchase Order/Charge Code: KT95AA00
Project Title: BLDG 779 FINAL SURVEY	Logbook No.	Ice Chest No. Temp.
To (Lab): Thermo NuTech	Method of Shipment	Bill of Lading/Air Bill No.
Protocol		Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption. Yes ☐ No ☐
WEIGH PORTION OF SAMPLE REMOVED FOR SCREENING TO NEAREST 0.1g OR BETTER. REPORT WEIGHT WITH RESULTS

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5187-046.001	SKH 3/15/99	SOLID SKH 3/15/99	N/A	N/A		10-G P/G SKH 3/15/99	OS01A003 (Rad-Screen - Soil) [Routine-r screen] SKH 3/15/99	None None SKH 3/15/99
99A5187-047 001		SOLID	3/15/99	1600	BLDG 729-10	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r.screen]	None None
99A5187-048 001		SOLID	3/15/99	1630	BLDG 729-N	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r.screen]	None None
99A5187-049 001		SOLID	3/15/99	1630	BLDG 729-15	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r.screen]	None None
							COPY	

Relinquished By / Date/Time	Received By / Date/Time	Relinquished By / Date/Time	Received By / Date/Time
3/16/99 1010	3/16/99 1010		
3/16/99 1020	C3 3/16/99 1020		
C3 3/18/99 1420	3/18/99 1420		
3/18/99 1420	3/18/99 1420		

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, for lab procedure, used in process) Disposed By Date/Time

99

Thermo NUtech - Roc. lats
Radscreen Results

RIN: 99A5187
Analysis. Radscreen
Report Date: 03/17/99

Distribution/Fax. ASD/ 4555
Schluterbusch/2884

Laboratory Sample ID	APO Sample ID			Matrix	Gross Alpha		Gross Beta		Total Activity pCi/g	DOT Class	Refer to Note
	RIN	Event	Bottle		pCi/g	2σ	pCi/g	2σ			Analysis Aliquot (g)
99030223-01	99A5187	047	001	Solid	3 5	2 6	8 3	2.6	17 00	NONRAD	2.0234
99030223-02	99A5187	048	001	Solid	1 0	1 1	1 4	1 1	1 10	NONRAD	2.0228
99030223-03	99A5187	049	001	Solid	3 4	2.7	7 1	2 5	15 70	NONRAD	2 0054

DOT Classification <2000 pCi/g total activity is NONRAD
>= 2000 pCi/g total activity is RAD

Total Activity Calculated as the sum of the gross alpha and beta activities AND the measurement uncertainties for these two measurements
If the measured activity is negative, 0 pCi/g (instead of the negative value) is used to calculate the total activity

Analysis Methods Sample Preparation Procedures. L-6194-I, "Preparation of Oils and Solvents for Analysis of Gross Alpha and Beta Activity" and L-6278-A, "Sample Preparation for Radiological Screening by Gas Proportional Counting"
Counting Procedure L-6295-A, "Operation of Tennelec LB4100 Gas Proportional Counters"

Note: The COC for these samples had special instructions to include the analysis aliquot in the report.

H C Clark /Date 3/17/99
Technical Review

R M Hagglund /Date 3/17/99
Quality Assurance Review

Thermo NUtech - Rocky Flats
RFETS - Building 788D
Golden, Colorado 80402
(303) 966-8880

RP-0002 (11/97)

100

RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C # 99A5187#003

Page 1 of 1

Collector J. HORTON x 3789	Contact/Requester SCHLUTERBUSCH, MIKE / MIKE GRUBE	Telephone No 4215 MSIN FAX 303 966 2864
RIN 99A5187	Sampling Origin Bldg 729	Purchase Order/Charge Code KT95AA00
Project Title BLDG 779 FINAL SURVEY	Logbook No.	Ice Chest No Temp
To (Lab) Thermo NuTech	Method of Shipment	Bill of Lading/Air Bill No.
Protocol		Offsite Property No

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐
WEIGH PORTION OF SAMPLE REMOVED FOR SCREENING TO NEAREST 0.1g OR BETTER. REPORT WEIGHT WITH RESULTS

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
~~99A5187-046 001~~	SJH 3/15/99	~~SOLID~~ SJH 3/15/99	N/A	N/A		~~10-G P/G~~ SJH 3/15/99	~~OS01A003 (Rad-Screen - Soil) [Routine-r screen]~~ SJH 3/15/99	~~None~~ ~~None~~ SJH 3/15/99
99A5187-047 001		SOLID	3/15/99	1600	BLDG 729-10	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-048 001		SOLID	3/15/99	1630	BLDG 729-N	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-049 001		SOLID	3/15/99	1630	BLDG 729-15	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
							COPY	

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/16/99 1010	[signature]	3/16/99 1010				
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time

FINAL SAMPLE DISPOSITION — Disposal Method (e.g. Return to customer per lab procedure used in process) — Disposed By — Date/Time

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Thermo NUtech - Rocky Flats
Radscreen Results

RIN: 99A5187
Analysis: Radscreen
Report Date: 03/09/99

Distribution/Fax. ASD/ 4555
Schluterbusch/2864

Laboratory Sample ID	APO Sample ID			Matrix	Gross Alpha		Gross Beta		Total Activity	DOT Class	Refer to Note
	RIN	Event	Bottle		pCi/g	2σ	pCi/g	2σ	pCi/g		Analysis Aliquot (g)
99030084-01	99A5187	034	001	Solid	5.6	4.5	15	4	29.10	NONRAD	1.0204
99030084-02	99A5187	035	001	Solid	14	3	6.2	1.6	24.80	NONRAD	1.0061
99030084-03	99A5187	036	001	Solid	14	6	11	4	35.00	NONRAD	1.0281
99030084-04	99A5187	037	001	Solid	0.5	0.8	1.5	0.9	3.70	NONRAD	1.0095
99030084-05	99A5187	038	001	Solid	5.7	3.5	11	3	23.20	NONRAD	1.0076
99030084-06	99A5187	039	001	Solid	5.6	4.2	7.4	3.9	21.10	NONRAD	1.0085
99030084-07	99A5187	040	001	Solid	9.9	5.3	15	5	35.20	NONRAD	1.0132
99030084-08	99A5187	041	001	Solid	3.1	3.8	11	4	21.90	NONRAD	1.0110
99030084-09	99A5187	042	001	Solid	3.2	2.8	6.6	2.8	15.40	NONRAD	1.0167
99030084-10	99A5187	043	001	Solid	8.5	4.2	13	4	29.70	NONRAD	1.0252
99030084-11	99A5187	044	001	Solid	2.5	2.1	3.6	2.0	10.20	NONRAD	1.0242
99030084-12	99A5187	045	001	Solid	11	5	13	4	33.00	NONRAD	1.0036
99030084-13	99A5187	046	001	Solid	6.4	4.6	5.2	3.7	19.90	NONRAD	1.0233

DOT Classification <2000 pCi/g total activity is NONRAD
>= 2000 pCi/g total activity is RAD

Total Activity Calculated as the sum of the gross alpha and beta activities AND the measurement uncertainties for these two measurements
If the measured activity is negative 0 pCi/g (instead of the negative value) is used to calculate the total activity

Analysis Methods Sample Preparation Procedures L-6194-I, "Preparation of Oils and Solvents for Analysis of Gross Alpha and Beta Activity" (1 g aliquot) and L-6278-A, "Sample Preparation for Radiological Screening by Gas Proportional Counting"
Counting Procedure L-6295-A, "Operation of Tennelec LB4100 Gas Proportional Counters"

Note The COCs for these samples had special instructions to include the analysis aliquot in the report.

/Date 3/9/99
Technical Review for KM Hoglund

/Date 3/9/99
Quality Assurance Review

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(303) 966-6000

102

ATTACHMENT I

Survey Unit 72902 Survey Package

Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description
Emergency diesel generator room, control room, restroom, hallway, and air lock

SURVEY PACKAGE COVER SHEET

Justification for Survey Unit Classification

Classification Class 1 ☐ Class 2 ☐ Class 3 ☒

The emergency diesel generator room, control room, air lock, hallway, and restroom are not expected to contain any residual radioactive contamination based on site operating history and previous radiological survey Characterization surveys performed between 12/29/97 and 5/27/98 indicated no alpha activity greater than 20dpm/100 cm^2 removable or 100 dpm/100 cm^2 total, and media sample levels (converted to surface contamination levels) from 0 2 to 6 1 dpm/100cm^2 Therefore these areas are classified as Class 3 Refer to the history files for specific details of characterization survey results

Special Support Requirements

Scaffolding or man-lifts will be required to access upper walls

Special Safety Precautions

Fall protection is required for work above 6 ft

Isolation Controls

Level 1 ☐ Level 2 ☒ **Note Isolation controls are not required prior to surface media sampling**

No use, storage or movement of radioactive material, with the exception of instrument check sources, is permitted in this survey unit

Isolation Control may be established seperately for each room in this survey unit Isolation Control signs shall be posted on the entrances to each area within the survey unit prior to the performance of final survey Isolation Control signs shall state that "Approval from the radiological Manager or his designee is required prior to the storage of radioactive material within this area or the transfer of radioactive material through this area"

Grid Requirements

Gridding and labeling is to be performed as indicated on the attached survey unit map(s) If gridding and labeling cannot be performed per the survey unit map(s), contact radiological engineering for assistance Total, removable, and solid media sample numbers will be annotated on the labels at each survey location (e g , each grid intersection)

Survey Package Implementation

[redacted]

2/16/99
Date

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Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description

Emergency diesel generator room, control room, restroom, hallway, and air lock

Amplified Survey Package Design Information

When grid locations fall on areas that are not suited for paint/surface media measurements, the following guidance will be used

- An adjacent suitable location within one meter of the initial location will be used for the paint/surface media sample, and total/removable measurements
- For paint/surface media sample locations that cannot be relocated in accordance with the above guidance, (i e the entire ceiling is unpainted), a smear will be obtained, and a 2nd random start location will be used to obtain the minimum required MARSSIM sample measurements

1-meter by 1-meter grid lines are used on the survey maps for ease of locating sample measurements ~~A 4-meter by 4-meter grid pattern is used for actual measurement density~~ MG 4/27/99

Survey Package Closure

All required reviews are complete, and data analysis results meet acceptance criteria Survey package is authorized for closure

[redacted]

[redacted]	4/9/99 Date
[redacted]	4/20/99 Date

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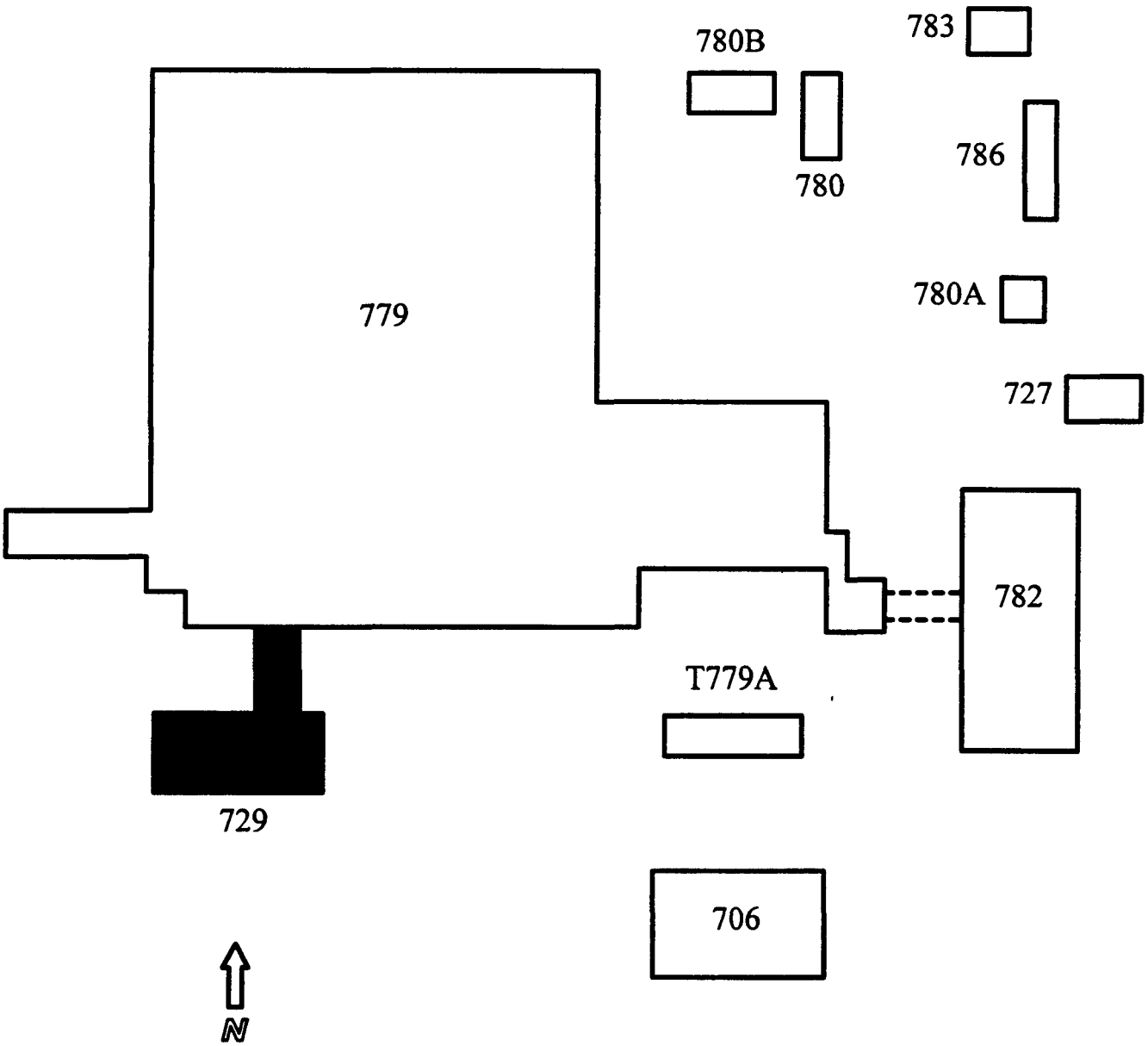
779 CLUSTER OVERVIEW MAP



Survey Area

NOT TO SCALE

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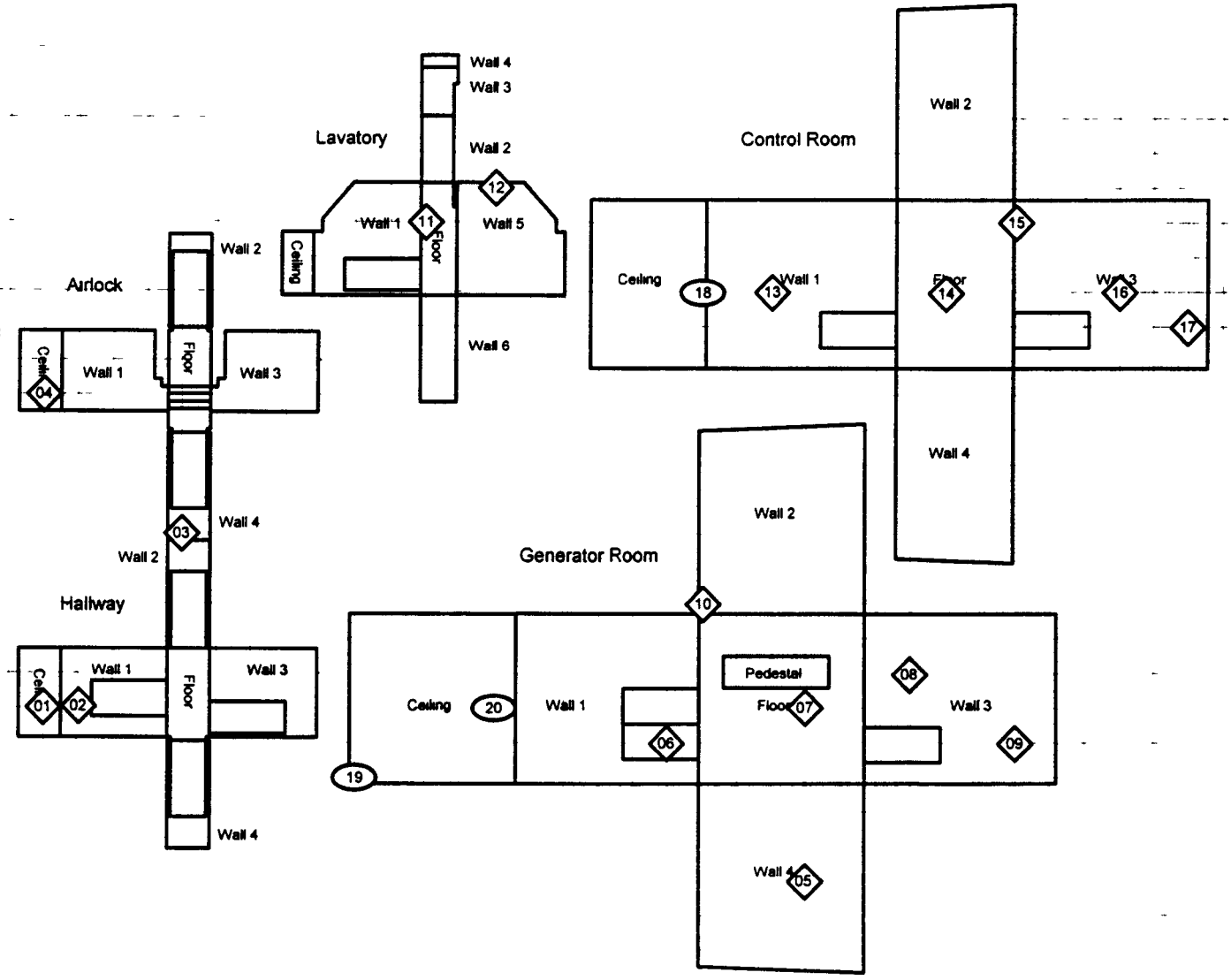
RADIOLOGICAL CLOSEOUT SURVEY PLAN FOR THE 779 CLUSTER

Survey Area A **Survey Unit 72902** **Classification 3**
Building 729
Survey Unit Description Bldg 729 Generator Room, Control Room, Hallway/Airlock & Lavatory

Total Area 362 sq m **Grid Size Not Applicable**

SURVEY UNIT 72902-MAP 1 OF 1



0 FEET 30

0 METERS 10

N

SURVEY MAP LEGEND

- Smear & TSC Location
- Smear TSC & Sample Location
- Open/Inaccessible Area

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Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description

Emergency diesel generator room, control room, restroom, hallway, and air lock

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Sample Measurements Required

Removable Alpha (Pre & Post Media)	Total Alpha (Pre & Post Media)	Media Samples	Alpha Scan
18**/16	16*	16	10%

Removable Contamination and Surface Media Sampling Instructions

The following steps may be performed out of sequence in order to obtain multiple samples

1 RCT – If not already completed, grid and label the survey unit surfaces per the Survey Package Cover Sheet Grid Requirements Section and the attached survey map(s)
2 RCT – If not already completed, mark an approximate 5" by 8" sample area adjacent to each grid intersection
3 RCT – If not already completed, transpose sample numbers from attached survey maps onto the labels at each corresponding grid intersection on the survey unit surfaces
4 RCT - Obtain pre-media sampling 100cm^2 removable alpha smears at each labeled measurement location (within the marked 5" by 8" sample area) *per 3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
5 RCT - Obtain pre-media sampling 100cm^2 total alpha direct measurements at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
6 Media Sampler – Affix a plastic bag, or equivalent, beneath the marked sample area
7 Media Sampler – Using an appropriate sampling tool, remove the surface material to a depth sufficient to expose the base material over the entire sample area Label the sample container and sample location with the necessary information Record the required information on the chain of custody form (COC) and the attached Surface Media Sampling form
8 Media Sampler - After each sample, wipe-down the sampling tool to remove loose sample media and prevent possible sample cross-contamination
9 Media Sampler – Repeat the above steps at each designated sample location
10 Media Sampler - After all survey unit surface media samples have been obtained, forward, the COC forms and the surface media samples to Final Survey Radiological Engineering for processing
11 RCT – Obtain a post-media sampling 100cm^2 removable alpha smear at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
12 RCT – Obtain a post-media sampling 100cm^2 total alpha direct measurement at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
13 RCT – Analyze alpha smears using a two-minute count on a Final Survey Radiological Engineer approved instrument Attach the alpha smear results to the survey package
14 RCT – Record total alpha direct measurements on the attached Surface Media Data form
15 RCT – Complete the attached Instrument Data Sheet for all instrumentation used for this final survey
16 RCT – Complete the attached Survey Signature Sheet and forward the survey package to the RCT Foreman for review
17 RCT – In the event any alpha removable measurement exceeds 20 dpm/100cm^2 or any total activity measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
18 RCT Foreman – Review the final survey package for completeness, complete the attached Survey Signature Sheet and forward the survey package to Final Survey Radiological Engineering for final disposition

* These Pre & post total activity samples are obtained to validate media sampling and are not intended to satisfy MARSSIM requirements Additional surveys will be performed for the MARSSIM total activity requirements

** Additional smears taken on bare surfaces not requiring surface media samples

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Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description

Emergency diesel generator room, control room, restroom, hallway, and air lock

Surface Contamination Monitor (SCM) Survey Instructions

1. Operate the SCM in accordance with written procedures
2. Perform total contamination scan surveys on a minimum of 10% of the accessible walls and floor surfaces
3. In the event any alpha scan measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
4. Complete the attached Instrument Data Sheet for all instrumentation used
5. Complete the attached Survey Signature Sheet and forward the survey package to the Final Survey Radiological Engineer for review

Total Activity Measurement Survey Instructions

1. Acquire a N E Electra with an MDA of < 50-dpm/100 cm^2
2. Obtain total activity and QC measurements (1 minute PATs) at the designated survey locations Record the gross cpm for each location
3. Obtain a minimum of 18 local area backgrounds at the designated locations Record the gross cpm for the local area backgrounds
4. In the event any alpha measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
5. Complete the attached Instrument Data Sheet for all instrumentation used
6. Complete the attached Survey Signature Sheet and forward the survey package to the Final Survey Radiological Engineer for review

[redacted]

4/14/99

Date

109

Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description
Emergency diesel generator room, control room, restroom, hallway, and air lock

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	Eberline	
Model	SAC-4	
Serial #	1411	
Cal Due Date	07-20-99	N/A
Alpha Bkgd	0 0 cpm	
Alpha Eff	33 3%	
Calculated MDA (Max = 10 dpm/100 cm^2)	4 1	
Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]		

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	Electra	Electra	Electra	Electra	Electra
Serial #	2382	2354	2354	2380	2371
Cal Due Date	03-22-99	07-20-99	07-20-99	06-04-99	07-31-99
Date	02-18-99	02-24-99	02-25-99	02-25-99	02-26-99
Alpha Bkgd	0 0 cpm	0 0 cpm	0 0 cpm	0 0 cpm	0 0 cpm
Alpha Efficiency	21 82%	21 74%	21 74%	20 7%	21 2%
Calculated MDA	13 dpm	13 dpm	13 dpm	13 dpm	13 dpm
Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]					

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model & Detector S/N	SCM-2 SRA-C-001	
Cal Date	02-15-99	
Survey Date	02-16-99	N/A
Alpha Bkgd 1 min Full Detector	37 cpm	
Alpha Efficiency	37%	

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Survey Area: A	Survey Unit: 72902	Building 729
Survey Unit Description Emergency diesel generator room, control room, restroom, hallway, and air lock		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	Eberline	
Model		
Serial #		
Cal Due Date		
Alpha Bkgd		
Alpha Eff		
Calculated MDA (Max = 10 dpm/100 cm²)		

N/A

MG 4/15/99

Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	ELECTRA	ELECTRA			
Serial #	2181	2181			
Cal Due Date	7-15-99	7-15-99			
Date	4-14-99	4-15-99			
Alpha Bkgd	00	1.0			
Alpha Efficiency	20.8%	20.8%			
Calculated MDA	13 dpm	36 dpm			

N/A

MG 4/15/99

Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model & Detector S/N	SCM-2 SRA-C-001	
Cal Date	02-15-99	
Survey Date	02-16-99	
Alpha Bkgd 1 min Full Detector	37 cpm	
Alpha Efficiency	37%	

N/A

MG 4/15/99

Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description
Emergency diesel generator room, control room, restroom, hallway, and air lock

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer		
Model		
Serial #		
Cal Due Date		
Alpha Bkgd		
Alpha Eff		
Calculated MDA (Max = 10 dpm/100 cm^2)		

N/A 4/24/99 MG

Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	Electra 1B				
Serial #	1359				
Cal Due Date	8-18-99				
Date	4 23 99				
Alpha Bkgd	1 cpm				
Alpha Efficiency	21 65 %				
Calculated MDA	35 dpm				

N/A MG 4/24/99

Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model & Detector S/N		
Cal Date		
Survey Date		
Alpha Bkgd 1 min Full Detector		
Alpha Efficiency		

N/A 4/24/99 MG

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Survey Area: A	**Building** 729
Survey Unit (s): 72901, 72902, 72903	

Total Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift (Δ/δ) in accordance with MARSSIM, Section 5 5 2 3, as follows

$\Delta/\delta = (DCGL_{TSA} - LBGR_{TSA}) / SD_{TSA}$

$\Delta/\delta_{transuranics} = 2\ 0 = (100\ dpm/100cm^2 - 34\ dpm/100cm^2)/33\ dpm/100cm^2$

Where

Δ/δ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1 and 3)

$DCGL_{TSA}$ is the total surface activity derived concentration guideline value (DOE Order 5400 5 total surface activity limit equals 100 dpm/100cm^2 for transuranics, per the B779 Cluster Radiological Closeout Survey Plan)

$LBGR_{TSA}$ is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor The $LBGR_{TSA}$ was adjusted to obtain a relative shift between 1 and 3 (i e , 34 dpm/100cm^2 for transuranics)

SD_{TSA} is the estimated standard deviation of the total surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available)

Step 2 Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, equals 0 977250 for a relative shift of 2 0

Step 3 Determine the number of total surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula that is based on Plutonium contaminants not being present in the background

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 977250 - 0\ 5)^2 = 11\ 88$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 977250

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

N = 11 88 * 1 2 = 14 25

Conclusion A minimum of 15 Total Surface Activity measurements will be obtained in each of the above survey unit(s)

[redacted]

4/24/99
Date

4/24/99 *
Date

* Late Entry - form originally signed on 4/14/99 mc

113

Survey Area: A	**Building** 729
Survey Unit (s): 72901, 72902, 72903	

Media Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift ($\Delta\delta$) in accordance with MARSSIM Section 5 5 2 3 as follows

Note Since a reference area background subtract will not be used for uranium measurements and since the equation in Section 5 5 2 3 results in a larger number of samples than the equation in Section 5 5 2 1 for a relative shift of 2 0, it is acceptable to use the equation in Section 5 5 2 3 for uranium

$\Delta\delta = (DCGL_{media} - LBGR_{media}) / SD_{media}$

$\Delta\delta_{transuranics} =$ 2 0 = (100 dpm/100cm^2 – 95 7 dpm/100cm^2)/2 15 dpm/100cm^2
$\Delta\delta_{uranium} =$ 2 0 = (5000 dpm/100cm^2 – 4819 9 dpm/100cm^2)/90 04 dpm/100cm^2

Where

$\Delta\delta$ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1and 3)

$DCGL_{media}$ is the total surface activity derived concentration guideline value (DOE Order 5400 5 total surface contamination limit equals 100 dpm/100cm^2 for transuranics and 5000 dpm/100cm^2 for uranium, per the B779 Cluster Radiological Closeout Survey Plan)

$LBGR_{media}$ is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor The $LBGR_{media}$ was adjusted to obtain a relative shift between 1 and 3 (i e , 95 7 dpm/100cm^2 for transuranics and 4819 9 dpm/100cm^2 for uranium)

SD_{media} is the estimated standard deviation of the media surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available) Six paint samples (3 interior and 3 exterior) were taken during the characterization phase of B729 The six samples resulted in a standard deviation of 2 15 for transuranics and 90 04 for uranium

Step 2 Determine the Sign P value by looking up the relative shift ($\Delta\delta$) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, equals 0 977250 for a relative shift of 2 0

Step 3 Determine the number of media surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula that is based on Plutonium contaminants not being present in the background

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 977250 - 0\ 5)^2 = 11\ 88$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 977250

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

N = 11 88 * 1 2 = 14 25

Conclusion: A minimum of 15 media surface activity measurements will be obtained in each of the above survey unit(s)

[redacted]

3/9/99
Date

3/9/99
Date

114

Survey Area: A	**Building** 729
Survey Unit (s): 72901 72902, 72903	

Removable Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift ($\Delta\delta$) in accordance with MARSSIM, Section 5 5 2 3, as follows

$\Delta/\delta = (DCGL_{removable} - LBGR_{removable}) / SD_{removable}$

$\Delta/\delta = 1\ 67 = (20\ dpm/100cm^2 - 10\ dpm/100cm^2)/6\ dpm/100cm^2$

Where

Δ/δ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1and 3)

$DCGL_{removable}$ is the removable surface activity derived concentration guideline value (DOE Order 5400 5 removable surface contamination limit equals 20 dpm/100cm^2 for transuranics)

$LBGR_{removable}$ is the lower bound of the gray region - the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor In order to obtain a relative shift between 1 and 3, and since the surface activity counting instrumentation has a minimum MDA of 50% of DCGL, the chosen LBGR is 50% of the DCGL (i e , 10 dpm/100cm^2 for transuranics)

$SD_{removable}$ is the estimated standard deviation of the removable surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available) Since the B729 scoping or characterization data did not contain actual values less than the MDA of the counting instrument a value of 6 dpm/100cm^2 was used (6 dpm/100cm^2 equals a 30% coefficient of variation of the $DCGL_{removable}$)

Step 2 Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, rounded conservatively, equals 0 945201 for a relative shift of 1 67

Step 3 Determine the number of removable surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula (based on Plutonium contaminants not being present in the background)

$N = (1\ 645 + 1\ 645)^2 / 4(Sign\ P - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 945201 - 0\ 5)^2 = 13\ 65$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 945201

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

$N = 13\ 65 * 1\ 2 = 16\ 38$

Conclusion A minimum of 17 removable surface activity measurements will be obtained in each of the above survey unit(s)

[redacted] 4/8/99 Date

4/8/99 Date

115

Survey Area: A	Survey Unit: 72902	Building: 729

Survey Unit Description

Emergency diesel generator room, control room, restroom, hallway, and air lock

SURVEY SIGNATURE SHEET

Removable Contamination and Surface Media Survey Performed By

[redacted]	2-18-99
	Date
	2-22-99 2-23-99
	Date
	2-24-99
	Date
	2-25-99
	Date
	Date

Surface Contamination Monitor Survey Performed By

[redacted]			4.2.99
			Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
	N/A		
Engineer s Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date

Survey Reviewed By

[redacted]	4/2-99
	Date

110

Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description

Emergency diesel generator room, control room, restroom, hallway, and air lock

Total Surface Contamination Measurements Performed By

[redacted]			4-14-99 Date
			4-15-99 Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

N/A

Survey Reviewed By

[redacted]	4-20-99 Date

117

Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description
Emergency diesel generator room, control room, restroom, hallway, and air lock

SURVEY SIGNATURE SHEET

Removable Contamination and Surface Media Survey Performed By

[redacted]			4-23-99
			Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

N/A

Surface Contamination Monitor Survey Performed By

Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date

N/A

Survey Reviewed By

[redacted]	4-24-99
	Date

118

Survey Area: A	Survey Unit: 72902	Building 729

Survey Unit Description

Emergency diesel generator room, control room, restroom, hallway, and air lock

SURFACE MEDIA DATA FORM

Lab Sample Number	Sample Location Number	Sample Surface Area (in^2)	Pre-Sample Total Activity Measurement ($dpm/100\ cm^2$)	Pre Sample Removable Activity Number	Post Sample Total Activity Measurement ($dpm/100\ cm^2$)	Post Sample Removable Activity Number
99A5D5D-029 001	1	40	<13	1A	<13	1B
99A5D5D-030 001	2	40	<13	2A	<13	2B
99A5D5D-032.001	3	40	<13	3A	<13	3B
99A5D5D-033 001	4	40	<13	4A	<13	4B
99A5D5D-028.001	5	40	<13	5A	<13	5B
99A5D5D-020 001	6	40	<13	6A	<13	6B
99A5D5D-021 001	7	40	<13	7A	<13	7B
99A5D5D-025.001	8	40	<13	8A	<13	8B
NO SAMPLE —	9	40	N/A	9A	N/A	9B
99A5D5D-023 001	10	40	<13	10A	<13	10B
99A5D5D-018 001	11	40	<13	11A	<13	11B
99A5D5D-019.001	12	40	<13	12A	<13	12B
99A5D5D-026 001	13	40	<13	13A	<13	13B
99A5D5D-022 001	14	40	<13	14A	<13	14B
99A5D5D-024 001	15	40	<13	15A	<13	15B
99A5D5D-027 001	16	40	<13	16A	<13	16B
99A5D5D-031.001	17	40	<13	17A	<13	17B
Smear only	18	-	-	-	-	-
NO SAMPLE —	19	N/A	N/A	N/A	N/A	N/A
Smear only	20	-	-	-	-	-

Remarks SAMPLE LOCATIONS #09 AND #19 WERE INACCESSABLE DUE TO HIGH VOLTAGE LINES WITHIN 10 FT OF SAMPLE LOCATIONS. SQM 2/25/99

SAMPLES 18 AND 20 WERE SMEARS ONLY. NO SOLID MEDIA SAMPLES WERE TAKEN BECAUSE THESE AREAS WERE ON UNPAINTED CONCRETE SURFACES. SQM 2/25/99

Sampling Performed By

[redacted]			2/25/99 Date
Printed Name	Employee #	Signature	Date

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Surface Media Survey Results

Survey Unit	Sample Location	Pre-Sample Results			Post-Sample Results		
		Total Activity (dpm/100 cm²)	Removable Activity (dpm/100 cm²)	MDA	Total Activity (dpm/100 cm²)	Removable Activity (dpm/100 cm²)	MDA
72902	1	< 13	0.0	4.1	< 13	0.0	4.1
72902	2	< 13	0.0	4.1	< 13	1.5	4.1
72902	3	< 13	1.5	4.1	< 13	0.0	4.1
72902	4	< 13	0.0	4.1	< 13	1.5	4.1
72902	5	< 13	0.0	4.1	< 13	0.0	4.1
72902	6	< 13	1.5	4.1	< 13	1.5	4.1
72902	7	< 13	0.0	4.1	< 13	1.5	4.1
72902	8	< 13	1.5	4.1	< 13	0.0	4.1
72902	9 #						
72902	10	< 13	3.0	4.1	< 13	0.0	4.1
72902	11	< 13	0.0	4.1	< 13	0.0	4.1
72902	12	< 13	0.0	4.1	< 13	0.0	4.1
72902	13	< 13	1.5	4.1	< 13	0.0	4.1
72902	14	< 13	0.0	4.1	< 13	1.5	4.1
72902	15	< 13	1.5	4.1	< 13	0.0	4.1
72902	16	< 13	0.0	4.1	< 13	1.5	4.1
72902	17	< 13	0.0	4.1	< 13	1.5	4.1
72902	18 **		1.5	4.1			
72902	19 #						
72902	20 **		0.0	4.1			

** *Survey measurements 18 and 20 were smears only No solid media samples were obtained due to unpainted concrete surfaces*

Survey measurements 9 and 19 were inaccessable due to high voltage lines within 10 feet of sample locations

TRANSURANIC LIMIT = 100 **TRANSURANIC LIMIT = 100**

Data Entered By [redacted] 4-2-99 Date

Data Reviewed By [redacted] 4/5/99 Date

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Survey Area 'A' Building 729 Surface ~~Media~~ Survey Results

Survey Unit	~~Sample~~ Location	~~Sample Results~~ Total Activity (cpm)	Local Area Background (cpm)
72902	1	3	0
72902	2	2	3
72902	3	3	1
72902	4	2	0
72902	5	1	3
72902	6	3	3
72902	7	1	1
72902	8	5	1
72902	9		
72902	10	1	2
72902	11	0	2
72902	12	4	1
72902	13	1	1
72902	14	0	2
72902	15	0	2
72902	16	2	1
72902	17	2	2
72902	18	5	2
72902	19		
72902	20	8	1

QC CPM

2 #5

1 #14

Superceded on 4/24/99

Data Entered By [redacted] 4/14/99 Date

Data Reviewed By [redacted] 4/19/99 Date

Printed Name Employee # Signature

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Total Activity

Survey Area 'A' Building 729 Surface ~~Media~~ Survey Results

MG 4/27/99

Survey Unit	Measurement ~~Sample~~ Location MC 4/27/99	Total Activity Measurements (cpm)	Total Activity Quality Control Measurements (cpm)	Local Area Background (cpm)
72902	1			
72902	2			N/A MG 4/24/99
72902	3			
72902	4		N/A 4/24/99 MG	
72902	5			
72902	6			
72902	7			
72902	8		5	5
72902	9			
72902	10		N/A 4/24/99 MC	NA NA
72902	11	N/A 4/24/99 MG		
72902	12		4	0
72902	13			
72902	14			
72902	15			N/A 4/24/99 MG
72902	16		NA 4/24/99 MG	
72902	17			
72902	18			
72902	19			
72902	20			

Measurements Obtained By [redacted] 4-23-99

Printed Name Employee # Signature Date

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SURVEY UNIT 72902
RANDOM START DATA SHEET

Measurement Location	X-Coordinate	Y-Coordinate	Measurement Location	X-Coordinate	Y-Coordinate
N/A	17	26	N/A	32	16
#11	13	23	#16	33	21
N/A	1	13	X-N/A	34	19
#15	30	23		17	10
N/A	1	0		24	22
#05	24	4		24	11
N/A	26	3		3	27
#04	2	18		27	12
#09	30	8		10	28
N/A	26	2		3	27
#17	35	20		22	9
N/A	18	27		28	24
N/A	5	7		34	7
#07	24	9		2	17
#12	15	24		2	0
N/A	9	8		18	18
N/A	12	14		23	27
#02	3	9		3	15
N/A	2	22		21	10
#20	15	9		20	1
N/A	18	24		31	27
N/A	5	15		5	11
N/A	34	16		15	21
#14	28	21		3	1
#19	11	7		28	14
#13	23	21		24	17
N/A	26	27		2	14
#10	21	12		33	28
N/A	31	0		25	25
N/A	3	14		9	3
#08	27	10		3	6
N/A	14	4		8	6
#06	20	8		27	3
#01	2	9		16	24
N/A	10	8		4	26
N/A	29	12		5	19
#03	6	14		10	20
#18	21	21		15	22
N/A	25	28		6	7
N/A	4	14		12	9

LEGEND 2/15/99

C-N/A = UNPAINTED CEILING
X-N/A = > NUMBER OF SAMPLES REQUIRED

REVIEWED BY SIGNATURE
2/15/99

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SURVEY UNIT 72902
RANDOM START DATA SHEET

Measurement Location	X-Coordinate	Y-Coordinate	Measurement Location	X-Coordinate	Y-Coordinate
N/A	17	26	N/A	32	16
#11	13	23	#16	33	21
N/A	1	13	X-N/A	34	19
#15	30	23		17	10
N/A	1	0		24	22
#05	24	4		24	11
N/A	26	3		3	27
#04	2	18		27	12
#09	30	8		10	28
N/A	26	2		3	27
#17	35	20		22	9
N/A	18	27		28	24
N/A	5	7		34	7
#07	24	9		2	17
#12	15	24		2	0
N/A	9	8		18	18
N/A	12	14		23	27
#02	3	9		3	15
N/A	2	22		21	10
#20	15	9		20	1
N/A	18	24		31	27
N/A	5	15		5	11
N/A	34	16		15	21
#14	28	21		3	1
#19	11	7		28	14
#13	23	21		24	17
N/A	26	27		2	14
#10	21	12		33	28
N/A	31	0		25	25
N/A	3	14		9	3
#08	27	10		3	6
N/A	14	4		8	6
#06	20	8		27	3
#01	2	9		16	24
N/A	10	8		4	26
N/A	29	12		5	19
#03	6	14		10	20
#18	21	21		15	22
N/A	25	28		6	7
N/A	4	14		12	9

LEGEND 2/15/99

C-N/A = UNPAINTED CEILING
X-N/A = > NUMBER OF SAMPLES REQUIRED

REVIEWED BY SIGNATURE
2/15/99

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COVER PAGE

Sanford Cohen & Associates
Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code SCA Subcontract Number KH700325EP6

RIN 99A5050
LIC RC01B004
Laboratory Report Identification Code 1480, 1481, 1482, 1483, 1488, 1489, 1500

Sample Matrix Waste

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-001 001 Bldg 729	KH199-1480-01	KH199-1480-01	KH199-1480-01
99A5050-002 001 Bldg 729	KH199-1480-02	KH199-1480-02	KH199-1480-02
99A5050-003 001 Bldg 729	KH199-1480-03	KH199-1480-03	KH199-1480-03
99A5050-004 001 Bldg 729	KH199-1480-04	KH199-1480-04	KH199-1480-04
99A5050-005 001 Bldg 729	KH199-1480-05	KH199-1480-05	KH199-1480-05
99A5050-006 001 Bldg 729	KH199-1480-06	KH199-1480-06	KH199-1480-06
99A5050-007 001 Bldg 729	KH199-1480-07	KH199-1480-07	KH199-1480-07
99A5050-008 001 Bldg 729	KH199-1480-08	KH199-1480-08	KH199-1480-08
99A5050-009 001 Bldg 729	KH199-1480-09	KH199-1480-09	KH199-1480-09
99A5050-010 001 Bldg 729	KH199-1480-10	KH199-1480-10	KH199-1480-10
Laboratory Control Sample (LC)	SCAQC-1480-LC1	SCAQC-1480-LC1	SCAQC-1480-LC1
Duplicate (LD)	SCAQC-1480-LD1	SCAQC-1480-LD1	SCAQC-1480-LD1
Preparation Blank (PB)	SCAQC-1480-PB	SCAQC-1480-PB	SCAQC-1480-PB

72903

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-011 001 Bldg 729	KH199-1481-01	KH199-1481-01	KH199-1481-01
99A5050-012 001 Bldg 729	KH199-1481-02	KH199-1481-02	KH199-1481-02
99A5050-013 001 Bldg 729	KH199-1481-03	KH199-1481-03	KH199-1481-03
99A5050-014 001 Bldg 729	KH199-1481-04	KH199-1481-04	KH199-1481-04
99A5050-015 001 Bldg 729	KH199-1481-05	KH199-1481-05	KH199-1481-05
99A5050-016 001 Bldg 729	KH199-1481-06	KH199-1481-06	KH199-1481-06
99A5050-017 001 Bldg 729	KH199-1481-07	KH199-1481-07	KH199-1481-07
99A5050-018 001 Bldg 729	KH199-1481-08	KH199-1481-08	KH199-1481-08
99A5050-019 001 Bldg 729	KH199-1481-09	KH199-1481-09	KH199-1481-09
99A5050-020 001 Bldg 729	KH199-1481-10	KH199-1481-10	KH199-1481-10
Laboratory Control Sample (LC)	SCAQC-1481-LC1	SCAQC-1481-LC1	SCAQC-1481-LC1
Duplicate (LD)	SCAQC-1481-LD1	SCAQC-1481-LD1	SCAQC-1481-LD1
Preparation Blank (PB)	SCAQC-1481-PB	SCAQC-1481-PB	SCAQC-1481-PB

72902

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COVER PAGE (Continued)

Sanford Cohen & Associates
Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code SCA Subcontract Number KH700325EP6

RIN 99A5050
LIC RC01B004
Laboratory Report Identification Code 1480, 1481, 1482, 1483, 1488, 1489, 1500

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-021 001 Bldg 729	KH199-1482-01	KH199-1482-01	KH199-1482-01
99A5050-022 001 Bldg 729	KH199-1482-02	KH199-1482-02	KH199-1482-02
99A5050-023 001 Bldg 729	KH199-1482-03	KH199-1482-03	KH199-1482-03
99A5050-024 001 Bldg 729	KH199-1482-04	KH199-1482-04	KH199-1482-04
99A5050-025 001 Bldg 729	KH199-1482-05	KH199-1482-05	KH199-1482-05
99A5050-026 001 Bldg 729	KH199-1482-06	KH199-1482-06	KH199-1482-06
99A5050-027 001 Bldg 729	KH199-1482-07	KH199-1482-07	KH199-1482-07
99A5050-028 001 Bldg 729	KH199-1482-08	KH199-1482-08	KH199-1482-08
99A5050-029 001 Bldg 729	KH199-1482-09	KH199-1482-09	KH199-1482-09
99A5050-030 001 Bldg 729	KH199-1482-10	KH199-1482-10	KH199-1482-10
Laboratory Control Sample (LC)	SCAQC-1482-LC1	SCAQC-1482-LC1	SCAQC-1482-LC1
Duplicate (LD)	SCAQC-1482-LD1	SCAQC-1482-LD1	SCAQC-1482-LD1
Preparation Blank (PB)	SCAQC-1482-PB	SCAQC-1482-PB	SCAQC-1482-PB

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-031 001 Bldg 729	KH199-1483-01	KH199-1483-01	KH199-1483-01
99A5050-032 001 Bldg 729	KH199-1483-02	KH199-1483-02	KH199-1483-02
99A5050-033 001 Bldg 729	KH199-1483-03	KH199-1483-03	KH199-1483-03
Laboratory Control Sample (LC)	SCAQC-1483-LC1	SCAQC-1483-LC1	SCAQC-1483-LC1
Duplicate (LD)	SCAQC-1483-LD1	SCAQC-1483-LD1	SCAQC-1483-LD1B
Preparation Blank (PB)	SCAQC-1483-PB	SCAQC-1483-PB	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	018 001				
Other Sample ID	BLDG 729	Collection Date	2/18/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-08	0 353	0 150	0 166	0 040
ACW03	U-235	KH199-1481-08	0 018	0 036	0 037	0 049
ACW03	U-238	KH199-1481-08	0 190	0 108	0 115	0 040
ACW03	PU-239/240	KH199-1481-08	0 223	0 131	0 138	0 046
ACW03	AM-241	KH199-1481-08	0 069	0 079	0 081	0 093

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	019 001				
Other Sample ID	BLDG 729	Collection Date	2/18/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-09	0 648	0 239	0 272	0 091
ACW03	U-235	KH199-1481-09	0 046	0 066	0 067	0 063
ACW03	U-238	KH199-1481-09	0 504	0 206	0 229	0 051
ACW03	PU-239/240	KH199-1481-09	0 010	0 039	0 039	0 086
ACW03	AM-241	KH199-1481-09	0 068	0 191	0 191	0 303

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	021 001				
Other Sample ID	BLDG 729	Collection Date	2/23/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-01	0 558	0 196	0 225	0 072
ACW03	U-235	KH199-1482-01	0 018	0 037	0 037	0 050
ACW03	U-238	KH199-1482-01	0 325	0 144	0 158	0 040
ACW03	PU-239/240	KH199-1482-01	0 373	0 152	0 169	0 035
ACW03	AM-241	KH199-1482-01	0 150	0 098	0 103	0 068

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	022 001				
Other Sample ID	BLDG 729	Collection Date	2/23/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-02	0 173	0 102	0 107	0 066
ACW03	U-235	KH199-1482-02	0 000	0 000	0 000	0 046
ACW03	U-238	KH199-1482-02	0 301	0 133	0 146	0 037
ACW03	PU-239/240	KH199-1482-02	0 111	0 093	0 096	0 050
ACW03	AM-241	KH199-1482-02	0 016	0 140	0 140	0 239

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	023 001				
Other Sample ID	BLDG 729	Collection Date	2/23/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-03	0 499	0 164	0 192	0 057
ACW03	U-235	KH199-1482-03	0 029	0 041	0 042	0 039
ACW03	U-238	KH199-1482-03	0 672	0 193	0 235	0 056
ACW03	PU-239/240	KH199-1482-03	-0 024	0 034	0 034	0 163
ACW03	AM-241	KH199-1482-03	0 077	0 091	0 092	0 070

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	024 001				
Other Sample ID	BLDG 729	Collection Date	2/23/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-04	0 465	0 160	0 185	0 033
ACW03	U-235	KH199-1482-04	0 054	0 062	0 064	0 073
ACW03	U-238	KH199-1482-04	0 354	0 137	0 154	0 033
ACW03	PU-239/240	KH199-1482-04	0 035	0 074	0 075	0 126
ACW03	AM-241	KH199-1482-04	-0 018	0 069	0 069	0 160

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	025 001				
Other Sample ID	BLDG 729	Collection Date	2/23/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-05	0 865	0 235	0 292	0 036
ACW03	U-235	KH199-1482-05	0 032	0 046	0 047	0 044
ACW03	U-238	KH199-1482-05	1 04	0 263	0 336	0 035
ACW03	PU-239/240	KH199-1482-05	0 020	0 037	0 038	0 061
ACW03	AM-241	KH199-1482-05	0 081	0 090	0 092	0 117

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	026 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-06	1 00	0 287	0 350	0 079
ACW03	U-235	KH199-1482-06	0 040	0 057	0 058	0 054
ACW03	U-238	KH199-1482-06	1 18	0 316	0 395	0 044
ACW03	PU-239/240	KH199-1482-06	0 040	0 047	0 048	0 037
ACW03	AM-241	KH199-1482-06	0 081	0 086	0 087	0 106

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	027 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-07	0 965	0 257	0 322	0 066
ACW03	U-235	KH199-1482-07	0 034	0 048	0 049	0 046
ACW03	U-238	KH199-1482-07	0 899	0 245	0 304	0 037
ACW03	PU-239/240	KH199-1482-07	0 022	0 043	0 044	0 059
ACW03	AM-241	KH199-1482-07	0 037	0 086	0 086	0 145

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	028 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-08	0 311	0 138	0 151	0 067
ACW03	U-235	KH199-1482-08	0 000	0 000	0 000	0 046
ACW03	U-238	KH199-1482-08	0 488	0 175	0 200	0 066
ACW03	PU-239/240	KH199-1482-08	0 009	0 034	0 034	0 077
ACW03	AM-241	KH199-1482-08	0 057	0 096	0 097	0 147

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number: 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	029 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-09	0 301	0 128	0 141	0 034
ACW03	U-235	KH199-1482-09	0 009	0 034	0 034	0 075
ACW03	U-238	KH199-1482-09	0 362	0 141	0 158	0 034
ACW03	PU-239/240	KH199-1482-09	0 025	0 051	0 051	0 069
ACW03	AM-241	KH199-1482-09	0 054	0 134	0 134	0 219

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	030 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1482	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1482-10	0 557	0 190	0 221	0 039
ACW03	U-235	KH199-1482-10	0 035	0 050	0 051	0 048
ACW03	U-238	KH199-1482-10	0 654	0 208	0 246	0 039
ACW03	PU-239/240	KH199-1482-10	0 038	0 054	0 054	0 051
ACW03	AM-241	KH199-1482-10	0 081	0 110	0 111	0 155

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Pu	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB
Am	SCAQC-1482-LC1	SCAQC-1482-LD1	SCAQC-1482-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	031 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1483	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1483-01	0 711	0 223	0 264	0 071
ACW03	U-235	KH199-1483-01	0 036	0 051	0 052	0 049
ACW03	U-238	KH199-1483-01	0 510	0 183	0 210	0 040
ACW03	PU-239/240	KH199-1483-01	0 000	0 000	0 000	0 066
ACW03	AM-241	KH199-1483-01	0 023	0 045	0 046	0 061

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	032 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1483	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1483-02	0 240	0 127	0 136	0 074
ACW03	U-235	KH199-1483-02	0 000	0 000	0 000	0 051
ACW03	U-238	KH199-1483-02	0 306	0 142	0 155	0 042
ACW03	PU-239/240	KH199-1483-02	0 000	0 000	0 000	0 044
ACW03	AM-241	KH199-1483-02	0 044	0 108	0 108	0 178

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	033 001				
Other Sample ID	BLDG 729	Collection Date	2/24/99	Date Received	3/2/99
		Batch Number	1483	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1483-03	0 266	0 129	0 140	0 069
ACW03	U-235	KH199-1483-03	0 018	0 035	0 036	0 048
ACW03	U-238	KH199-1483-03	0 086	0 071	0 073	0 039
ACW03	PU-239/240	KH199-1483-03	-0 007	0 014	0 014	0 079
ACW03	AM-241	KH199-1483-03	-0 018	0 072	0 073	0 168

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Pu	SCAQC-1483-LC1	SCAQC-1483-LD1	SCAQC-1483-PB
Am	SCAQC-1483-LC1	SCAQC-1483-LD1B	SCAQC-1483-PB

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Radioanalytical Results

Report Identification Number: 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number:	99A5050#001	Matrix	Waste
Site Sample ID	020 001				
Other Sample ID	BLDG 729	Collection Date	2/23/99	Date Received	3/2/99
		Batch Number:	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-10	0 412	0 198	0 214	0 107
ACW03	U-235	KH199-1481-10	0 027	0 055	0 055	0 074
ACW03	U-238	KH199-1481-10	0 154	0 118	0 122	0 060
ACW03	PU-239/240	KH199-1481-10	0 085	0 086	0 087	0 058
ACW03	AM-241	KH199-1481-10	0 068	0 079	0 080	0 062

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99A[illegible]7#001

RIN	Contact/Requestor	Telephone No	MSIN	FAX
99A5187	SCHLUTERBUSCH, MIKE	4215		

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5187-008 001	N/A	SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-009 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-010 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-011 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-012 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-013 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-014 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-015 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-016 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-017 001	N/A	SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-018 001		SOLID	2/18/99	1230	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/25/99 1325	[signature] TNU	2/25/99 1325				

FINAL SAMPLE DISPOSITION	Disposal Method (e g , Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

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COPY

RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99A5187#001

RIN 99A5187 | Contact/Requestor SCHLUTERBUSCH, MIKE | Telephone No 4215 | MSIN | FAX

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5187-019 001		SOLID	2/18/99	1230	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-020 001		SOLID	2/23/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-021 001		SOLID	2/23/99	0930	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-022 001		SOLID	2/23/99	1000	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-023 001		SOLID	2/23/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-024 001		SOLID	2/23/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-025 001		SOLID	2/23/99	1300	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-026 001		SOLID	2/24/99	0800	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-027 001		SOLID	2/24/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-028 001		SOLID	2/24/99	0930	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-029 001		SOLID	2/24/99	1000	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/25/99 1325	[signature]	2/25/99 1325				

FINAL SAMPLE DISPOSITION	Disposal Method (e g , Return to customer per lab procedure, used in process)	Disposed By	Date/Time

144

RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COPY

COC # 99A5187#001

RIN	Contact/Requestor	Telephone No	MSIN	FAX
99A5187	SCHLUTERBUSCH, MIKE	4215		

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
99A5187-030 001		SOLID	2/24/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-031 001		SOLID	2/24/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-032 001		SOLID	2/24/99	1600	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-033 001		SOLID	2/24/99	1600	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-034 001	N/A	SOLID	N/A	N/A	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-035 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-036 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-037 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-038 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-039 001		SOLID			Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-040 001	N/A	SOLID	N/A	N/A	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[illegible]	2/25/99 1325	[illegible]	2/25/99 1325				

FINAL SAMPLE DISPOSITION	Disposal Method (e g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99A5 #001

Page 1 of 4

llector J HORTON x2863	Contact/Requester Mike Schluterbusch x4215 / M. GRUBE x2863	Telephone No 4215 MSIN	FAX 303 966 2864
N 99A5050	Sampling Origin Building 729	Purchase Order/Charge Code KT95AA00	
ject Title 779 CLUSTER FINAL SURVEY	Logbook No	Ice Chest No	Temp
(Lab) S Cohen & Associates	Method of Shipment	Bill of Lading/Air Bill No	
otocol		Offsite Property No	

SSIBLE SAMPLE HAZARDS/REMARKS
* **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐
WEIGH SAMPLES TO NEAREST 0.1g BEFORE ANALYSIS REPORT TOTAL WEIGHT WITH RESULTS

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
9A5050-01 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-02 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-03 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-04 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-05 001		WASTE	2/12/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-06 001		WASTE	2/12/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-07 001		WASTE	2/12/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
	3/1/99 1400		3/1/99 1400				

FINAL SAMPLE DISPOSITION: Disposal Method (e g , Return to customer, per lab procedure used in process) Disposed By Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99A5050-001

N 99A5050

Contact/Requestor Mike Schluterbusch / MIKE GRUBE

Telephone No 4215 / 2863

MSIN

FAX 303 961 2864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
9A5050-08 001		WASTE	2/9/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-09 001		WASTE	2/9/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-10 001		WASTE	2/8/99	1330	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-11 001		WASTE	2/8/99	1330	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-12 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-13 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-14 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-15 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-16 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-17 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
9A5050-18 001		WASTE	2/18/99	1230	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/1/99 1400	[signature]	3/1/99 1400				

FINAL SAMPLE DISPOSITION: Disposal Method (e g Return to customer per lab procedure used in process) | Disposed By | Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99A [illegible]#001

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RIN 99A5050

Contact/Requestor Mike Schluterbusch / MIKE GRUBE

Telephone No 4215 / 2863

MSIN

FAX 303 966 2864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
99A5050-019 001		WASTE	2/18/99	1230	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-020 001		WASTE	2/23/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-021 001		WASTE	2/23/99	0930	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-022 001		WASTE	2/23/99	1000	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-023 001		WASTE	2/23/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-024 001		WASTE	2/23/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-025 001		WASTE	2/23/99	1300	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-026 001		WASTE	2/24/99	0800	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-027 001		WASTE	2/24/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-028 001		WASTE	2/24/99	0930	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-029 001		WASTE	2/24/99	1000	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/1/99 1400	[signature]	3/1/99 1400				
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time

FINAL SAMPLE DISPOSITION: Disposal Method (e g Return to customer per lab procedure used in process) | Disposed By | Date/Time

RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99A 0#001

Page 4 of ~~3~~ 4

RIN	Contact/Requestor	Telephone No	MSIN	FAX
99A5050	Mike Schluterbusch / MIKE GRUBE	4215 / 2865		303 966 2864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
99A5050-030 001		WASTE	2/24/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-031 001		WASTE	2/24/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-032 001		WASTE	2/24/99	1600	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-033 001		WASTE	2/24/99	1600	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-034 001	N/A	WASTE	N/A	N/A	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-035 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-036 001		WASTE			Bldg 729 N/A	10-G P/G N/A	RC01B004 (Isotopic Waste) [Priority] N/A	None 4 degrees C N/A
99A5050-037 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-038 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-039 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-040 001	N/A	WASTE	N/A	N/A	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/1/99 1400	[signature]	3-1-99 1400				
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time

FINAL SAMPLE DISPOSITION	Disposal Method (e g Return to customer per lab procedure used in process)	Disposed By	Date/Time

Thermo NUtech - Rocky Flats
Radscreen Results

COPY

RIN 99A5187
Analysis Radscreen
Report Date 03/01/99

Distribution/Fax ASD/ 4555

Laboratory Sample ID	APO Sample ID RIN	Event	Bottle	Matrix	Gross Alpha pCi/g	2σ	Gross Beta pCi/g	2σ	Total Activity pCi/g	DOT Class	Refer to Note Analysis Aliquot (g)
99020305-01	99A5187	018	001	Solid	4 3	2 7	3 8	2 3	13 10	NONRAD	1 0279
99020305-02	99A5187	019	001	Solid	3 8	3 6	6 7	3 6	17 70	NONRAD	1 0060
99020305-03	99A5187	020	001	Solid	1 4	2 0	3 2	1 9	8 50	NONRAD	1 0512
99020305-04	99A5187	021	001	Solid	4 2	2 5	4 3	2 1	13 10	NONRAD	1 0012
99020305-05	99A5187	022	001	Solid	3 3	2 3	2 9	2 1	10 60	NONRAD	1 0137
99020305-06	99A5187	023	001	Solid	6 3	3 9	7 7	3 8	21 70	NONRAD	1 0217
99020305-07	99A5187	024	001	Solid	2 8	3 3	3 0	3 5	12 60	NONRAD	1 0197
99020305-08	99A5187	025	001	Solid	7 1	3 8	14	4	28 30	NONRAD	1 0333
99020305-09	99A5187	026	001	Solid	12	5	19	4	40 00	NONRAD	1 0058
99020305-10	99A5187	027	001	Solid	6 4	3 9	7 8	3 7	21 80	NONRAD	1 0276
99020305-11	99A5187	028	001	Solid	3 9	3 3	9 6	2 9	19 70	NONRAD	1 0062
99020305-12	99A5187	029	001	Solid	8 0	4 4	5 7	3 7	21 80	NONRAD	1 0086
99020305-13	99A5187	030	001	Solid	7 5	3 5	9 4	2 8	23 20	NONRAD	1 0106
99020305-14	99A5187	031	001	Solid	7 3	4 1	5 4	3 5	20 30	NONRAD	1 0256
99020305-15	99A5187	032	001	Solid	1 3	2 8	4 0	2 9	11 00	NONRAD	1 0296
99020305-16	99A5187	033	001	Solid	2 8	3 9	4 7	3 6	15 00	NONRAD	1 0363

DOT Classification <2000 pCi/g total activity is NONRAD
>= 2000 pCi/g total activity is RAD

Total Activity Calculated as the sum of the gross alpha and beta activities AND the measurement uncertainties for these two measurements
If the measured activity is negative 0 pCi/g (instead of the negative value) is used to calculate the total activity

Analysis Methods Sample Preparation Procedures L-6194 I "Preparation of Oils and Solvents for Analysis of Gross Alpha and Beta Activity" (1 g aliquot) and
L-6278-A "Sample Preparation for Radiological Screening by Gas Proportional Counting"
Counting Procedure L-6295-A "Operation of Tennelec LB4100 Gas Proportional Counters"

Note The COCs for these samples did not have any speical instructions However during data review it was noted that previous samples received under RIN 99A5187 had special instructions to report the quantity of sample which was received to the nearest 0 1 g For the previous set of samples this request was discussed with Mike Schluterbusch It was agreed that due to the difficulty in directly weighing the sample without potentially compromising the sample integrity TNU would include the analysis aliquot, which was used for the analyses in the report. This weight will then be added to the sample weight which will be measured by the offsite laboratory that is doing the isotopic analyses on these samples For the previous set of samples the samples were also weighed upon receipt and an estimate of the total sample taken was estimated However since there were no special instructions on the COCs received with these samples the samples were not weighed upon receipt The analysis aliquot is included in the report.

K M Hagglund /Date 3/1/99
Technical Review

Ronald L. Taylor /Date 3/1/99
Quality Assurance Review

Thermo NUtech Rocky Flats
RFETS Building 1889D
Golden, Colorado 80402
(303) 966-6860

RF-2002 (11/97)

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ATTACHMENT J

Survey Unit 72903 Survey Package

Survey Area: A	Survey Unit: 72903	Building 729

Survey Unit Description
Bldg 729 exterior walls and roof

SURVEY PACKAGE COVER SHEET

Justification for Survey Unit Classification

Classification Class 1 ☐ Class 2 ☒ Class 3 ☐

B729 exterior walls and roof have a potential for radioactive contamination since they are located downwind from past radiological release points (e g , B776 glovebox fire release and Solar Pond releases)
Radiological characterization data was obtained on the exterior surfaces of B729 walls from 3/10/98-5/27/98
Results of the characterization data showed all removable surface contamination levels < 20 dpm/100cm^2, all total surface contamination levels < 100dpm/100cm^2, and media sample levels (converted to surface contamination levels) from 0 2 to 6 1 dpm/100cm^2 Refer to the history files for further details of characterization survey results

Since the B729 exterior walls and roof have a potential for radioactive contamination, and since radiological characterization data taken on B729 exterior surfaces did not indicate any measurements greater than the $DCGL_W$, this survey unit is being classified as a Class 2

Special Support Requirements

Scaffolding or man-lifts will be required to access upper walls

Special Safety Precautions

Fall protection is required for work above 6 ft

Isolation Controls

Level 1 ☐ Level 2 ☒ **Note Isolation controls are not required prior to surface media sampling**

No use, storage or movement of radioactive material, with the exception of instrument check sources, is permitted in this survey unit
Final configuration of this area is to be maintained Authorization shall be obtained prior to the removal of components from this area
Isolation Control signs shall be posted on the exterior walls of B729 at approximately 10-meter intervals
Isolation Control signs shall state that " Approval from the radiological Manager or his designee is required prior to storage or transfer of radioactive material within 3 meters of this building"

Grid Requirements

Gridding and labeling is to be performed as indicated on the attached survey unit map(s) If gridding and labeling cannot be performed per the survey unit map(s), contact radiological engineering for assistance
Total, removable, and solid media sample numbers will be annotated on the labels at each survey location (e g , each grid intersection)

Survey Package Implementation

This survey package is ready for implementation

[redacted] 2/2/99
Date

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Survey Area: A	Survey Unit: 72903	Building 729

Survey Unit Description

Bldg 729 exterior walls and roof

Amplified Survey Package Design Information

When grid locations fall on areas that are not suited for paint/surface media measurements, the following guidance will be used

- An adjacent suitable location within one meter of the initial location will be used for the paint/surface media sample, and total/removable measurements
- For paint/surface media sample locations that cannot be relocated in accordance with the above guidance, (i e the entire ceiling is unpainted), a smear will be obtained, and a 2nd random start location will be used to obtain the minimum required MARSSIM sample measurements

1-meter by 1-meter grid lines are used on the survey maps for ease of locating sample measurements A 7-meter by 7-meter grid pattern is used for actual measurement density

[redacted]	4/9/99 Date
	4/20/99 Date

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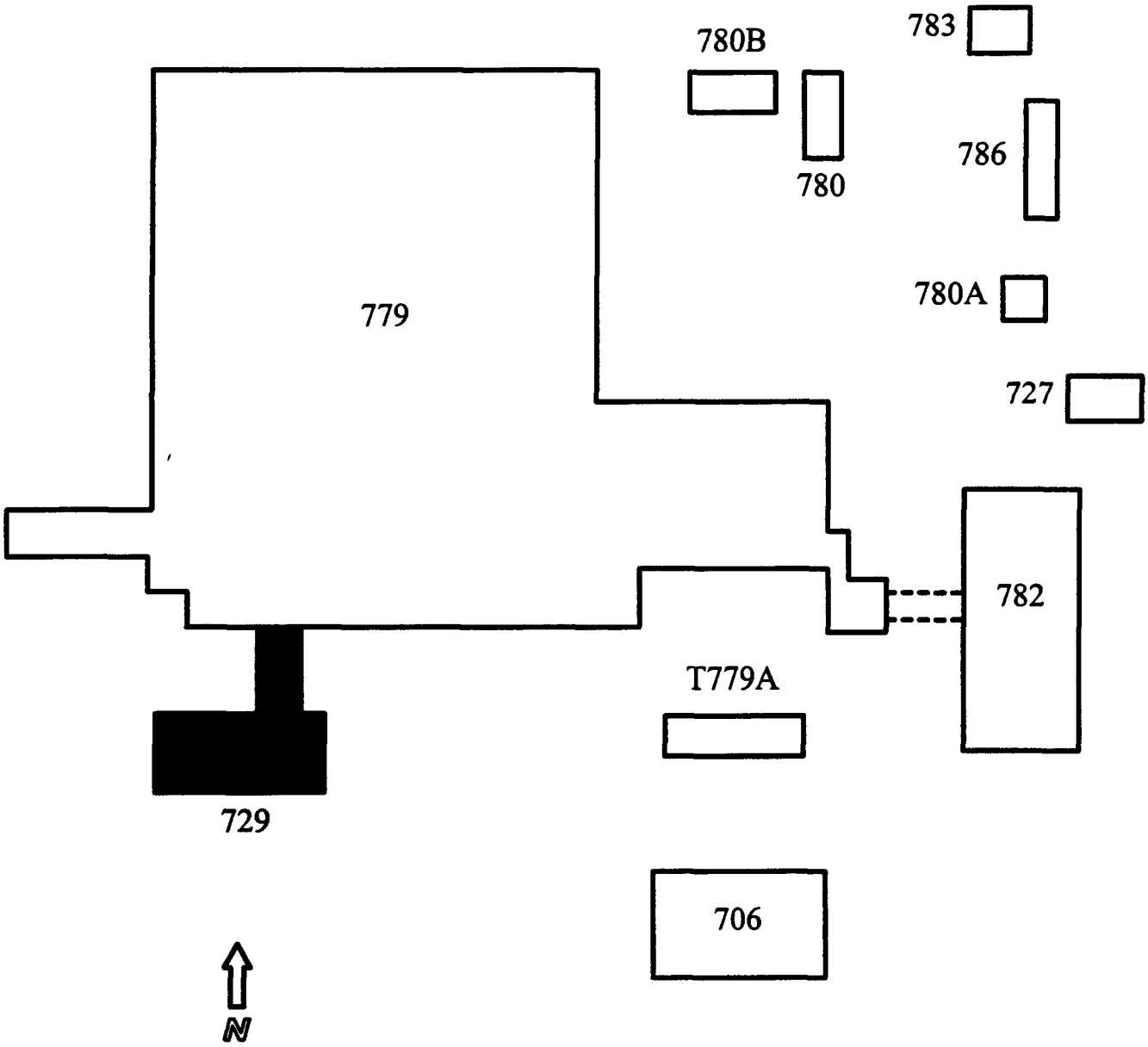
779 CLUSTER OVERVIEW MAP



Survey Area

NOT TO SCALE

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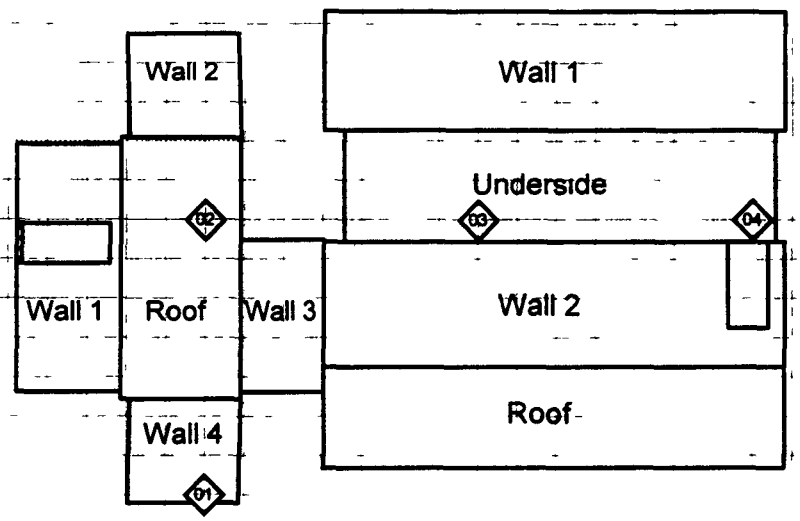
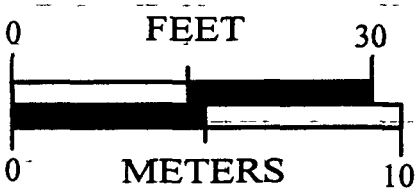
RADIOLOGICAL CLOSEOUT SURVEY PLAN FOR THE 779 CLUSTER

Survey Area. A Survey Unit 72903 Classification. 2
Building 729
Survey Unit Description Bldg 729 Outside Walls, Roof & Duct Bridge

Total Area 828 sq m Grid Size. 7m x 7m

SURVEY UNIT 72903-MAP 1 OF 2





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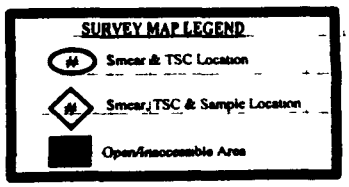

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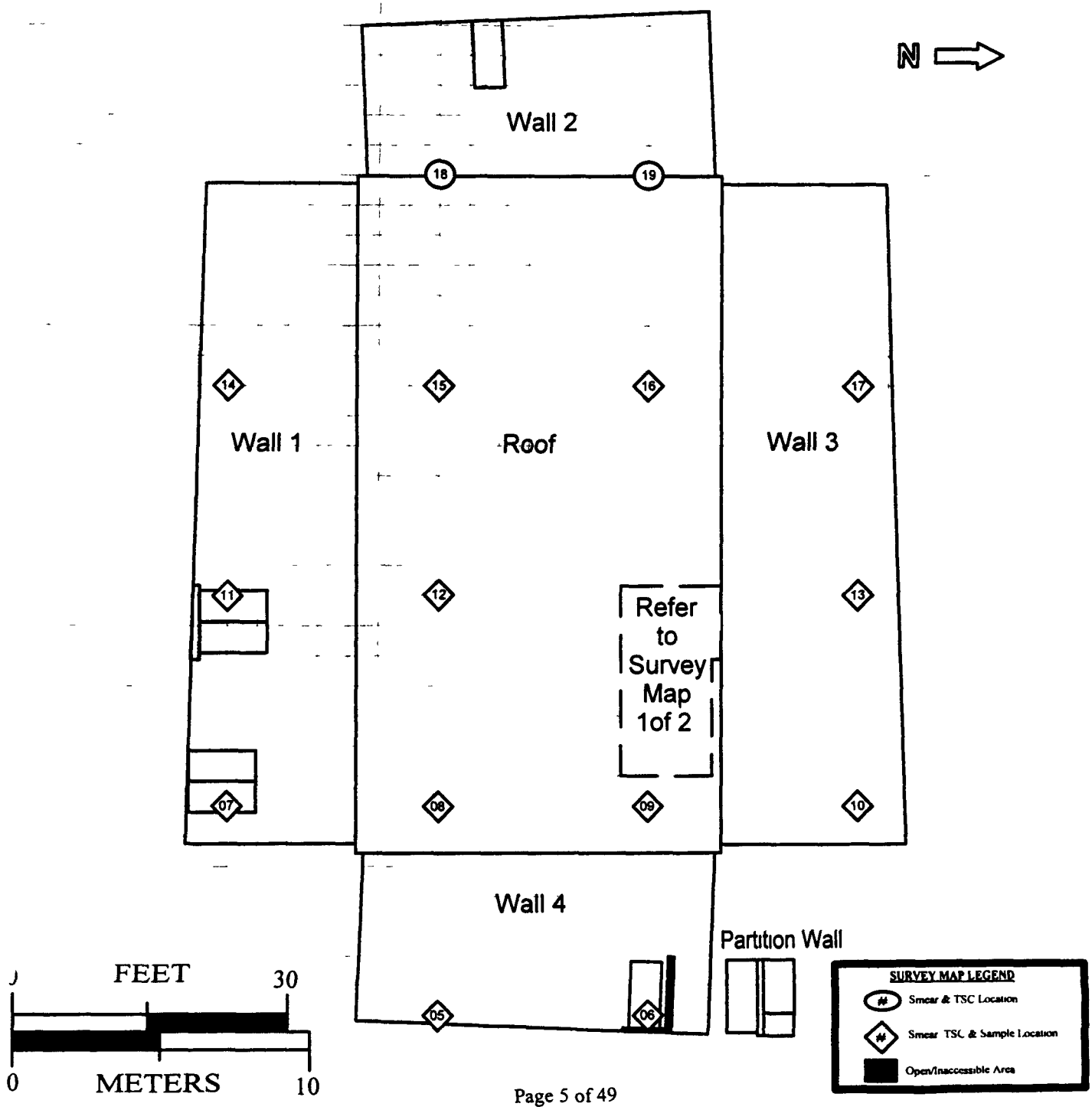
RADIOLOGICAL CLOSEOUT SURVEY PLAN FOR THE 779 CLUSTER

Survey Area A **Survey Unit** 72903 **Classification** 2
Building: 729
Survey Unit Description Bldg 729 Outside Walls, Roof & Duct Bridge

Total Area 828 sq m **Grid Size** 7m x 7m

SURVEY UNIT 72903-MAP 2 OF 2



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Survey Area: A	Survey Unit: 72903	Building 729

Survey Unit Description
Bldg 729 exterior walls and roof

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Sample Measurements Required

Removable Alpha (Pre & Post Media)	Total Alpha (Pre & Post Media)	Media Samples	Alpha Scan
19**/17	17*	17	100%***

Removable Contamination and Surface Media Sampling Instructions

The following steps may be performed out of sequence in order to obtain multiple samples

1 RCT – If not already completed, grid and label the survey unit surfaces per the Survey Package Cover Sheet Grid Requirements Section and the attached survey map(s)
2 RCT – If not already completed, mark an approximate 5" by 8" sample area adjacent to each grid intersection
3 RCT – If not already completed, transpose sample numbers from attached survey maps onto the labels at each corresponding grid intersection on the survey unit surfaces
4 RCT - Obtain pre-media sampling 100cm^2 removable alpha smears at each labeled measurement location (within the marked 5" by 8" sample area) *per 3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
5 RCT - Obtain pre-media sampling 100cm^2 total alpha direct measurements at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
6 Media Sampler – Affix a plastic bag, or equivalent, beneath the marked sample area
7 Media Sampler – Using an appropriate sampling tool, remove the surface material to a depth sufficient to expose the base material over the entire sample area Label the sample container and sample location with the necessary information Record the required information on the chain of custody form (COC) and the attached Surface Media Sampling form
8 Media Sampler - After each sample, wipe-down the sampling tool to remove loose sample media and prevent possible sample cross-contamination
9 Media Sampler – Repeat the above steps at each designated sample location
10 Media Sampler - After all survey unit surface media samples have been obtained, forward, the COC forms and the surface media samples to Final Survey Radiological Engineering for processing
11 RCT – Obtain a post-media sampling 100cm^2 removable alpha smear at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
12 RCT – Obtain a post-media sampling 100cm^2 total alpha direct measurement at each labeled measurement location (within the marked sample area) per *3-PRO-165-RSP 07 02, Contamination Monitoring Requirements*
13 RCT – Analyze alpha smears using a two-minute count on a Final Survey Radiological Engineer approved instrument Attach the alpha smear results to the survey package
14 RCT – Record total alpha direct measurements on the attached Surface Media Data form
15 RCT – Complete the attached Instrument Data Sheet for all instrumentation used for this final survey
16 RCT – Complete the attached Survey Signature Sheet and forward the survey package to the RCT Foreman for review
17 RCT – In the event any alpha removable measurement exceeds 20 dpm/100cm^2 or any total activity measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
18 RCT Foreman – Review the final survey package for completeness, complete the attached Survey Signature Sheet and forward the survey package to Final Survey Radiological Engineering for final disposition

* These Pre & post total activity samples are obtained to validate media sampling and are not intended to satisfy MARSSIM requirements Additional surveys will be performed for the MARSSIM total activity requirements

** 2 smears shall be taken on the roof flashing (survey measurements 18 & 19) on the west end of the roof However, since no paint exists, no surface media samples will be taken at these sample points

***100% of floors and lower walls If no contamination > than 75% of the DCGL is detected, the upper walls and ceiling scans may be reduced in accordance with the CRSP

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Survey Area: A	Survey Unit: 72903	Building 729

Survey Unit Description
Bldg 729 exterior walls and roof

Surface Contamination Monitor (SCM) Survey Instructions

1 Operate the SCM in accordance with written procedures
2 Perform total contamination scan surveys on 100% of the accessible exterior lower walls
3 Perform total contamination scan surveys on 50% of the accessible exterior upper walls
4 Delineated on the survey map(s) where areas cannot be scanned 100%
5 In the event any alpha scan measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
6 Complete the attached Instrument Data Sheet for all instrumentation used
7 Complete the attached Survey Signature Sheet and forward the survey package to the Final Survey Radiological Engineer for review

Total Activity Measurement Survey Instructions

1 Acquire a N E Electra with an MDA of < 50-dpm/100 cm^2
2 Obtain total activity and QC measurements (1 minute PATs) at the designated survey locations Record the gross cpm for each location
3 Obtain a minimum of 19 local area backgrounds at the designated locations Record the gross cpm for the local area backgrounds
4 In the event any alpha measurement exceeds 100 dpm/100cm^2, notify the Final Survey Radiological Engineer
5 Complete the attached Instrument Data Sheet for all instrumentation used
6 Complete the attached Survey Signature Sheet and forward the survey package to the Final Survey Radiological Engineer for review

Prepared by:

[redacted] 4/14/99
Date

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Survey Area: A	Survey Unit: 72903	Building: 729
Survey Unit Description Bldg 729 exterior walls and roof		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	Tennelec	
Model	5100W	
Serial #	28125-2	
Cal Due Date	04/21/99	
Alpha Bkgd	0 35 cpm	
Alpha Eff	32 35%	
Calculated MDA (Max = 10 dpm/100 cm^2)	8 51	
Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]		

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	Electra	Electra	Electra	Electra	Electra
Serial #	1280	2354	1826	1834	2382
Cal Due Date	03-25-99	07-20-99	07-13-99	08-10-99	03-22-99
Date	02-04-99	02-08-99	02-09-99	02-17-99	02-18-99
Alpha Bkgd	1 0 cpm	1 0 cpm	1 0 cpm	5 0 cpm	0 0 cpm
Alpha Efficiency	22 31%	22 71%	21 51%	21 79%	21 82%
Calculated MDA	34 dpm	35 dpm	34 dpm	60 dpm	13 dpm
Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]					

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model	SCM-2	
Serial #	SRA-C-001, 002, 003, 004	
Cal Due Date	Feb 2000	
Date	03-05-99	
Alpha Bkgd 1 min Full Detector	37 cpm	
Alpha Efficiency	37%	

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Survey Area: A	Survey Unit: 72903	Building: 729
Survey Unit Description Bldg 729 exterior walls and roof		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer		
Model		
Serial #		
Cal Due Date		
Alpha Bkgd		N/A
Alpha Eff		MG
Calculated MDA (Max = 10 dpm/100 cm^2)		4/15/99

Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	ELECTRA	ELECTRA			
Serial #	2181	2181			
Cal Due Date	7-15-99	7-15-99			
Date	4-14-99	4-15-99			
Alpha Bkgd	0 0	1.0		N/A	
Alpha Efficiency	20.8%	20.8%		MG	
Calculated MDA	13 dpm	36 dpm		4/15/99	

Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model		
Serial #		
Cal Due Date		
Date		N/A
Alpha Bkgd 1 min Full Detector	JAH	MG
Alpha Efficiency	~~37%~~ 4/15/99	4/15/99

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Survey Area: A	Survey Unit: 72903	Building. 729
Survey Unit Description Bldg 729 exterior walls and roof		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer		
Model		
Serial #		
Cal Due Date		
Alpha Bkgd		
Alpha Eff		
Calculated MDA (Max = 10 dpm/100 cm^2)		

N/A 4/24/99 ~C

Calculated MDA = CF x [2 71 + {3 29 x SQRT(bkgd x ct (1 + ts/tb))}]

Total Contamination Survey Instrument Data

Manufacturer	N E Tech	N E Tech	N E Tech	N E Tech	N E Tech
Model	Electra 1 B				
Serial #	1259				
Cal Due Date	8 18-99				
Date	4-23 99				
Alpha Bkgd	1 cpm				
Alpha Efficiency	21 69 %				
Calculated MDA	35 dpm				

N/A 4/24/99 ~C

Calculated MDA = CF x [2 71 + {4 65 x SQRT(bkgd)}]

Surface Contamination Monitor Survey Instrument Data

Manufacturer	SCM	SCM
Model		
Serial #		
Cal Due Date		
Date		
Alpha Bkgd 1 min Full Detector		
Alpha Efficiency		

N/A 4/24/99 ~C

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Survey Area: A	**Building:** 729
Survey Unit (s): 72901, 72902, 72903	

Total Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift (Δ/δ) in accordance with MARSSIM, Section 5 5 2 3, as follows

$\Delta/\delta = (DCGL_{TSA} - LBGR_{TSA}) / SD_{TSA}$

$\Delta/\delta_{transuranics} = 2\ 0 = (100\ dpm/100cm^2 - 34\ dpm/100cm^2)/33\ dpm/100cm^2$

Where

Δ/δ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1 and 3)

$DCGL_{TSA}$ is the total surface activity derived concentration guideline value (DOE Order 5400 5 total surface activity limit equals 100 $dpm/100cm^2$ for transuranics, per the B779 Cluster Radiological Closeout Survey Plan)

$LBGR_{TSA}$ is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor The $LBGR_{TSA}$ was adjusted to obtain a relative shift between 1 and 3 (i e , 34 $dpm/100cm^2$ for transuranics)

SD_{TSA} is the estimated standard deviation of the total surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available)

Step 2 Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, equals 0 977250 for a relative shift of 2 0

Step 3 Determine the number of total surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula that is based on Plutonium contaminants not being present in the background

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 977250 - 0\ 5)^2 = 11\ 88$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 977250

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

N = 11 88 * 1.2 = 14 25

Conclusion: A minimum of 15 Total Surface Activity measurements will be obtained in each of the above survey unit(s)

[redacted] 4/24/99 Date

4/24/99 * Date

* Late Entry - form originally signed on 4/14/99 MG

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Survey Area: A	**Building** 729
Survey Unit (s): 72901, 72902, 72903	

Media Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift ($\Delta\delta$) in accordance with MARSSIM Section 5 5 2 3 as follows

Note Since a reference area background subtract will not be used for uranium measurements and since the equation in Section 5 5 2 3 results in a larger number of samples than the equation in Section 5 5 2 1 for a relative shift of 2 0, it is acceptable to use the equation in Section 5 5 2 3 for uranium

$\Delta\delta = (DCGL_{media} - LBGR_{media}) / SD_{media}$

$\Delta\delta_{transuranics} = 2\ 0 = (100\ dpm/100cm^2 - 95\ 7\ dpm/100cm^2)/2\ 15\ dpm/100cm^2$
$\Delta\delta_{uranium} = 2\ 0 = (5000\ dpm/100cm^2 - 4819\ 9\ dpm/100cm^2)/90\ 04\ dpm/100cm^2$

Where

$\Delta\delta$ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1and 3)

$DCGL_{media}$ is the total surface activity derived concentration guideline value (DOE Order 5400 5 total surface contamination limit equals 100 dpm/100cm^2 for transuranics and 5000 dpm/100cm^2 for uranium, per the B779 Cluster Radiological Closeout Survey Plan)

$LBGR_{media}$ is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor The $LBGR_{media}$ was adjusted to obtain a relative shift between 1 and 3 (i e , 95 7 dpm/100cm^2 for transuranics and 4819 9 dpm/100cm^2 for uranium)

SD_{media} is the estimated standard deviation of the media surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available) Six paint samples (3 interior and 3 exterior) were taken during the characterization phase of B729 The six samples resulted in a standard deviation of 2 15 for transuranics and 90 04 for uranium

Step 2 Determine the Sign P value by looking up the relative shift ($\Delta\delta$) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, equals 0 977250 for a relative shift of 2 0

Step 3 Determine the number of media surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula that is based on Plutonium contaminants not being present in the background

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 977250 - 0\ 5)^2 = 11\ 88$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 977250

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

N = 11 88 • 1 2 = 14 25

Conclusion: A minimum of 15 media surface activity measurements will be obtained in each of the above survey unit(s)

[redacted] 3/9/99 Date

[redacted] 3/9/99 Date

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Survey Area: A	**Building** 729
Survey Unit (s): 72901, 72902, 72903	

Removable Surface Activity Measurement Calculation Worksheet

Step 1 Determine the relative shift ($\Delta\delta$) in accordance with MARSSIM, Section 5 5 2 3, as follows

Δ/δ = (DCGL $_{removable}$ - LBGR $_{removable}$)/ SD $_{removable}$

Δ/δ = 1 67 = (20 dpm/100cm^2 – 10 dpm/100cm^2)/6 dpm/100cm^2

Where

Δ/δ is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1and 3)

DCGL $_{removable}$ is the removable surface activity derived concentration guideline value (DOE Order 5400 5 removable surface contamination limit equals 20 dpm/100cm^2 for transuranics)

LBGR $_{removable}$ is the lower bound of the gray region - the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor In order to obtain a relative shift between 1 and 3 and since the surface activity counting instrumentation has a minimum MDA of 50% of DCGL, the chosen LBGR is 50% of the DCGL (i e , 10 dpm/100cm^2 for transuranics)

SD $_{removable}$ is the estimated standard deviation of the removable surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available) Since the B729 scoping or characterization data did not contain actual values less than the MDA of the counting instrument, a value of 6 dpm/100cm^2 was used (6 dpm/100cm^2 equals a 30% coefficient of variation of the DCGL $_{removable}$)

Step 2 Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5 4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR) The Sign P value from Table 5 4, rounded conservatively, equals 0 945201 for a relative shift of 1 67

Step 3 Determine the number of removable surface activity measurements for the applicable survey unit using the following MARSSIM, Section 5 5 2 3 formula (based on Plutonium contaminants not being present in the background)

$N = (1\ 645 + 1\ 645)^2 / 4(\text{Sign P} - 0\ 5)^2$

$N = (1\ 645 + 1\ 645)^2 / 4(0\ 945201 - 0\ 5)^2 = 13\ 65$

Where

1 645 is the alpha and beta decision error value (95% confidence) per the B779 Cluster Radiological Closeout Survey Plan

Sign P equals 0 945201

Step 4 Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5 5 2 3

N = 13 65 * 1 2 = 16 38

Conclusion A minimum of 17 removable surface activity measurements will be obtained in each of the above survey unit(s)

[redacted]

4/8/99
Date

4/8/99
Date

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Survey Area: A	Survey Unit: 72903	Building 729
Survey Unit Description Bldg 729 exterior walls and roof		

SURVEY SIGNATURE SHEET

Removable Contamination and Surface Media Survey Performed By

[redacted]	2-4-99 Date
	2-8-99 Date
	2-9-99 Date
	2-17-99 Date
	2-18-99 Date

Surface Contamination Monitor Survey Performed By

[redacted]	4.9.99 Date

Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date

N/A

Survey Reviewed By

[redacted]	4-12-99 Date

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Survey Area: A	Survey Unit: 72903	Building 729

Survey Unit Description
Bldg 729 exterior walls and roof

Total Surface Contamination Measurements Performed By

[redacted]			4-14-99
			Date
			4-15-99
			Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

N/A

Survey Reviewed By

[redacted]	4 30 99
	Date

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Survey Area: A	Survey Unit: 72903	Building 729

Survey Unit Description
Bldg 729 exterior walls and roof

SURVEY SIGNATURE SHEET

Removable Contamination and Surface Media Survey Performed By

[redacted]			4-23-99
			Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
		N/A	
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Surface Contamination Monitor Survey Performed By

Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
		N/A	
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date
Engineer's Printed Name	Employee #	Engineer's Signature	Date

Survey Reviewed By

[redacted]	4 24 99
	Date

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Survey Area: A	Survey Unit: 72903	Building 729

Survey Unit Description
Bldg 729 exterior walls and roof

SURFACE MEDIA DATA FORM

Lab Sample Number	Sample Location Number	Sample Surface Area (in^2)	Pre-Sample Total Activity Measurement ($dpm/100\ cm^2$)	Pre Sample Removable Activity Number	Post Sample Total Activity Measurement ($dpm/100\ cm^2$)	Post Sample Removable Activity Number
99A5D5D-011.001	1	40	21749 <60	1A	<60	1B
99A5D5D-017 001	2	40	19 ~~<60~~ 2/27/99 <34	2A	<34	2B
99A5D5D-009 001	3	40	<60	3A	<60	3B
99A5D5D-010 001	4	40	<60	4A	<60	4B
99A5D5D-003.001	5	40	42	5A	<60	5B
99A5D5D-008.001	6	40	<34	6A	<34	6B
99A5D5D-007.001	7	40	<34	7A	36	7B
99A5D5D-015.001	8	40	<60	8A	<60	8B
99A5D5D-016 001	9	40	<60	9A	<60	9B
99A5D5D-006.001	10	40	<34	10A	<35	10B
99A5D5D-005.001	11	40	<34	11A	<35	11B
99A5D5D-014.001	12	40	<60	12A	<60	12B
99A5D5D-002.001	13	40	<34	13A	<34	13B
99A5D5D-004.001	14	40	<34	14A	36	14B
99A5D5D-013.001	15	40	<60	15A	<60	15B
99A5D5D-012.001	16	40	<60	16A	<60	16B
99A5D5D-001.001	17	40	<34	17A	<34	17B

Remarks Survey measurements 18 + 19 were smears only. No solid media samples were taken because these areas were on unpainted metallic surfaces mG 2/24/99

Sampling Performed By

[redacted] 2/18/99 Date

[redacted] Date

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Total Activity

Survey Area 'A' Building 725 rface ~~Media~~ Survey Results

MG 4/27/99

Survey Unit	measurement MG 4/27/99 ~~Sample~~ Location	MG 4/27/99 ~~Sample Results~~ Total Activity (cpm)	Local Area Background (cpm)	QC cpm
72903	1	3	5	
72903	2	4	0	
72903	3	0	2	
72903	4	3	3	5 #4
72903	5	8	5	
72903	6	1	0	
72903	7	3	1	
72903	8	5	1	
72903	9	3	1	
72903	10	10	2	12 #10
72903	11	7	4	
72903	12	1	3	
72903	13	3	6	
72903	14	8	3	
72903	15	4	3	
72903	16	5	4	
72903	17	2	6	
72903	18	4	3	
72903	19	4	4	

Supervisor JN 4/24/99 MG

Data Entered B[redacted] 4/15/99 Date

Data Reviewed [redacted] 4/19/99 Date

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Survey Area 'A' Building 729 Surface Media Survey Results

Survey Unit	~~Sample~~ Measurement Location MG 4/27/99	Total Activity Measurements (cpm)	Total Activity Quality Control Measurements (cpm)	Local Area Background (cpm)
72903	1			
72903	2		N/A	N/A
72903	3		4/24/99 MG	4/24/99 MG
72903	4			
72903	5		4	4
72903	6			
72903	7		N/A 4/24/99 MG	N/A 4/24/99 MG
72903	8	N/A		
72903	9			
72903	10	MG 4/24/99	4	4
72903	11			
72903	12			
72903	13		4/24/99 MG	4/24/99 MG
72903	14			
72903	15		N/A	N/A
72903	16			
72903	17			
72903	18			
72903	19			

Measurements Obtained By [redacted]

4-23-99
Date

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GRIDDING METHODOLOGY/CALCULATION DATA SHEET

Survey Unit: 72903

Grid Spacing Equations

For Triangular Grids

$$L = SQRT\ (A/0.866*n)$$

Where *A = total surface area of survey unit, m^2*
n = number of measurements as calculated using the one sample statistical test
0 866 = constant provided by MARSSIM for triangular gridding
L = calculated distance between grid points, m

For Rectangular Grids

$$L = SQRT\ (A/n)$$

Where *A = total surface area of survey unit, m^2*
n = number of measurements as calculated using the one sample statistical test
L = calculated distance between grid points, m

Grid Calculations

Grid Type Selection ____ Triangular ✓ Rectangular

Total Area in Survey Unit 828 m^2

$L = SQRT\ (828 / 16)$

$L =$ 7 19 *m*

Actual Grid Size (rounded down to nearest whole number) 70 m

Calculations Performed By

[redacted] 3/9/99 *
Date

Calculations Reviewed By

[redacted] 3/9/99 *
Date

* Calculations performed and reviewed on 2/2/99 -G

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Oxfo[illegible]nstruments Tennelec LB5100-W -- Swipe Analysis R[illegible]rt

Bldg 776 Instrument Serial # 28125-2 **Cal Date** 10/21/98 **Cal Due Date** 4/21/99
Batch ID BUILD 779 2min count
Counting Unit id 1
Data file name C \LBXL\UNIT1\TWO1A006 XLD
Batch Ended 2/18/99 13 26

Alpha activity action level (DPM) **20**
Beta activity action level (DPM) **1000**
Certainty level for MDA and flags 95%
High Voltage Setting 1380

RCT (Print) [redacted]
RCT (Sign) [redacted]

Alpha efficiency log file	PU239AB
Alpha Efficiency	32 35%
Alpha to Beta Crosstalk	4 07%
Alpha Background (CPM)	0 35
Alpha Correction Factor	1 000
Beta efficiency log file	SR90AB
Beta Efficiency	49 68%
Beta into Alpha Crosstalk	5 25%
Beta Background (CPM)	3 15
Beta Correction Factor	1 000

		Alpha Activity				Beta Activity							
Carrier	Swipe #	DPM	σ	flags	MDA	DPM	σ	flags	MDA	Count time (min)	Alpha CPM	Beta CPM	Completion Date Time
1	2 A	1 082	1 56	<MDA	8 51	0 70	2 70	<MDA	11 17	2 00	-0 350	0 35	2/18/99 12 09
2	2 B	-1 082	1 56	<MDA	8 51	1 71	2 89	<MDA	11 17	2 00	-0 350	0 85	2/18/99 12 12
3	12 B	0 464	1 56	<MDA	8 51	0 70	2 70	<MDA	11 17	2 00	0 150	0 35	2/18/99 12 14
4	15 B	2 009	2 20	<MDA	8 51	1 31	2 30	<MDA	11 17	2 00	0 650	0 65	2/18/99 12 16
5	16 B	2 009	2 20	<MDA	8 51	1 31	2 30	<MDA	11 17	2 00	0 650	0 65	2/18/99 12 18
6	8 B	1 082	1 56	<MDA	8 51	1 71	2 89	<MDA	11 17	2 00	-0 350	0 85	2/18/99 12 20
7	9 B	1 082	1 56	<MDA	8 51	1 31	2 30	<MDA	11 17	2 00	-0 350	0 65	2/18/99 12 23
8	1 B	0 464	1 56	<MDA	8 51	1 71	2 89	<MDA	11 17	2 00	0 150	0 85	2/18/99 12 25
9	16 A	0 464	1 56	<MDA	8 51	2 31	2 07	<MDA	11 17	2 00	0 150	1 15	2/18/99 12 27
10	15 A	-1 082	1 56	<MDA	8 51	-0 30	2 51	<MDA	11 17	2 00	-0 350	0 15	2/18/99 12 29
11	12 A	0 464	1 56	<MDA	8 51	2 72	3 06	<MDA	11 17	2 00	0 150	1 35	2/18/99 12 31
12	9 A	0 464	1 56	<MDA	8 51	1 71	2 89	<MDA	11 17	2 00	0 150	0 85	2/18/99 12 33
13	8 A	0 464	1 56	<MDA	8 51	-4 33	1 50	<MDA	11 17	2 00	0 150	2 15	2/18/99 12 36
14	1 A	0 464	1 56	<MDA	8 51	3 72	3 22	<MDA	11 17	2 00	0 150	1 85	2/18/99 12 38
15	4 A	2 009	2 20	<MDA	8 51	2 72	3 06	<MDA	11 17	2 00	0 650	1 35	2/18/99 12 40
16	4 B	0 464	1 56	<MDA	8 51	0 70	2 70	<MDA	11 17	2 00	0 150	0 35	2/18/99 12 42
17	3 A	-1 082	1 56	<MDA	8 51	3 72	3 22	<MDA	11 17	2 00	-0 350	1 85	2/18/99 12 44
18	10 B	-1 082	1 56	<MDA	8 51	-0 30	2 51	<MDA	11 17	2 00	0 350	0 15	2/18/99 12 47
19	5 A	2 009	2 20	<MDA	8 51	0 70	2 70	<MDA	11 17	2 00	0 650	0 35	2/18/99 12 49
20	7 B	-1 082	1 56	<MDA	8 51	-1 31	2 30	<MDA	11 17	2 00	0 350	0 65	2/18/99 12 51
21	6 B	-1 082	1 56	<MDA	8 51	1 71	2 89	<MDA	11 17	2 00	0 350	0 85	2/18/99 12 53
22	5 B	0 464	1 56	<MDA	8 51	3 72	3 22	<MDA	11 17	2 00	0 150	1 85	2/18/99 12 55
23	14 B	0 464	1 56	<MDA	8 51	0 70	2 70	<MDA	11 17	2 00	0 150	0 35	2/18/99 12 58
24	13 B	1 082	1 56	<MDA	8 51	0 70	2 70	<MDA	11 17	2 00	0 350	0 35	2/18/99 13 00
25	11 B	-1 082	1 56	<MDA	8 51	1 31	2 30	<MDA	11 17	2 00	0 350	0 65	2/18/99 13 02

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Oxfo[illegible]nstruments Tennelec LB5100-W -- Swipe Analysis [illegible]ort

Bldg 776 Instrument Serial # 28125 2 **Cal Date** 10/21/98 **Cal Due Date** 4/21/99

Batch ID BUILD 779 2min count

Counting Unit id 1

Data file name C \LBXL\UNIT1\TWO1A006 XLD

Batch Ended 2/18/99 13 26

Cro[redacted]

RCT (Print) [redacted]

RCT (Sign) [redacted]

Alpha activity action level (DPM) **20**

Beta activity action level (DPM) **1000**

Certainty level for MDA and flags 95%

High Voltage Setting 1380

Alpha efficiency log file PU239AB

Alpha Efficiency 32 35%

Alpha to Beta Crosstalk 4 07%

Alpha Background (CPM) 0 35

Alpha Correction Factor 1 000

Beta efficiency log file SR90AB

Beta Efficiency 49 68%

Beta into Alpha Crosstalk 5 25%

Beta Background (CPM) 3 15

Beta Correction Factor 1 000

		Alpha Activity				Beta Activity							
Carrier	Swipe #	DPM	σ	flags	MDA	DPM	σ	flags	MDA	Count time (min)	Alpha CPM	Beta CPM	Completion Date Time
26	17 B	**2 009**	2 20	<MDA	8 51	**2 72**	3 06	<MDA	11 17	2 00	0 650	1 35	2/18/99 13 04
27	3 B	**0 464**	1 56	<MDA	8 51	**1 71**	2 89	<MDA	11 17	2 00	0 150	0 85	2/18/99 13 06
29	19 A	**0 464**	1 56	<MDA	8 51	**6 74**	3 66	<AL	11 17	2 00	0 150	3 35	2/18/99 13 08
28	18 A	**2 009**	2 20	<MDA	8 51	**2 72**	3 06	<MDA	11 17	2 00	0 650	1 35	2/18/99 13 11
30	6 A	**0 464**	1 56	<MDA	8 51	**4 73**	3 37	<AL	11 17	2 00	0 150	2 35	2/18/99 13 13
31	7 A	**0 464**	1 56	<MDA	8 51	**-3 32**	1 80	<MDA	11 17	2 00	0 150	1 65	2/18/99 13 15
32	10 A	**1 082**	1 56	<MDA	8 51	**-0 30**	2 51	<MDA	11 17	2 00	-0 350	0 15	2/18/99 13 17
33	11 A	**1 082**	1 56	<MDA	8 51	**7 75**	3 80	<AL	11 17	2 00	0 350	3 85	2/18/99 13 19
34	13 A	**0 464**	1 56	<MDA	8 51	**-1 31**	2 30	<MDA	11 17	2 00	0 150	-0 65	2/18/99 13 21
35	14 A	**-1 082**	1 56	<MDA	8 51	**-1 31**	2 30	<MDA	11 17	2 00	0 350	0 65	2/18/99 13 24
36	17 A	**-1 082**	1 56	<MDA	8 51	**0 70**	2 70	<MDA	11 17	2 00	0 350	0 35	2/18/99 13 26

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Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code· SCA Subcontract Number· KH700325EP6

RIN· 99A5050
LIC RC01B004
Laboratory Report Identification Code: 1480, 1481, 1482, 1483

Sample Matrix: Waste

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-001 001 Bldg 729	KH199-1480-01	KH199-1480-01	KH199-1480-01
99A5050-002.001 Bldg 729	KH199-1480-02	KH199-1480-02	KH199-1480-02
99A5050-003.001 Bldg 729	KH199-1480-03	KH199-1480-03	KH199-1480-03
99A5050-004.001 Bldg 729	KH199-1480-04	KH199-1480-04	KH199-1480-04
99A5050-005.001 Bldg 729	KH199-1480-05	KH199-1480-05	KH199-1480-05
99A5050-006 001 Bldg 729	KH199-1480-06	KH199-1480-06	KH199-1480-06
99A5050-007.001 Bldg 729	KH199-1480-07	KH199-1480-07	KH199-1480-07
99A5050-008 001 Bldg 729	KH199-1480-08	KH199-1480-08	KH199-1480-08
99A5050-009 001 Bldg 729	KH199-1480-09	KH199-1480-09	KH199-1480-09
99A5050-010 001 Bldg 729	KH199-1480-10	KH199-1480-10	KH199-1480-10
Laboratory Control Sample (LC)	SCAQC-1480-LC1	SCAQC-1480-LC1	SCAQC-1480-LC1
Duplicate (LD)	SCAQC-1480-LD1	SCAQC-1480-LD1	SCAQC-1480-LD1
Preparation Blank (PB)	SCAQC-1480-PB	SCAQC-1480-PB	SCAQC-1480-PB

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-011.001 Bldg 729	KH199-1481-01	KH199-1481-01	KH199-1481-01
99A5050-012.001 Bldg 729	KH199-1481-02	KH199-1481-02	KH199-1481-02
99A5050-013 001 Bldg 729	KH199-1481-03	KH199-1481-03	KH199-1481-03
99A5050-014 001 Bldg 729	KH199-1481-04	KH199-1481-04	KH199-1481-04
99A5050-015.001 Bldg 729	KH199-1481-05	KH199-1481-05	KH199-1481-05
99A5050-016.001 Bldg 729	KH199-1481-06	KH199-1481-06	KH199-1481-06
99A5050-017 001 Bldg 729	KH199-1481-07	KH199-1481-07	KH199-1481-07
99A5050-018 001 Bldg 729	KH199-1481-08	KH199-1481-08	KH199-1481-08
99A5050-019 001 Bldg 729	KH199-1481-09	KH199-1481-09	KH199-1481-09
99A5050-020 001 Bldg 729	KH199-1481-10	KH199-1481-10	KH199-1481-10
Laboratory Control Sample (LC)	SCAQC-1481-LC1	SCAQC-1481-LC1	SCAQC-1481-LC1
Duplicate (LD)	SCAQC-1481-LD1	SCAQC-1481-LD1	SCAQC-1481-LD1
Preparation Blank (PB)	SCAQC-1481-PB	SCAQC-1481-PB	SCAQC-1481-PB

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Southeastern Environmental Laboratory
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Montgomery, Alabama 36117

Laboratory Code. SCA Subcontract Number· KH700325EP6

RIN 99A5050
LIC· RC01B004
Laboratory Report Identification Code: 1480, 1481, 1482, 1483

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-021 001 Bldg 729	KH199-1482-01	KH199-1482-01	KH199-1482-01
99A5050-022.001 Bldg 729	KH199-1482-02	KH199-1482-02	KH199-1482-02
99A5050-023 001 Bldg 729	KH199-1482-03	KH199-1482-03	KH199-1482-03
99A5050-024 001 Bldg 729	KH199-1482-04	KH199-1482-04	KH199-1482-04
99A5050-025 001 Bldg 729	KH199-1482-05	KH199-1482-05	KH199-1482-05
99A5050-026 001 Bldg 729	KH199-1482-06	KH199-1482-06	KH199-1482-06
99A5050-027.001 Bldg 729	KH199-1482-07	KH199-1482-07	KH199-1482-07
99A5050-028 001 Bldg 729	KH199-1482-08	KH199-1482-08	KH199-1482-08
99A5050-029 001 Bldg 729	KH199-1482-09	KH199-1482-09	KH199-1482-09
99A5050-030 001 Bldg 729	KH199-1482-10	KH199-1482-10	KH199-1482-10
Laboratory Control Sample (LC)	SCAQC-1482-LC1	SCAQC-1482-LC1	SCAQC-1482-LC1
Duplicate (LD)	SCAQC-1482-LD1	SCAQC-1482-LD1	SCAQC-1482-LD1
Preparation Blank (PB)	SCAQC-1482-PB	SCAQC-1482-PB	SCAQC-1482-PB

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-031.001 Bldg 729	KH199-1483-01	KH199-1483-01	KH199-1483-01
99A5050-032 001 Bldg 729	KH199-1483-02	KH199-1483-02	KH199-1483-02
99A5050-033 001 Bldg 729	KH199-1483-03	KH199-1483-03	KH199-1483-03
Laboratory Control Sample (LC)	SCAQC-1483-LC1	SCAQC-1483-LC1	SCAQC-1483-LC1
Duplicate (LD)	SCAQC-1483-LD1	SCAQC-1483-LD1	SCAQC-1483-LD1B
Preparation Blank (PB)	SCAQC-1483-PB	SCAQC-1483-PB	SCAQC-1483-PB

Comments: There were no problems encountered during sample receiving.

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the laboratory Manager or the Manager's designee, as verified by the following signature "

003

Signature

Joe Stinson
Name

Laboratory Manager
Title

3/15/99
Date

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Sanford Cohen & Associates
Southeastern Environmental Laboratory
1000 Monticello Court
Montgomery, Alabama 36117

Laboratory Code SCA Subcontract Number KH700325EP6

RIN 99A5050
LIC RC01B004
Laboratory Report Identification Code 1480, 1481, 1482, 1483, 1488, 1489, 1500

Sample Matrix Waste

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-001 001 Bldg 729	KH199-1480-01	KH199-1480-01	KH199-1480-01
99A5050-002 001 Bldg 729	KH199-1480-02	KH199-1480-02	KH199-1480-02
99A5050-003 001 Bldg 729	KH199-1480-03	KH199-1480-03	KH199-1480-03
99A5050-004 001 Bldg 729	KH199-1480-04	KH199-1480-04	KH199-1480-04
99A5050-005 001 Bldg 729	KH199-1480-05	KH199-1480-05	KH199-1480-05
99A5050-006 001 Bldg 729	KH199-1480-06	KH199-1480-06	KH199-1480-06
99A5050-007 001 Bldg 729	KH199-1480-07	KH199-1480-07	KH199-1480-07
99A5050-008 001 Bldg 729	KH199-1480-08	KH199-1480-08	KH199-1480-08
99A5050-009 001 Bldg 729	KH199-1480-09	KH199-1480-09	KH199-1480-09
99A5050-010 001 Bldg 729	KH199-1480-10	KH199-1480-10	KH199-1480-10
Laboratory Control Sample (LC)	SCAQC-1480-LC1	SCAQC-1480-LC1	SCAQC-1480-LC1
Duplicate (LD)	SCAQC-1480-LD1	SCAQC-1480-LD1	SCAQC-1480-LD1
Preparation Blank (PB)	SCAQC-1480-PB	SCAQC-1480-PB	SCAQC-1480-PB

72903

Site Sample Numbers	Laboratory Sample Number		
	Uranium	Plutonium	Americium
99A5050-011 001 Bldg 729	KH199-1481-01	KH199-1481-01	KH199-1481-01
99A5050-012 001 Bldg 729	KH199-1481-02	KH199-1481-02	KH199-1481-02
99A5050-013 001 Bldg 729	KH199-1481-03	KH199-1481-03	KH199-1481-03
99A5050-014 001 Bldg 729	KH199-1481-04	KH199-1481-04	KH199-1481-04
99A5050-015 001 Bldg 729	KH199-1481-05	KH199-1481-05	KH199-1481-05
99A5050-016 001 Bldg 729	KH199-1481-06	KH199-1481-06	KH199-1481-06
99A5050-017 001 Bldg 729	KH199-1481-07	KH199-1481-07	KH199-1481-07
99A5050-018 001 Bldg 729	KH199-1481-08	KH199-1481-08	KH199-1481-08
99A5050-019 001 Bldg 729	KH199-1481-09	KH199-1481-09	KH199-1481-09
99A5050-020 001 Bldg 729	KH199-1481-10	KH199-1481-10	KH199-1481-10
Laboratory Control Sample (LC)	SCAQC-1481-LC1	SCAQC-1481-LC1	SCAQC-1481-LC1
Duplicate (LD)	SCAQC-1481-LD1	SCAQC-1481-LD1	SCAQC-1481-LD1
Preparation Blank (PB)	SCAQC-1481-PB	SCAQC-1481-PB	SCAQC-1481-PB

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Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	001 001				
Other Sample ID	BLDG 729	Collection Date	2/18/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-01	0 266	0 117	0 129	0 057
ACW03	U-235	KH199-1480-01	0 015	0 029	0 029	0 039
ACW03	U-238	KH199-1480-01	0 352	0 134	0 152	0 032
ACW03	PU-239/240	KH199-1480-01	0 046	0 047	0 047	0 031
ACW03	AM-241	KH199-1480-01	0 131	0 104	0 107	0 109

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	002 001				
Other Sample ID	BLDG 729	Collection Date	2/18/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-02	0 425	0 158	0 179	0 063
ACW03	U-235	KH199-1480-02	0 016	0 032	0 033	0 044
ACW03	U-238	KH199-1480-02	0 377	0 146	0 165	0 035
ACW03	PU-239/240	KH199-1480-02	0 014	0 036	0 036	0 067
ACW03	AM-241	KH199-1480-02	0 009	0 061	0 061	0 115

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	003 001				
Other Sample ID	BLDG 729	Collection Date	2/18/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-03	0 313	0 130	0 144	0 059
ACW03	U-235	KH199-1480-03	0 000	0 000	0 000	0 041
ACW03	U-238	KH199-1480-03	0 312	0 130	0 144	0 059
ACW03	PU-239/240	KH199-1480-03	0 106	0 094	0 096	0 100
ACW03	AM-241	KH199-1480-03	0 005	0 046	0 046	0 097

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	004 001				
Other Sample ID	BLDG 729	Collection Date	2/18/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-04	0 318	0 119	0 135	0 028
ACW03	U-235	KH199-1480-04	0 020	0 037	0 038	0 061
ACW03	U-238	KH199-1480-04	0 368	0 128	0 148	0 028
ACW03	PU-239/240	KH199-1480-04	-0 004	0 009	0 009	0 051
ACW03	AM-241	KH199-1480-04	0 008	0 029	0 029	0 065

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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030

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	005 001				
Other Sample ID	BLDG 729	Collection Date	2/12/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-05	0 225	0 104	0 113	0 031
ACW03	U-235	KH199-1480-05	0 014	0 028	0 028	0 038
ACW03	U-238	KH199-1480-05	0 101	0 068	0 071	0 030
ACW03	PU-239/240	KH199-1480-05	0 037	0 043	0 043	0 033
ACW03	AM-241	KH199-1480-05	-0 044	0 135	0 135	0 259

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	006 001				
Other Sample ID	BLDG 729	Collection Date	2/12/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-06	0 777	0 231	0 278	0 069
ACW03	U-235	KH199-1480-06	0 035	0 050	0 051	0 048
ACW03	U-238	KH199-1480-06	0 779	0 230	0 278	0 038
ACW03	PU-239/240	KH199-1480-06	0 038	0 044	0 045	0 034
ACW03	AM-241	KH199-1480-06	0 024	0 046	0 046	0 075

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	007 001				
Other Sample ID	BLDG 729	Collection Date	2/12/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-07	0 152	0 098	0 102	0 069
ACW03	U-235	KH199-1480-07	0 018	0 035	0 036	0 048
ACW03	U-238	KH199-1480-07	0 186	0 105	0 112	0 039
ACW03	PU-239/240	KH199-1480-07	0 027	0 051	0 051	0 083
ACW03	AM-241	KH199-1480-07	0 028	0 114	0 114	0 202

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	008 001				
Other Sample ID	BLDG 729	Collection Date	2/9/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-08	0 264	0 119	0 130	0 059
ACW03	U-235	KH199-1480-08	0 015	0 030	0 031	0 041
ACW03	U-238	KH199-1480-08	0 134	0 082	0 087	0 033
ACW03	PU-239/240	KH199-1480-08	0 027	0 038	0 038	0 036
ACW03	AM-241	KH199-1480-08	-0 018	0 069	0 069	0 160

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	009 001				
Other Sample ID	BLDG 729	Collection Date	2/9/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-09	0 294	0 139	0 151	0 083
ACW03	U-235	KH199-1480-09	0 036	0 051	0 052	0 049
ACW03	U-238	KH199-1480-09	0 362	0 151	0 168	0 039
ACW03	PU-239/240	KH199-1480-09	-0 006	0 011	0 011	0 065
ACW03	AM-241	KH199-1480-09	0 050	0 076	0 077	0 113

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	010 001				
Other Sample ID	BLDG 729	Collection Date	2/8/99	Date Received	3/2/99
		Batch Number	1480	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1480-10	0 206	0 102	0 110	0 033
ACW03	U-235	KH199-1480-10	0 030	0 042	0 043	0 040
ACW03	U-238	KH199-1480-10	0 265	0 117	0 128	0 033
ACW03	PU-239/240	KH199-1480-10	0 029	0 041	0 041	0 039
ACW03	AM-241	KH199-1480-10	0 028	0 061	0 061	0 104

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Pu	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB
Am	SCAQC-1480-LC1	SCAQC-1480-LD1	SCAQC-1480-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	011 001				
Other Sample ID	BLDG 729	Collection Date	2/8/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-01	0 623	0 197	0 233	0 037
ACW03	U-235	KH199-1481-01	0 026	0 049	0 050	0 081
ACW03	U-238	KH199-1481-01	0 634	0 199	0 236	0 037
ACW03	PU-239/240	KH199-1481-01	0 041	0 048	0 048	0 037
ACW03	AM-241	KH199-1481-01	0 029	0 072	0 072	0 118

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	012 001				
Other Sample ID	BLDG 729	Collection Date	2/17/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-02	0 023	0 042	0 042	0 069
ACW03	U-235	KH199-1481-02	0 018	0 035	0 036	0 048
ACW03	U-238	KH199-1481-02	0 122	0 087	0 091	0 069
ACW03	PU-239/240	KH199-1481-02	0 024	0 034	0 034	0 032
ACW03	AM-241	KH199-1481-02	-0 022	0 042	0 042	0 116

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	013 001				
Other Sample ID	BLDG 729	Collection Date	2/17/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-03	0 086	0 086	0 088	0 058
ACW03	U-235	KH199-1481-03	0 015	0 057	0 057	0 128
ACW03	U-238	KH199-1481-03	0 149	0 115	0 119	0 058
ACW03	PU-239/240	KH199-1481-03	-0 010	0 014	0 014	0 066
ACW03	AM-241	KH199-1481-03	0 047	0 060	0 061	0 081

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	014 001				
Other Sample ID	BLDG 729	Collection Date	2/17/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-04	0 144	0 088	0 093	0 035
ACW03	U-235	KH199-1481-04	0 016	0 032	0 033	0 044
ACW03	U-238	KH199-1481-04	0 221	0 110	0 119	0 035
ACW03	PU-239/240	KH199-1481-04	0 023	0 049	0 049	0 083
ACW03	AM-241	KH199-1481-04	0 037	0 061	0 062	0 094

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	015 001				
Other Sample ID	BLDG 729	Collection Date	2/17/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-05	0 154	0 099	0 103	0 070
ACW03	U-235	KH199-1481-05	0 000	0 000	0 000	0 048
ACW03	U-238	KH199-1481-05	0 087	0 072	0 074	0 039
ACW03	PU-239/240	KH199-1481-05	0 007	0 027	0 027	0 061
ACW03	AM-241	KH199-1481-05	0 064	0 087	0 088	0 123

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	016 001				
Other Sample ID	BLDG 729	Collection Date	2/17/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-06	0 070	0 070	0 071	0 073
ACW03	U-235	KH199-1481-06	0 056	0 065	0 067	0 051
ACW03	U-238	KH199-1481-06	0 061	0 061	0 062	0 041
ACW03	PU-239/240	KH199-1481-06	0 000	0 000	0 000	0 037
ACW03	AM-241	KH199-1481-06	-0 041	0 054	0 055	0 152

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Radioanalytical Results

Report Identification Number 99A5050

Project Name	Kaiser-Hill	Chain-of-Custody Number	99A5050#001	Matrix	Waste
Site Sample ID	017 001				
Other Sample ID	BLDG 729	Collection Date	2/17/99	Date Received	3/2/99
		Batch Number	1481	Laboratory Code	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1481-07	0 077	0 069	0 071	0 066
ACW03	U-235	KH199-1481-07	0 017	0 034	0 034	0 046
ACW03	U-238	KH199-1481-07	0 090	0 074	0 076	0 066
ACW03	PU-239/240	KH199-1481-07	0 016	0 033	0 033	0 044
ACW03	AM-241	KH199-1481-07	-0 006	0 012	0 012	0 071

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Pu	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB
Am	SCAQC-1481-LC1	SCAQC-1481-LD1	SCAQC-1481-PB

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Thermo NUtech Rocky Flats
Radscreen Results

RN: 99A6187
Analysis: Radscreen
Report Date: 02/23/99

Distribution/Fax: ASD/4884

Laboratory Sample ID	APO Sample ID RN	Event	Index	Matrix	Gross Alpha pCi/g	1σ	Gross Beta pCi/g	1σ	Total Activity pCi/g	DOT Class	Refer to Note #2 Approx. Sample Received (g)	Analysis Aliquot (g)
99029236-01	99A6187	001	001	Solid	0.6	4.0	1.0	4.8	10.30	NONRAD	66	1.0000
99029236-02	99A6187	002	001	Solid	4.6	4.8	5.6	4.6	19.50	NONRAD	33	1.0027
99029236-03	99A6187	003	001	Solid	3.8	4.5	8.3	4.6	21.00	NONRAD	63	1.0070
99029236-04	99A6187	004	001	Solid	3.4	4.3	5.8	4.4	18.00	NONRAD	86	1.0164
99029236-05	99A6187	005	001	Solid	3.5	2.1	4.0	2.2	11.80	NONRAD	6	1.0002
99029236-06	99A6187	006	001	Solid	2.6	4.3	12	5	23.90	NONRAD	87	1.0104
99029236-07	99A6187	007	001	Solid	1.9	1.8	3.4	2.1	9.30	NONRAD	8	1.0070
99029236-08	99A6187	008	001	Solid	3.1	2.1	3.4	2.1	10.70	NONRAD	6	1.0055
99029236-09	99A6187	009	001	Solid	3.1	4.6	8.0	5.2	20.90	NONRAD	28	1.0025
99029236-10	99A6187	010	001	Solid	1.9	3.9	4.9	4.5	15.20	NONRAD	23	1.0212
99029236-11	99A6187	011	001	Solid	4.9	4.6	12	4	25.50	NONRAD	36	1.0168
99029236-12	99A6187	012	001	Solid	0.0	0.2	0.3	0.5	1.00	NONRAD	250	1.0006
99029236-13	99A6187	013	001	Solid	1.3	0.6	1.3	0.8	3.60	NONRAD	290	1.0000
99029236-14	99A6187	014	001	Solid	0.2	0.3	0.8	0.5	1.60	NONRAD	406	1.0037
99029236-15	99A6187	015	001	Solid	1.6	0.7	0.7	0.6	3.60	NONRAD	342	1.0000
99029236-16	99A6187	016	001	Solid	0.7	0.6	2.1	0.7	4.10	NONRAD	367	1.0234
99029236-17	99A6187	017	001	Solid	0.5	0.5	0.7	0.6	2.30	NONRAD	257	1.0154

DOT Classification <2000 pCi/g total activity is NONRAD
>= 2000 pCi/g total activity is RAD

Total Activity Calculated as the sum of the gross alpha and beta activities AND the measurement uncertainties for these two measurements. If the measured activity is negative, 0 pCi/g (instead of the negative value) is used to calculate the total activity.

Analysis Methods Sample Preparation Procedures: L-6184-1 "Preparation of Oils and Solvents for Analysis of Gross Alpha and Beta Activity" and L-6274-A, "Sample Preparation for Radiological Screening by Gas Proportional Counting"
Counting Procedure: L-6285-A, "Operation of Tennelec LB4100 Gas Proportional Counters"

Note #1 Samples 001 through 011 were paint samples. These were analyzed according to the analysis methods listed above. Samples 012 through 017 were blocks of a hard solid material which resembled asphalt shingle backing. Due to the matrix for samples 012 - 017, it was not possible to take a truly representative sub-sample. The analysis aliquot was taken by chipping pieces from the edges of the sample. These samples were analyzed using the analysis methods listed above, except that the analysis aliquot was not ashed. The samples were prepared for analysis by dissolving the analysis aliquot in nitric acid.

Note #2 The CDC's for these samples had special instructions to weigh each sample to nearest 0.1 gram to provide the weight of sample received in addition to the activity results. This request was discussed with Mike Schwartzbach. It was agreed that due to the difficulty in directly weighing the sample without potentially compromising the sample integrity, TNU would include the analysis aliquot, which was used for the analyses in the report. This weight will then be added to the sample weight which will be measured by the offsite laboratory that is doing the isotopic analyses on these samples. In addition, the weight of the sample was estimated as follows. The samples, including the sample bags were weighed upon receipt. The tare weight for the sample bag was determined by weighing unused ziplock bags. The tare weight of the bags was subtracted from the gross weight, taking into account that the samples were double bagged, to determine the net weight of the sample received. It should be noted that slight differences in bag tare weights, in addition to the weight of the sample label which was not accounted for in the tare weight, may result in small differences between the reported sample weight and the actual sample weight.

K L Clark date 2/23/99
Technical Review for KM Hagglund

Ronald L. Taylor date 2/23/99
Quality Assurance Review

Thermo NUtech Rocky Flats
9377 Jackson Street
Golden Colorado 80401
(303) 966-4000

RMR

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

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C.O.C. # 99A5187#001

Page 1 of 5

Collector J. HORTON x2863	Contact/Requester SCHLUTERBUSCH, MIKE	Telephone No. 4215 MSIN FAX 2864
RIN 99A5187	Sampling Origin Bldg 729	Purchase Order/Charge Code KT95AA00
Project Title 779 CLUSTER FINAL SURVEY	Logbook No.	Ice Chest No. Temp.
To (Lab) Thermo NuTech	Method of Shipment	Bill of Lading/Air Bill No.
Protocol		Offsite Property No

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐
WEIGH EACH SAMPLE TO NEAREST 0.1g BEFORE.
PROVIDE ACTIVITY + WEIGHT RESULTS

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative Packing
99A5187-001 001		SOLID	2/18/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-002 001		SOLID	2/18/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-003 001		SOLID	2/18/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-004 001		SOLID	2/18/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-005 001		SOLID	2/12/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-006 001		SOLID	2/12/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-007 001		SOLID	2/12/99	1030	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/18/99 1521	[signature] TAIT	2/18/99 1521				

FINAL SAMPLE DISPOSITION — Disposal Method (e.g., Return to customer, per lab procedure, used in process) — Disposed By — Date/Time

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RMRS

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CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 99A5187#0..

RIN 99A5187 | Contact/Requestor SCHLUTERBUSCH, MIKE | Telephone No. 4215 | MSIN | FAX

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5187-008 001		SOLID	2/9/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-009 001		SOLID	2/9/99	0900	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-010 001		SOLID	2/8/99	1330	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r.screen]	None None
99A5187-011 001		SOLID	2/8/99	1330	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r.screen]	None None
99A5187-012 001		SOLID	2/17/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-013 001		SOLID	2/17/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-014 001		SOLID	2/17/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-015 001		SOLID	2/17/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-016 001		SOLID	2/17/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-017 001		SOLID	2/17/99	1100	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None
99A5187-018 001	N/A	SOLID	N/A	N/A	Bldg 729	10-G P/G	OS01A003 (Rad-Screen - Soil) [Routine-r screen]	None None

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	2/18/99 1521	[signature] TNW	2/18/99 1521				

FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

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RMRS

CHAIN OF CUSTODY/S PLE ANALYSIS REQUEST

COC # 99. 50#001

Collector J. HORTON x2863	Contact/Requester Mike Schluterbusch x4215 / M. GRUBE X2863	Telephone No 4215 MSIN	FAX 303 966 2864
RIN 99A5050	Sampling Origin Building 729	Purchase Order/Charge Code KT95AA00	
Project Title 779 CLUSTER FINAL SURVEY	Logbook No	Ice Chest No	Temp
To (Lab) S Cohen & Associates	Method of Shipment	Bill of Lading/Air Bill No	
Protocol		Offsite Property No	

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption Yes ☐ No ☐
WEIGH SAMPLES TO NEAREST 0.1g BEFORE ANALYSIS REPORT TOTAL WEIGHT WITH RESULTS

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5050-001 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-002 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-003 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-004 001		WASTE	2/18/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-005 001		WASTE	2/12/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-006 001		WASTE	2/12/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-007 001		WASTE	2/12/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
	3/1/99 1400		3/1/99 1400				

FINAL SAMPLE DISPOSITION	Disposal Method (e g , Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99A 0#001

Page 2 of 4

RIN 99A5050

Contact/Requestor Mike Schluterbusch / MIKE GRUBE

Telephone No 4215 / 2863

MSIN

FAX 303 966 2864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5050-008 001		WASTE	2/9/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-009 001		WASTE	2/9/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-010 001		WASTE	2/8/99	1330	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-011 001		WASTE	2/8/99	1330	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-012 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-013 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-014 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-015 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-016 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-017 001		WASTE	2/17/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-018 001		WASTE	2/18/99	1230	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/1/99 1400	[signature]	3/1/99 1400				
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time

FINAL SAMPLE DISPOSITION	Disposal Method (e g , Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99[illegible]0#001

RIN 99A5050

Contact/Requestor Mike Schluterbusch / MIKE GRUBE

Telephone No 4215 / 2863

MSIN

FAX 303 966 2864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5050-019 001		WASTE	2/18/99	1230	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-020 001		WASTE	2/23/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-021 001		WASTE	2/23/99	0930	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-022 001		WASTE	2/23/99	1000	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-023 001		WASTE	2/23/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-024 001		WASTE	2/23/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-025 001		WASTE	2/23/99	1300	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-026 001		WASTE	2/24/99	0800	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-027 001		WASTE	2/24/99	0900	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-028 001		WASTE	2/24/99	0930	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-029 001		WASTE	2/24/99	1000	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/1/99 1400	[signature]	3/1/99 1400				
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time

FINAL SAMPLE DISPOSITION	Disposal Method (e g , Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

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RMRS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COC # 99 50#001

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RIN	Contact/Requestor	Telephone No	MSIN	FAX
99A5050	Mike Schluterbusch / MIKE GRUBE	4215 / 2863		3039662864

Bottle No	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative, Packing
99A5050-030 001		WASTE	2/24/99	1030	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-031 001		WASTE	2/24/99	1100	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-032 001		WASTE	2/24/99	1600	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-033 001		WASTE	2/24/99	1600	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-034 001	N/A	WASTE	N/A	N/A	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-035 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-036 001		WASTE			Bldg 729 N/A	10-G P/G N/A	RC01B004 (Isotopic Waste) [Priority] N/A	None 4 degrees C N/A
99A5050-037 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-038 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-039 001		WASTE			Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C
99A5050-040 001	N/A	WASTE	N/A	N/A	Bldg 729	10-G P/G	RC01B004 (Isotopic Waste) [Priority]	None 4 degrees C

Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[signature]	3/1/99 1400	[signature]	3-1-99 1400				

FINAL SAMPLE DISPOSITION	Disposal Method (e g Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

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ATTACHMENT K

Technical Basis Document for SRA/Millennium Services, Inc Data Qualification

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Safe Sites
OF COLORADO, L.L.C.
Rocky Flats Environmental Technology Site

INTEROFFICE MEMORANDUM

DATE April 24, 1998

TO C L Guthne, ENGR/CONS/DECON, Bldg T130F, X2419

FROM R L Morris, Radiological Engineering, Bldg T130B, X6468

SUBJECT QUALIFICATION OF SRA/MILLENNIUM SERVICES, INC DATA FOR USE IN BUILDING 123 FINAL SURVEY - RLM-004-98

The Safe Sites of Colorado Radiological Engineering group evaluates and approves radiological survey technology used at the Rocky Flats Environmental Technology Site to assure compliance with 10 CFR § 835 401 The subject report, which is attached, documents our approval of the data and survey method used by the Shonka Research Associates, Inc and Millennium Services, Inc. team in Building 123 The Executive Summary for the report states.

Surface contamination surveys of portions of the north and west wings of Building 123 performed by Shonka Research Associates are acceptable for use in final release survey documentation. The information content, detection limits, and accuracy of the survey report meets or exceeds conventional survey technology.

Please contact me if you have questions or I can be of further assistance

cjb

Attachment
As Stated

cc
K W Daniels
J J Miller
J M Stewart-Bell
J M Wood

cc
J B Barroso w/o Attach
K A Dorr w/o Attach
D J Harward w/o Attach
E D Lesses w/o Attach
T L Vaughn w/o Attach
B A Watson w/o Atach

702

Qualification of SRA/Millennium Services, Inc. Data for Use in Building 123 Final Survey

Rocky Flats Environmental Technology Site
April 24, 1998

Revision 0

Prepared by Robert Morris, CHP _____ 4/24/98
Safe Sites of Colorado, Radiological Engineer

Reviewed by Elliott Lesses _____ 4/24/98
Safe Sites of Colorado, Radiological Engineer

Approved by Terry Vaughn, CHP _____ 4/24/98
Safe Sites of Colorado, Manager, Radiological Engineering

Qualification of SRA/Millennium Services, Inc. Data for Use in Building 123 Final Survey

Executive Summary

Surface contamination surveys of portions of the north and west wings of Building 123 performed by Shonka Research Associates are acceptable for use in final release survey documentation. The information content, detection limits, and accuracy of the survey report meets or exceeds conventional survey technology.

Introduction

In early April, 1998, Shonka Research Associates, Inc. and Millennium Services, Inc (called, for this report, SRA) teamed to perform alpha and beta surface contamination surveys of certain prepared and accessible portions of the north and west wings of Building 123 The contamination surveys were intended for use in the final release surveys of the building To assure compliance with 10 CFR § 835 401*, survey technology used at Rocky Flats Environmental Technology Site (RFETS) for radiological control purposes is normally pre-approved by the central Radiological Engineering group of Safe Sites of Colorado (SSOC). In this case, pre-approval was not obtained due to the short lead-time for use of the technology Project management recognized and accepted the risk that the data might not prove to be acceptable

Prior to collecting data, SRA and Rocky Mountain Remediation Services, Inc (RMRS) project staff members were provided with an acceptance test plan prepared by SSOC A copy of the plan is included as Attachment 1 Acceptance is based on demonstrating the following

- Information presented by the SRA report provides at least the same information as surveys performed by conventional means
- The Minimum Detectable Concentration for the SRA survey is adequate to meet the release criteria in the final survey plan
- The average measured value for each of four NIST-traceable test sources is within ±20% of the conventionally true value

* 10 CFR § 835.401(c) Instruments used for monitoring and contamination control shall be
(2) Appropriate for the types(s), levels, and energies of the radiations(s) encountered
(3) Appropriate for existing environmental conditions,

Acceptance Test Results

Refer to Attachment 1 for the specific requirements of each test The SRA survey method provided data that passed the acceptance tests in each case Details of the test results, exceptions, and conclusions follow

Confirmatory Measurements

Measurements were made at ten of the same one-meter square survey grids by SRA using their method, and by Radiological Control Technicians using conventional RFETS methods The SRA surveys are documented in their draft final survey report The conventionally acquired survey report for alpha and beta contamination is included as Attachment 2 Surveys were collected in two separate sessions in which the alpha and beta backgrounds and reporting formats varied The conventionally acquired surveys were reported on the basis of square yard grids, not square meter grids as requested in the test plan Consequently a direct comparison of grids was not entirely possible The SRA grid that most closely overlaid the conventionally acquired grid was chosen for comparison This exception to the test plan, although undesirable, does not negate the value of the comparison because major portions of the matched grids do overlap.

A quantitatively comparison of the degree of agreement between the measurement methods is shown in Table 1 To avoid working with negative numbers[1], SRA reports results including background. In order to create a readily comparable data set, the conventionally acquired survey data, which are normally reported as net results, have been reformatted to show gross results. It does appear that there is a systematic bias is between the data sets These biases do not appear to be important differences in the context of the question at hand

[1] The image processing algorithms used by SRA require non-negative measurement values To accommodate this and preserve the integrity of the data, gross measurement values which include background are reported The assumed value for background is added to the net release limit and used for comparison to decide if the survey grid meets release criteria

Table 1 Comparison of conventional survey results and SRA measurement results for alpha and beta contamination

	Conventional Measurement Results					SRA Measurement Results									
		gross values reported						gross values reported							
Area	Grid #	Alpha Scan, dpm/100cm2	Alpha Pat, dpm/100 cm2, 60 sec count	Beta Scan, dpm/100cm2	Beta Pat, dpm/100 cm2, 60 sec count	SRA survey block	closest SRA grid	Alpha Mean, dpm/100 cm2	Alpha Standard Deviation, dpm/100 cm2	Alpha Minimum Value dpm/100 cm2	Alpha Maximum Value, dpm/100 cm2	Beta Mean dpm/100 cm2	Beta Standard Deviation dpm/100 cm2	Beta Minimum Value dpm/100 cm2	Beta Maximum Value dpm/100 cm2
6	276	<117	37	<3200	-440	12307	(9,2)	2	5 6	0	41	2301	270 5	1082	2875
6	286	<117	37	<3200	-299	12307	(4,2)	3	6 8	0	55	2504	269 4	1217	3023
10	356 wall	<117	56	<3200	2550	12309	(6,2)	4	3 9	0	13	3155	403 5	1453	3708
10	439 wall	<117	5	<3200	-347	12308	(4,1)	5	8 8	0	67	2137	319 8	1109	2695
10	27 floor	<117	18	<3200	2799	12304	(12,6)	7	6 8	0	42	3023	290 3	2485	3638
10	77 floor	<117	22	<3200	2697	12304	(4,5)	20	25 1	0	171	3500	163 4	3011	3878
10	103 floor	<117	18	<3200	2856	12304	(16,3)	12	9 5	2	76	3563	152 3	3212	4408
10	129 floor	<117	24	<3200	2742	12304	(8,2)	21	17 9	3	101	3444	194 6	3024	3673
10	213 floor	<117	16	<3200	2538	12305	(5,5)	14	21 8	0	143	3395	104 1	3127	3700
10	256 floor	<117	18	<3200	2769	12305	(9,2)	12	12 5	0	81	3631	153 4	3325	4124

Note Conventional measurement grids are based on square yards, SRA measurements are based on square meters, therefore the overlay is not exact

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The information in the SRA data set is consistent with and exceeds the information available from the conventional survey data set Each square meter of the SRA data set contains 400 quantified measurements covering the entire surface (10,000 cm^2)

The conventional survey data set includes a notation that the whole surface was scanned and no area of elevated count rate was perceived In other words the beta scan was < 750 dpm/100 cm^2 and the alpha scan was < 100 dpm/100 cm^2 The values correspond to the nominal background after corrections for counting efficiency have been applied One quantitative measurement representing 100 cm^2 is documented

As a quality assurance measure, and as a way to reduce detection limits, the SRA method independently recounts each location with a second detector following the first. For each measurement the primary and secondary detector results are plotted Well-behaved data follow a 45° degree line when plotted on an x-y axis Data points that fall off the 45° degree line are easily spotted and can be investigated

Control charting of periodic measurements made on standard sources during the survey provides assurance that system performance is not degrading during use This practice eliminates the need to maintain environmental conditions within arbitrary limits If measurements of the standard source fall out of control limits, the data collected since the last measurement that was within control would be evaluated and re-measured if necessary

The SRA method reduces the human factors involved in surveys on flat prepared surfaces The surface to detector distance is fixed by the wheel height and varies only when the surface roughness is substantial Survey speed is computer-controlled by the motorized cart

Presentation of the data visually and numerically (representing minimum, maximum, mean and standard deviation) for each square meter, is more descriptive that the conventional method The SRA method eliminates the problem of data censoring that occurs when "less than" detection limit values are recorded in the conventional method This allows complete statistical evaluation to be performed on low activity data sets which are of interest in release surveys

The SRA data passes the confirmatory measurements criteria

Detection Limits

To meet final survey plan criteria the Minimum Detectable Concentration[2] (MDC) of the system should be 50% of the net release limits or less This corresponds to an MDC for ^{239}Pu alpha contamination of 50 dpm / 100 cm^2 or better and the MDC for $^{90}Sr/^{90}Y$ beta contamination of 375 dpm / 100 cm^2 or better

Attachment 3 is a letter from Dr Shonka that explains how detection limits are determined for the SRA method For beta measurements he concludes "Any measurement that would lie above the desired performance limits of 375 dpa[5] would clearly be above the distribution of background, and could easily have been identified for further confirmatory measurements " A similar conclusion could be drawn for the alpha measurements

Although the MDC concept, which is conceptually based on paired background and sample measurements, does not apply to the data as collected by SRA, it is easy to conclude that the method is able to detect the kinds and amounts of radiation that the final survey plan specifies. This is confirmed by the fact that the SRA survey discovered a small spot in the midst of a large uncontaminated area, where the contamination level was 300 dpm/100 cm^2

The SRA data passes the detection limits criteria

NIST-Traceable Source Measurements

Dr Shonka's letter (Attachment 3), especially the last page, describes measurements of NIST-traceable sources and presents the results of that testing Several minor difficulties arose in testing that required exceptions to the plan Those difficulties do not reflect badly on the SRA survey method Although it was specified in the test plan, Dr Shonka was told that RFETS-supplied sources should be used for testing The high activity beta ($^{90}Sr/^{90}Y$) source that was supplied by RFETS was 50 cm^2, not 100 cm^2 as nominally specified Dr. Shonka used a 100 cm^2 ^{137}Cs source that he provided to complete the test In spite of the widely differing beta energies, all measurements of test sources passed the acceptance criteria

---

[2] Minimum Detectable Concentration may also be called Minimum Detectable Activity For this purpose the terms are interchangeable The SRA calculation of MDA is determined *a posteriori* based on data representing a square meter

[5] dpa is a term used by SRA and others to denote disintegrations per specified area, in this case per 100 cm^2

Wall-mounting the test sources proved to be more difficult than expected and the source location could not be maintained Handling knobs attached to some of the sources prevented a flush mount As a result the test source measurements were all done on the floor

The exceptions to the acceptance test plan are of little practical importance for evaluation of instrument performance They do not prevent drawing the conclusion that the accuracy of the measurements was well within the ± 20% criteria normally established for routine radiation assessments

The SRA data passes the NIST-traceable source measurements criteria

Attachment 1

Acceptance Test Plan for Shonka Research Associates Surface Contamination Monitor for Use in Building 123 Closeout Surveys

Robert Morris, CHP
SSOC Radiological Engineering
March 31,1998

RMRS Project Management has arranged for the Shonka Research Associates (SRA) Surface Contamination Monitor to be demonstrated by Millennium Technologies, Inc in Building 123 If acceptable, the data will be used for closeout release surveys of real property in the north and west wings of Building 123 The data will be acceptable if the Safe Sites of Colorado Radiological Engineering staff determines that acceptance criteria for two tests have been met Shonka Research Associates and Millennium Technologies, Inc personnel will be allowed to review preliminary conclusions to assure the data are not misinterpreted due to lack of understanding of the technology by SSOC staff The tests that will be performed are

- confirmatory measurements by comparing surveys made by RCTs using standard portable instruments in a few selected areas
- measurements of ~~a test jig fitted with~~* sealed sources

Confirmatory measurements

Confirmatory measurements should be made with respect to approximately ten unobstructed 1-meter square areas that have been characterized for total alpha and beta contamination At least four of these areas should represent vertical surfaces no more than six feet above floor level Attempts should be made to locate areas with residual contamination so non-zero data can be compared A special survey report should be prepared that summarizes the scan and quantitative measurements for each square meter on a separate page The survey report should note the amount of time expended to obtain the characterization

The results from the SRA survey should be compared quantitatively and qualitatively to the RCT surveys A verbal description of the degree of

* This correction was made on April 20, 1998, after the data were collected In writing the final report it was recognized that this introductory remark did not match the details of the acceptance test specified later in the plan *R. Morris*

agreement should be provided by SSOC Radiological Engineering after the data have been collected

To meet final survey plan criteria the Minimum Detectable Concentration[††] (MDC) of the system should be 50% of the release limits or less The release limits are 100 dpm / 100 cm^2 alpha and 750 dpm / 100 cm^2 beta

Acceptance criteria Acceptance will be based on the determination that the information presented by the SRA survey report provides at least the same information available from characterization performed by conventional means The MDC for ^{239}Pu alpha contamination shall be 50 dpm / 100 cm^2 or better and the MDC for $^{90}Sr/^{90}Y$ beta contamination shall be 375 dpm / 100 cm^2 or better

Test Measurements

Test measurements should be made by moving the Surface Contamination Monitor over selected test sources The test set up should include the following characteristics

- A thin backing plate may be used as an aid for reproducibly locating the sources
- Two Amersham anodized aluminum ^{239}Pu alpha sources, nominally 100 cm^2, of known activity traceable to NIST or equivalent, reproducibly located, ± 2 cm, with respect to the reference points for the survey One of the sources should have activity in the range of 500 to 1000 dpm The other source should have activity at least a factor of 10 higher
- Two Amersham anodized aluminum $^{90}Sr/^{90}Y$ beta sources, nominally 100 cm^2, of known activity traceable to NIST or equivalent, reproducibly located, ± 2 cm, with respect to the reference points for the survey One of the sources should have total activity in the range of 500 to 5000 dpm The other source should have total activity at least a factor of 10 higher
- ~~A sketch of the source layout on the backing plate should be provided~~ [‡‡]

[††] Minimum Detectable Concentration may also be called Minimum Detectable Activity For this purpose the terms are interchangeable The SRA calculation of MDA is determined *a posteriori* based on data representing a square meter

[‡‡] This correction was made on April 20, 1998, after the data were collected In writing the final report it was recognized that this requirement did not match the details of the acceptance test which allowed, but did not require use of a backing plate *R Morris*

In a measurement campaign separate from the normal survey, SRA will use their normal survey technique to collect a set of test data representing twenty measurements at one horizontal location and twenty measurements at one vertical location

The calibration procedure for this data set may be modified to closely match the conditions that will occur during the test SRA may also choose to collect background data for the test locations and subtract that as appropriate

The average net measured value for each test source will be computed and reported in dpm/100 cm^2 If the test sources are not exactly 100 cm^2 the conventionally true value will be calculated and reported in dpm/100 cm^2

Field measurements made under good conditions are expected to be accurate to within ± 20%

Acceptance criteria The SRA data set will be accepted if the average measured value for each of the test sources is within ±20% of the conventionally true value

Robert L Morris _____original signed by Robert Morris_____3/31/98

212

Attachment 2

Survey Reports of Ten Survey Grids by Convention Methods

RADIOLOGICAL CONTAMINATION SURVEY FORM

LOG NUMBER

FOR X P/WRE ____ PRL ____ RWP ____ OTHER ____

BUILDING/LOCATION	ROOM
123	AREA 10
DATE 4-15-98	TIME 1300

ITEM DESCRIPTION: PAT & Scan survey of grids 27, 77, 103, 129, 213, 256, 280, 337, 356, 455.

COMMENTS

[redacted]

REVIEWED BY [redacted]

RO SUPERVISION SIGNATURE DATE

REMOVABLE CONTAMINATION SURVEY INSTRUMENT DATA

MFR	EBER	EBER	EBER	EBER
MODEL	SAC-4	SAC 4	SAC 4	SAC 4
SERIAL #.				
CAL DATE.				
CAL DUE DATE				

MFR	EBER	EBER	EBER	EBER
MODEL:	B.C 4	BC 4	BC 4	BC 4
SERIAL #:				
CAL DATE:				
CAL DUE DATE				

TOTAL CONTAMINATION SURVEY INSTRUMENT DATA

MFR:	N.E. TECH			
MODEL.	ELECTRA			
SERIAL #:	1420			
CAL DATE	3-12-98			
CAL DUE DATE	9-12-98			
BACKGROUND	α 4.22 cpm β 831.39 cpm			
SFFICIENCY.	α 25.0 % β 38.15 %			
MDA	α 93.3 β 455			

MDA = CF X (2.71 + 4.65 √BACKGROUND (CPM))

214

Survey Unit Specific Background Count Rate Calculation Sheet

ALPHA (α)

Survey Unit: 10	Serial #: 1420	α Efficiency: 25.0%	RadioNuclide: α
Date: 4-15-98	Cal. Due Date: 9-12-98	β Efficiency: 32.8%	RCT Initial: MF

Survey Unit (plywood shield)	"A" (cpm)	Reference Area (unshielded)	"B" (cpm)	Reference Area (plywood shield)	"C" (cpm)	Difference	("B" - "C") (cpm)
Background (1)	5	Background (1)	N/A	Background (1)	N/A	N/A	N/A
Background (2)	3	Background (2)	N/A	Background (2)	N/A	N/A	N/A
Background (3)	2	Background (3)	N/A	Background (3)	N/A	N/A	N/A
Background (4)	2	Background (4)	N/A	Background (4)	N/A	N/A	N/A
Background (5)	2	Background (5)	N/A	Background (5)	N/A	N/A	N/A
Background (6)	5	Background (6)	N/A	Background (6)	N/A	N/A	N/A
Background (7)	1	Background (7)	N/A	Background (7)	N/A	N/A	N/A
Background (8)	1	Background (8)	N/A	Background (8)	N/A	N/A	N/A
Background (9)	4	Background (9)	N/A	Background (9)	N/A	N/A	N/A
Background (10)	3	Background (10)	N/A	Background (10)	N/A	N/A	N/A
Average ("A")	2.8					Average ("B" - "C")	1.42

SUSBCR (concrete mt'ls) = Average ("A") 2.8 plus Average ("B" - "C") 1.42 cpm
SUSBCR (concrete mt'ls) = 4.22
SUSBCR (all other mt'ls) = Average ("A")
SUSBCR (all other mt'ls) =

2.8 cpm

BETA (β)

Survey Unit: 10	Serial #: 1420	α Efficiency: 25.0%	RadioNuclide: β
Date: 4-15-98	Cal. Due Date: 9-12-98	β Efficiency: 32.8%	RCT Initial: MF

Survey Unit (plywood shield)	"A" (cpm)	Reference Area (unshielded)	"B" (cpm)	Reference Area (plywood shield)	"C" (cpm)	Difference	("B" - "C") (cpm)
Background (1)	691	Background (1)	N/A	Background (1)	N/A	N/A	N/A
Background (2)	688	Background (2)	N/A	Background (2)	N/A	N/A	N/A
Background (3)	724	Background (3)	N/A	Background (3)	N/A	N/A	N/A
Background (4)	714	Background (4)	N/A	Background (4)	N/A	N/A	N/A
Background (5)	668	Background (5)	N/A	Background (5)	N/A	N/A	N/A
Background (6)	762	Background (6)	N/A	Background (6)	N/A	N/A	N/A
Background (7)	710	Background (7)	N/A	Background (7)	N/A	N/A	N/A
Background (8)	672	Background (8)	N/A	Background (8)	N/A	N/A	N/A
Background (9)	684	Background (9)	N/A	Background (9)	N/A	N/A	N/A
Background (10)	675	Background (10)	N/A	Background (10)	N/A	N/A	N/A
Average ("A")						Average ("B" - "C")	132.57

SUSBCR (concrete mt'ls) = Average ("A") 698.8 plus Average ("B" - "C") 132.57 cpm
SUSBCR (concrete mt'ls) = 831.37
SUSBCR (all other mt'ls) = Average ("A")
SUSBCR (all other mt'ls) =

818.8 cpm

215

PAT Readings; Electras

STICK #	Electra #	Electra #	Electra #	Electra #	STICK #	Electra #	Electra #	Electra #	Electra #
	1420								
1	3 782	Wall 455	✓		51				
2	8 769	Wall 280	✓		52				
3	3 737	Wall 337	✓		53				
4	10 850	Wall 356	✓		54				
5	2 909	Floor 79	✓		55				
6	4 914	Floor 129	✓		56				
7	3 846	Floor 213	✓		57				
8	3 923	Floor 256	✓		58				
9	3 952	Floor 103	✓		59				
10	3 933	Floor 27	✓		60				
11					61				
12					62				
13					63				
14					64				
15					65				
16					66				
17					67				
18					68				
19					69				
20					70				
21					71				
22					72				
23					73				
24					74				
25					75				
26					76				
27					77				
28					78				
29					79				
30					80				
31					81				
32					82				
33					83				
34					84				
35					85				
36					86				
37					87				
38					88				
39					89				
40					90				
41					91				
42					92				
43					93				
44					94				
45					95				
46					96				
47					97				
48					98				
49					99				
50					100				

216

SURVEY RESULTS
AREA 10

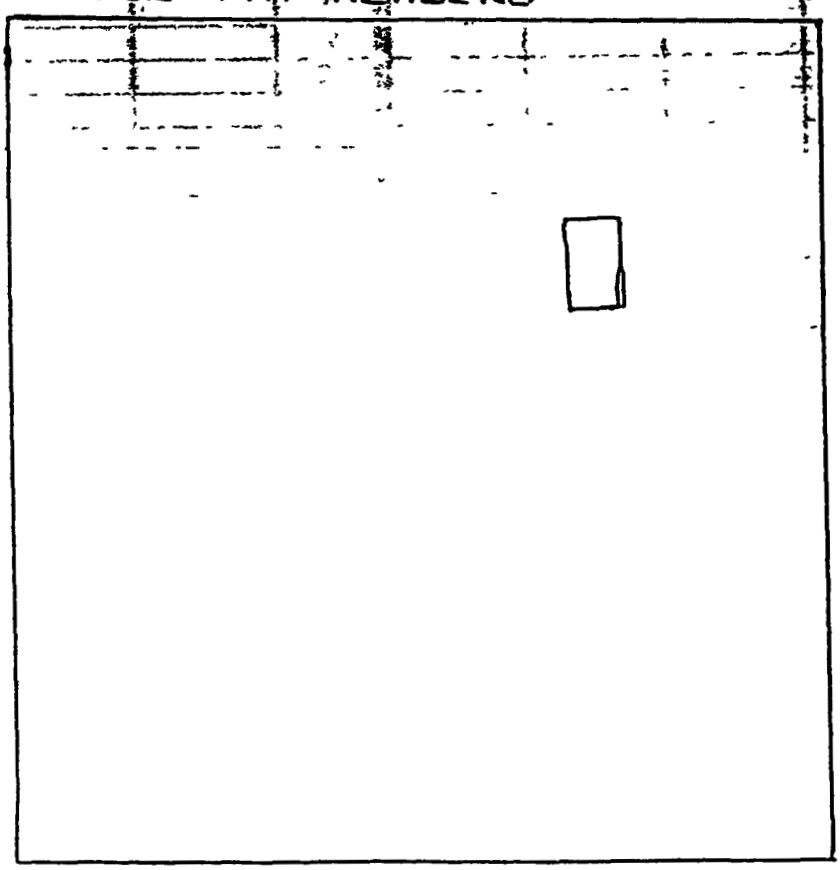
LOCATION: WALL

GRID NUMBER: 280

SCAN RESULTS: ALPHA <100 dpm BETA <750 dpm

60 SEC. PAT RESULTS: ALPHA 8 cp Counts BETA 769 Counts
31.2 DPM 147 DPM

APPROXIMATE LOCATION
FOR PAT READING



217

SURVEY RESULTS
AREA 10

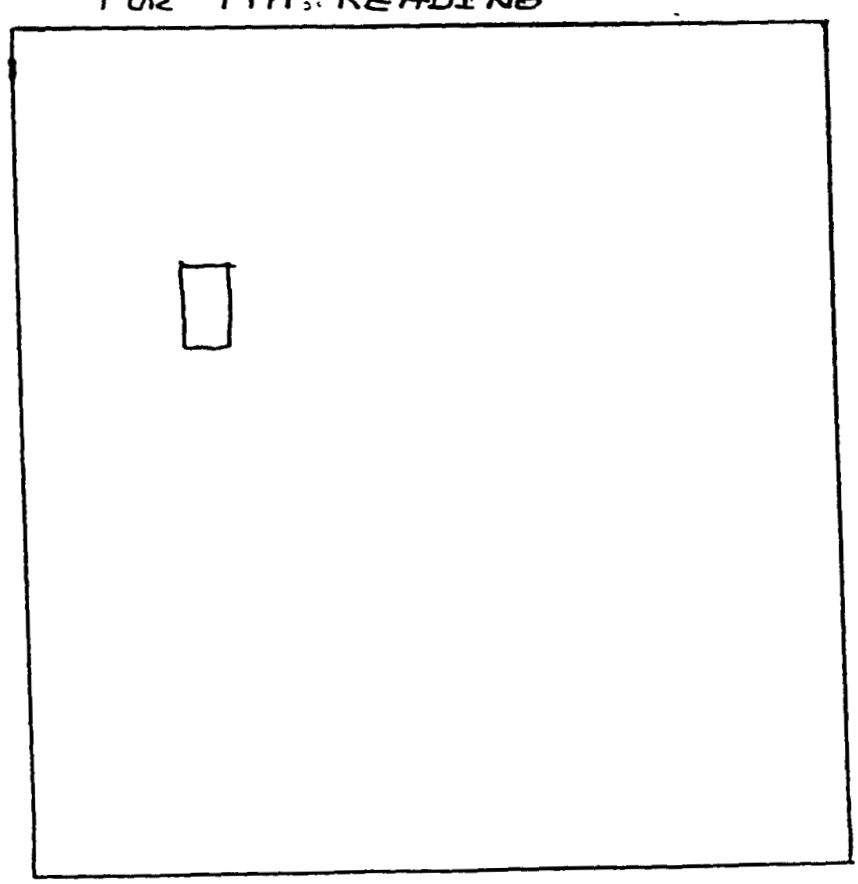
LOCATION: WALL

GRID NUMBER: 337

SCAN RESULTS: ALPHA <100 dpm BETA <750 dpm

60 SEC. PAT RESULTS: ALPHA 3 BETA 737 counts
1.2 DPM -245.4 DPM

APPROXIMATE LOCATION
FOR PAT. READING



218

SURVEY RESULTS
AREA 10

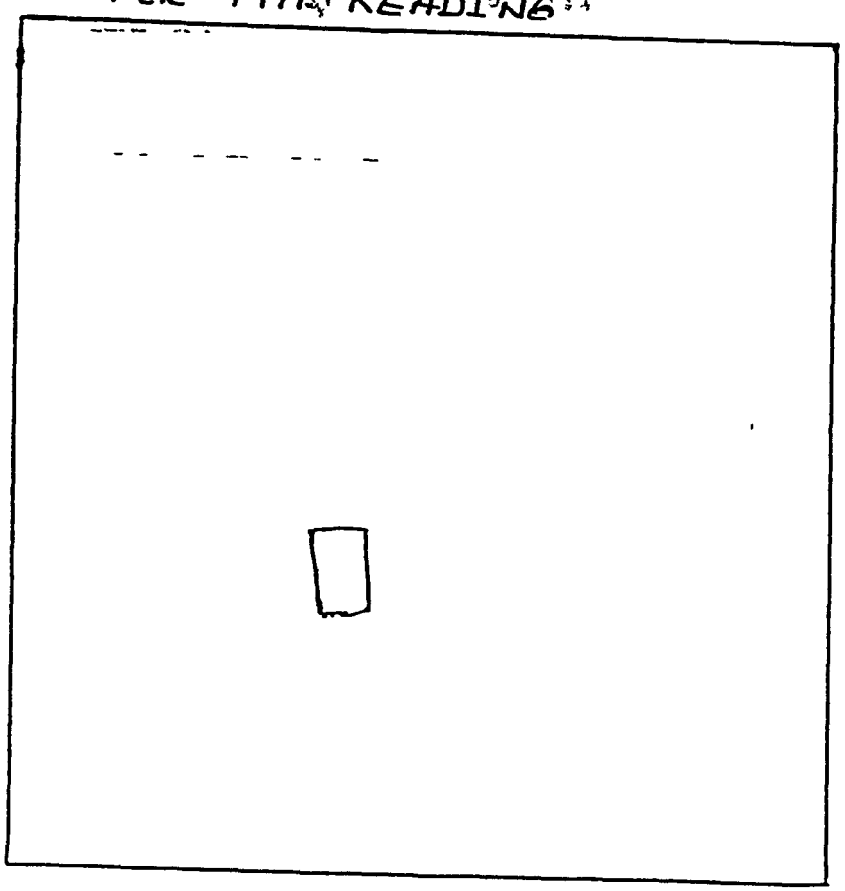
LOCATION: WALL

GRID NUMBER: 356

SCAN RESULTS: ALPHA <100 dpm BETA <750 dpm

60 SEC. PAT RESULTS: 10 counts ALPHA 43.2 DPM 850 counts BETA 93.6 DPM

APPROXIMATE LOCATION FOR PAT READING



219

SURVEY RESULTS
AREA 10

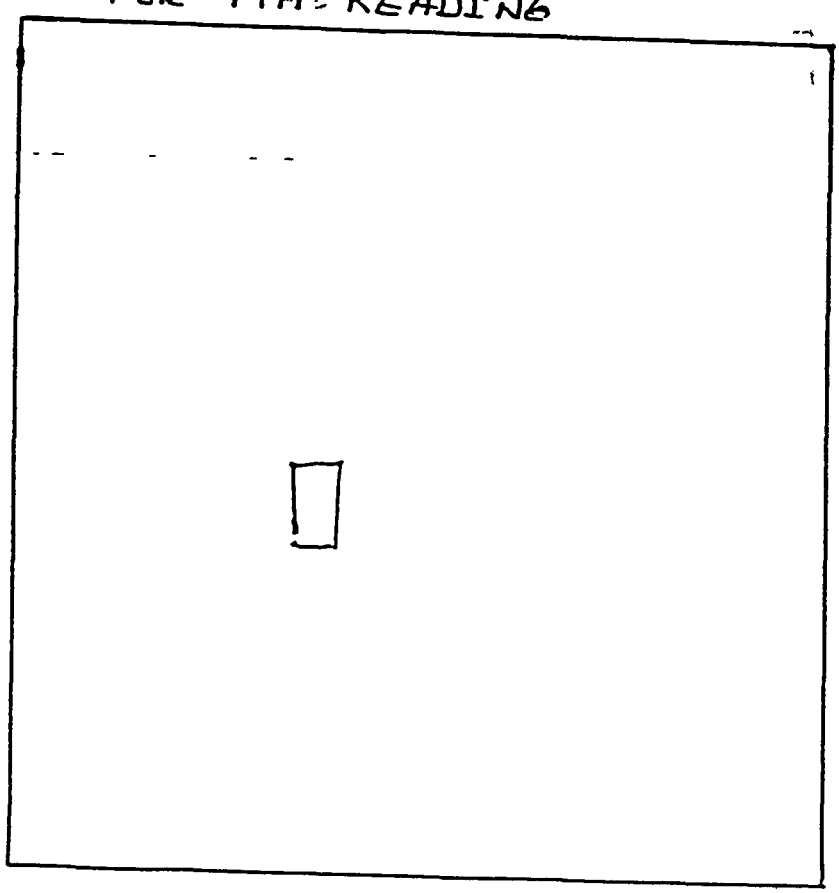
LOCATION: FLOOR

GRID NUMBER: 455

SCAN RESULTS: ALPHA < 100 dpm BETA < 750 dpm

60 SEC. PAT RESULTS: ALPHA 3 counts BETA 782 counts
1 2 DPM -110 4 DPM

APPROXIMATE LOCATION
FOR PAT READING



220

SURVEY RESULTS
AREA 10

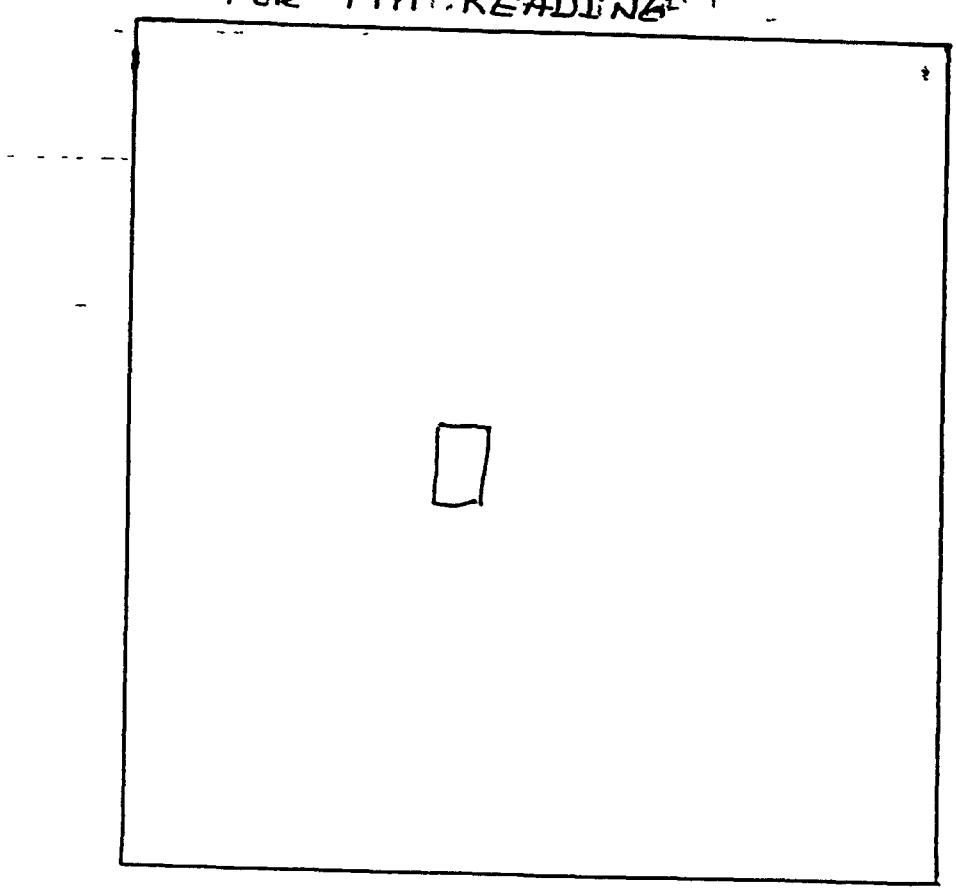
LOCATION: FLOOR

GRID NUMBER: 27

SCAN RESULTS: ALPHA <100 dpm BETA 750 dpm

60 SEC. PAT RESULTS: ALPHA 3 counts BETA 933 counts
1.2 DPM 342.6 DPM

APPROXIMATE LOCATION
FOR PAT. READING



221

SURVEY RESULTS
AREA 10

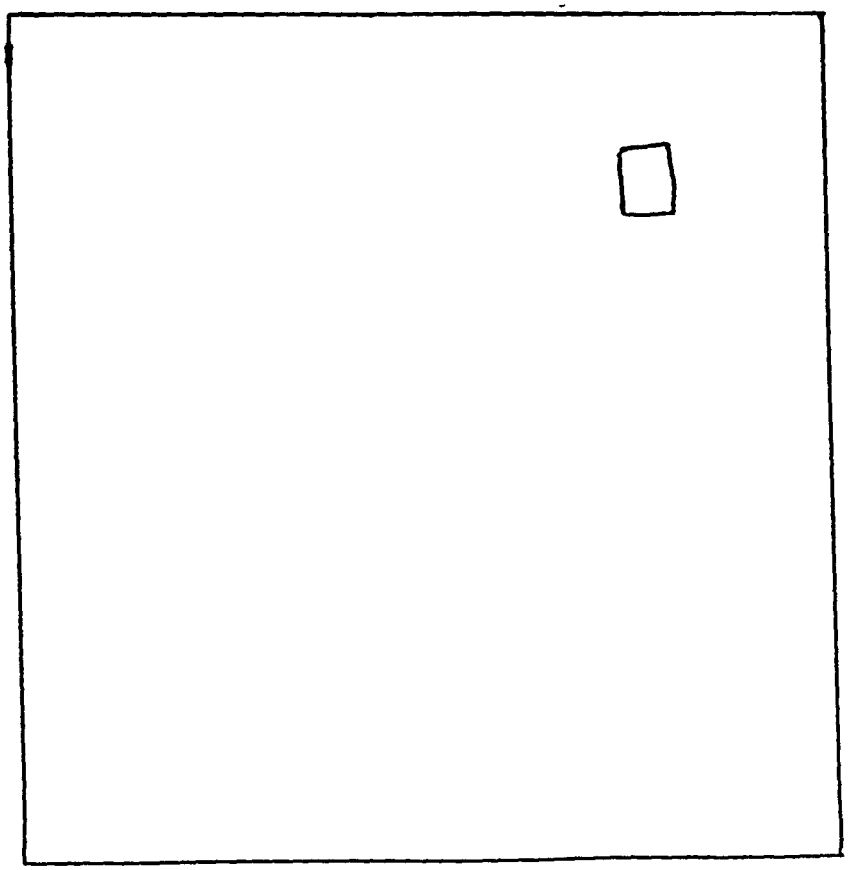
LOCATION: FLOOR

GRID NUMBER: 77

SCAN RESULTS: ALPHA <100 dpm BETA <750 dpm

60 SEC. PAT RESULTS: ALPHA 2 counts BETA 909 counts
-4.8 DPM 2110.6 DPM

APPROXIMATE LOCATION
FOR PAT READING



SURVEY RESULTS

AREA 10

LOCATION: FLOOR

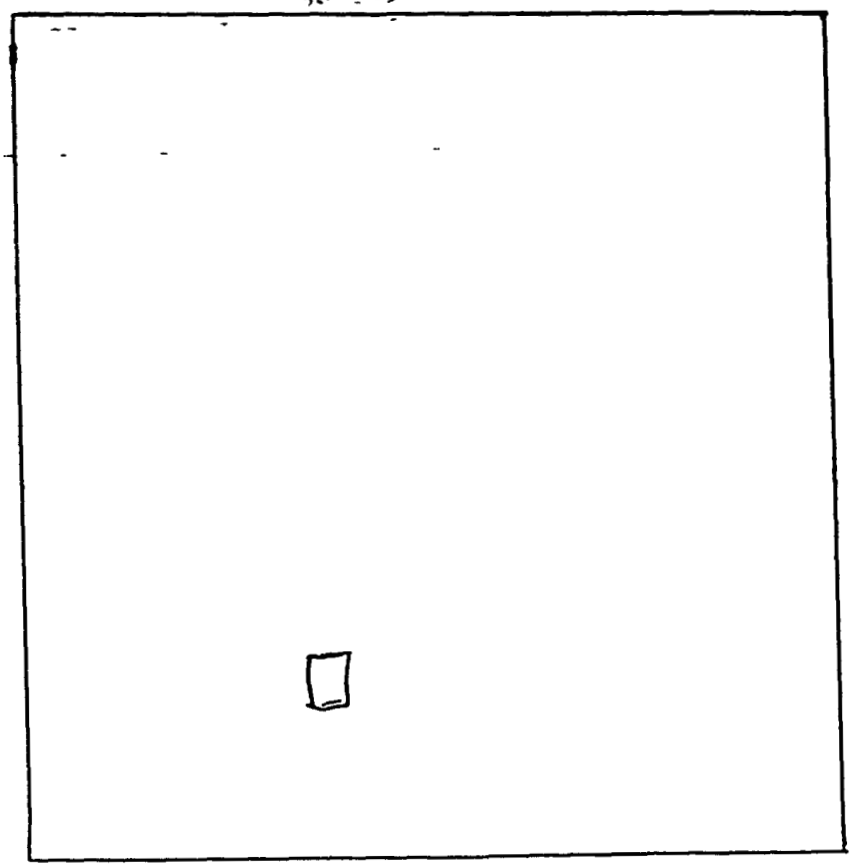
GRID NUMBER: 103

SCAN RESULTS: ALPHA <100 dpm BETA <750 dpm

60 SEC. PAT RESULTS: ALPHA 3 counts BETA 952 counts

1.2 DPM 3996 DPM

APPROXIMATE LOCATION FOR PAT READING



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SURVEY RESULTS
AREA 10

LOCATION: FLOOR

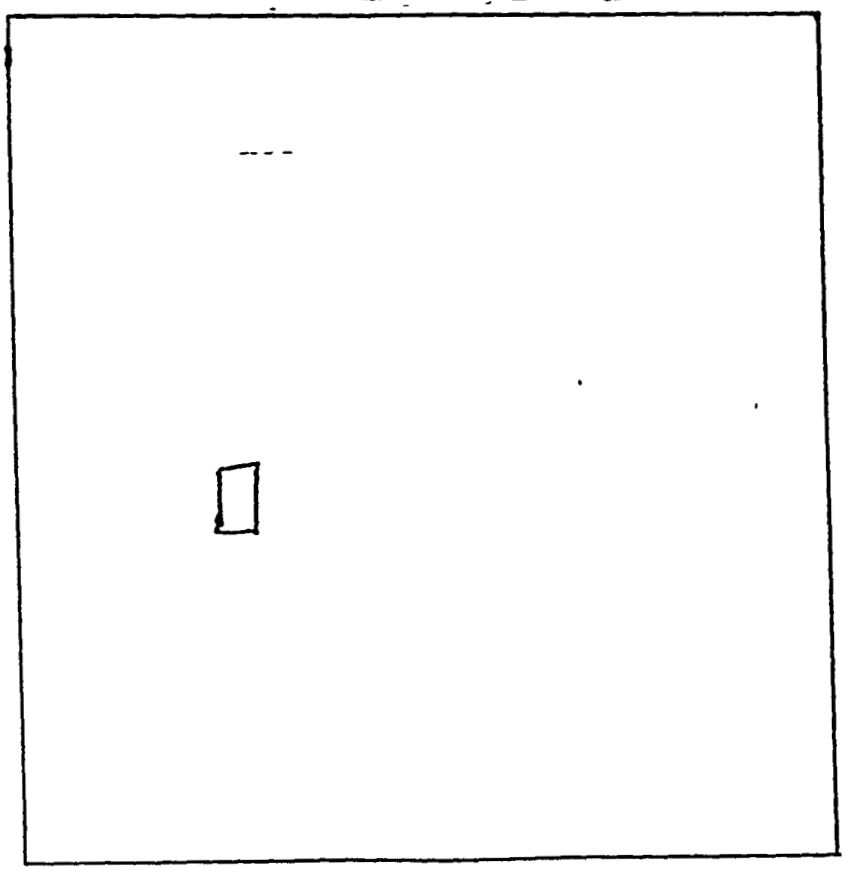
GRID NUMBER: 129

SCAN RESULTS: ALPHA <100 dpm BETA <750 dpm

60 SEC. PAT RESULTS: ALPHA 4 counts BETA 914 counts

7.2 DPM 225.6 DPM

APPROXIMATE LOCATION FOR PAT READING



224

SURVEY RESULTS
AREA 10

LOCATION: FLOOR

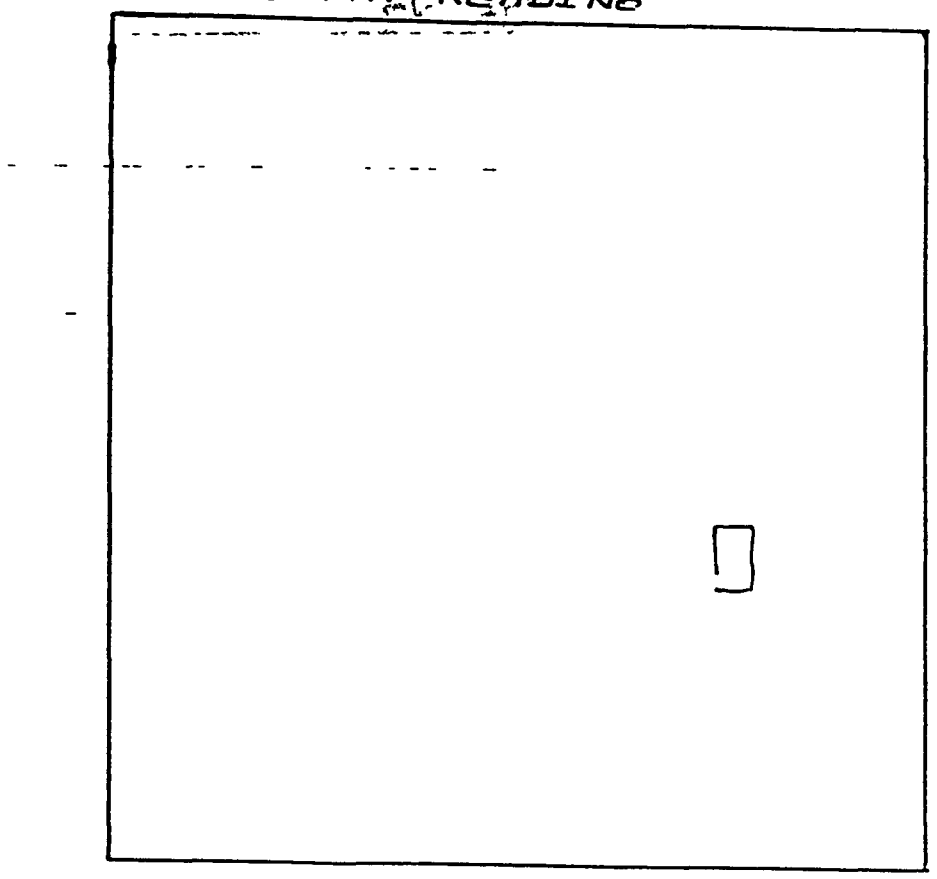
GRID NUMBER: 213

SCAN RESULTS: ALPHA <100 dpm BETA <150 dpm

60 SEC. PAT RESULTS: ALPHA 3 counts BETA 846 counts

1.2 DPM 81.6 DPM

APPROXIMATE LOCATION FOR PAT READING



225

SURVEY RESULTS
AREA 10

LOCATION: FLOOR

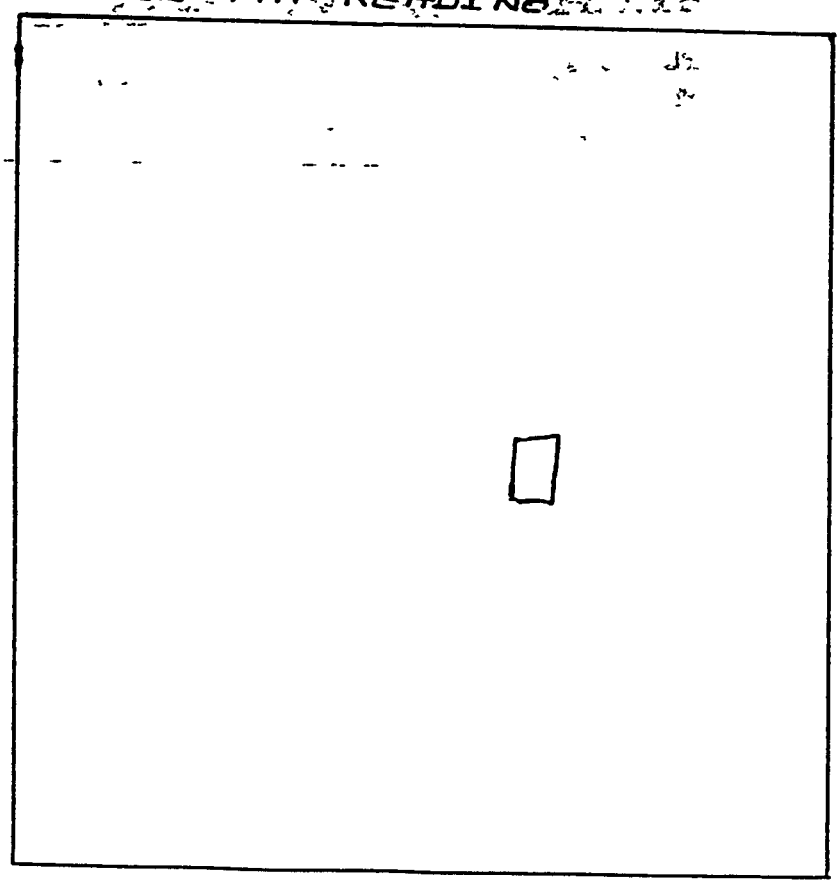
GRID NUMBER: 256

SCAN RESULTS: ALPHA <100 dpm BETA ~~923~~ 415-TB <750 dpm

60 SEC. PAT RESULTS: ALPHA 3 counts BETA 923 counts

1.2 DPM 312.6 DPM

APPROXIMATE LOCATION FOR PAT READING



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Survey Unit Specific Background Count Rate Calculation Sheet

ALPHA (α)

Survey Unit: 6	Serial #: 2396	α Efficiency: 23.9	RadioNuclide: α
Date: 4/23/98	Cal. Due Date: 10.7.98	β Efficiency: 32.8	RCT Initial: RLL

Survey Unit (plywood shield)	"A" (cpm)	Reference Area (unshielded)	"B" (cpm)	Reference Area (plywood shield)	"C" (cpm)	Difference	("B" - "C") (cpm)
Background (1)	4.0	Background (1)	N/A	Background (1)	N/A	N/A	N/A
Background (2)	2.0	Background (2)	N/A	Background (2)	N/A	N/A	N/A
Background (3)	2.0	Background (3)	N/A	Background (3)	N/A	N/A	N/A
Background (4)	2.0	Background (4)	N/A	Background (4)	N/A	N/A	N/A
Background (5)	0.0	Background (5)	N/A	Background (5)	N/A	N/A	N/A
Background (6)	1.0	Background (6)	N/A	Background (6)	N/A	N/A	N/A
Background (7)	0.0	Background (7)	N/A	Background (7)	N/A	N/A	N/A
Background (8)	4.0	Background (8)	N/A	Background (8)	N/A	N/A	N/A
Background (9)	1.0	Background (9)	N/A	Background (9)	N/A	N/A	N/A
Background (10)	2.0	Background (10)	N/A	Background (10)	N/A	N/A	N/A
Average ("A")	1.8					Average ("B" - "C")	1.42

SUSBCR (concrete mt'ls) = Average ("A") 1.8 plus Average ("B" - "C") ~~1.42 cpm~~ 0.0 RL

SUSBCR (concrete mt'ls) = 1.8

SUSBCR (all other mt'ls) = Average ("A") 1.8

SUSBCR (all other mt'ls) =

BETA (β)

Survey Unit: 6	Serial #: 2396	α Efficiency: 23.9	RadioNuclide: β
Date: 4/23/98	Cal. Due Date: 10.7.98	β Efficiency: 32.8	RCT Initial: RLL

Survey Unit (plywood shield)	"A" (cpm)	Reference Area (unshielded)	"B" (cpm)	Reference Area (plywood shield)	"C" (cpm)	Difference	("B" - "C") (cpm)
Background (1)	771	Background (1)	N/A	Background (1)	N/A	N/A	N/A
Background (2)	761	Background (2)	N/A	Background (2)	N/A	N/A	N/A
Background (3)	787	Background (3)	N/A	Background (3)	N/A	N/A	N/A
Background (4)	781	Background (4)	N/A	Background (4)	N/A	N/A	N/A
Background (5)	767	Background (5)	N/A	Background (5)	N/A	N/A	N/A
Background (6)	824	Background (6)	N/A	Background (6)	N/A	N/A	N/A
Background (7)	815	Background (7)	N/A	Background (7)	N/A	N/A	N/A
Background (8)	788	Background (8)	N/A	Background (8)	N/A	N/A	N/A
Background (9)	758	Background (9)	N/A	Background (9)	N/A	N/A	N/A
Background (10)	740	Background (10)	N/A	Background (10)	N/A	N/A	N/A
Average ("A")	779.8					Average ("B" - "C")	132.57

SUSBCR (concrete mt'ls) = Average ("A") 779.8 plus Average ("B" - "C") ~~132.57 cpm~~ 120.0 RL

SUSBCR (concrete mt'ls) = 899.8

SUSBCR (all other mt'ls) = Average ("A") 779.8

SUSBCR (all other mt'ls) =

UNIT #- 6 GRID #- 276

RESURVEY OF THE ABOVE GRID

100% Scan performed over grid
1 meas. Pat taken at highest alpha reading

Assumed Scan
MDC α = 100 dpm/100 cm²
with 17 dpm/100 cm² bkg equivalent = 117

β = 3200 gross dpm/100 cm²

RM 4/24/98

	8 80/753	

Assumptions used in interpretation of this report

dpm/100cm² = (counts − bkg) * CF

80/753

α counts in 60s — β counts in 60 s

RM 4/24/98

ELECTRA # 2396

CAL DUE DATE 10 7.98

ALPHA BKGD 1.8

BETA BKGD 899.8

UNIT #- 6 **GRID #-** 288

RESURVEY OF THE ABOVE GRID

100% Scan performed over grid
1 min Pat taken - at highest alpha reading

4 8.0/800		

The same interpretation assumptions used for unit 6 #276 are applied here
fm
4/24/98

ELECTRA # 2396

CAL DUE DATE 10.7.98

ALPHA BKGD 1.8

BETA BKGD 899.8

516830
4/23/98

Survey Unit Specific Background Count Rate Calculation Sheet

ALPHA (α)

Survey Unit: 10	Serial #: 2396	α Efficiency: 23.9	RadioNuclide: α
Date: 4/23/98	Cal. Due Date: 10 7 98	β Efficiency: 32.8	RCT Initial: [illegible]

Survey Unit (plywood shield)	"A" (cpm)	Reference Area (unshielded)	"B" (cpm)	Reference Area (plywood shield)	"C" (cpm)	Difference	("B" - "C") (cpm)
Background (1)	3.0	Background (1)	N/A	Background (1)	N/A	N/A	N/A
Background (2)	0.0	Background (2)	N/A	Background (2)	N/A	N/A	N/A
Background (3)	3.0	Background (3)	N/A	Background (3)	N/A	N/A	N/A
Background (4)	3.0	Background (4)	N/A	Background (4)	N/A	N/A	N/A
Background (5)	3.0	Background (5)	N/A	Background (5)	N/A	N/A	N/A
Background (6)	1.0	Background (6)	N/A	Background (6)	N/A	N/A	N/A
Background (7)	30	Background (7)	N/A	Background (7)	N/A	N/A	N/A
Background (8)	4.0	Background (8)	N/A	Background (8)	N/A	N/A	N/A
Background (9)	0.0	Background (9)	N/A	Background (9)	N/A	N/A	N/A
Background (10)	2.0	Background (10)	N/A	Background (10)	N/A	N/A	N/A
Average ("A")	2.2					Average ("B" - "C")	1.42

SUSBCR (concrete mt'ls) = Average ("A") 2.2 plus Average ("B" - "C") ~~1.42 cpm~~ 0.0

SUSBCR (concrete mt'ls) =

SUSBCR (all other mt'ls) = Average ("A")

SUSBCR (all other mt'ls) =

BETA (β)

Survey Unit: 10	Serial #: 2396	α Efficiency: 23.9	RadioNuclide: β
Date: 4/23/98	Cal. Due Date: 10.7.98	β Efficiency: 32.8	RCT Initial: [illegible]

Survey Unit (plywood shield)	"A" (cpm)	Reference Area (unshielded)	"B" (cpm)	Reference Area (plywood shield)	"C" (cpm)	Difference	("B" - "C") (cpm)
Background (1)	793	Background (1)	N/A	Background (1)	N/A	N/A	N/A
Background (2)	913	Background (2)	N/A	Background (2)	N/A	N/A	N/A
Background (3)	935	Background (3)	N/A	Background (3)	N/A	N/A	N/A
Background (4)	905	Background (4)	N/A	Background (4)	N/A	N/A	N/A
Background (5)	891	Background (5)	N/A	Background (5)	N/A	N/A	N/A
Background (6)	966	Background (6)	N/A	Background (6)	N/A	N/A	N/A
Background (7)	938	Background (7)	N/A	Background (7)	N/A	N/A	N/A
Background (8)	866	Background (8)	N/A	Background (8)	N/A	N/A	N/A
Background (9)	854	Background (9)	N/A	Background (9)	N/A	N/A	N/A
Background (10)	975	Background (10)	N/A	Background (10)	N/A	N/A	N/A
Average ("A")	903.6					Average ("B" - "C")	132.57

SUSBCR (concrete mt'ls) = Average ("A") 903.6 plus Average ("B" - "C") ~~132.57 cpm~~ 120

SUSBCR (concrete mt'ls) = 120.0

SUSBCR (all other mt'ls) = Average ("A") 1023.6

SUSBCR (all other mt'ls) =

730

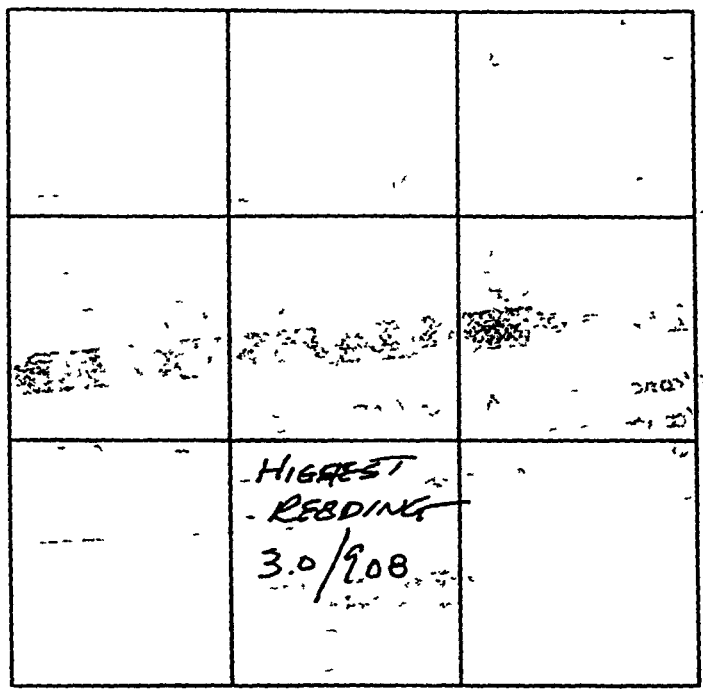
UNIT #- 10 **GRID #-** 4/39

RESURVEY OF THE ABOVE GRID

100% Scan Performed 1min Pat Taken at Highest Reading (alpha)

The same interpretation assumptions used in unit 6 grid 276 are applied here

RA
4/24/98



ELECTRA # 2396

CAL DUE DATE 10.7.98

ALPHA BKGD ~~239~~ RA 2.2

BETA BKGD ~~3~~ RA 10236

RA
4/24

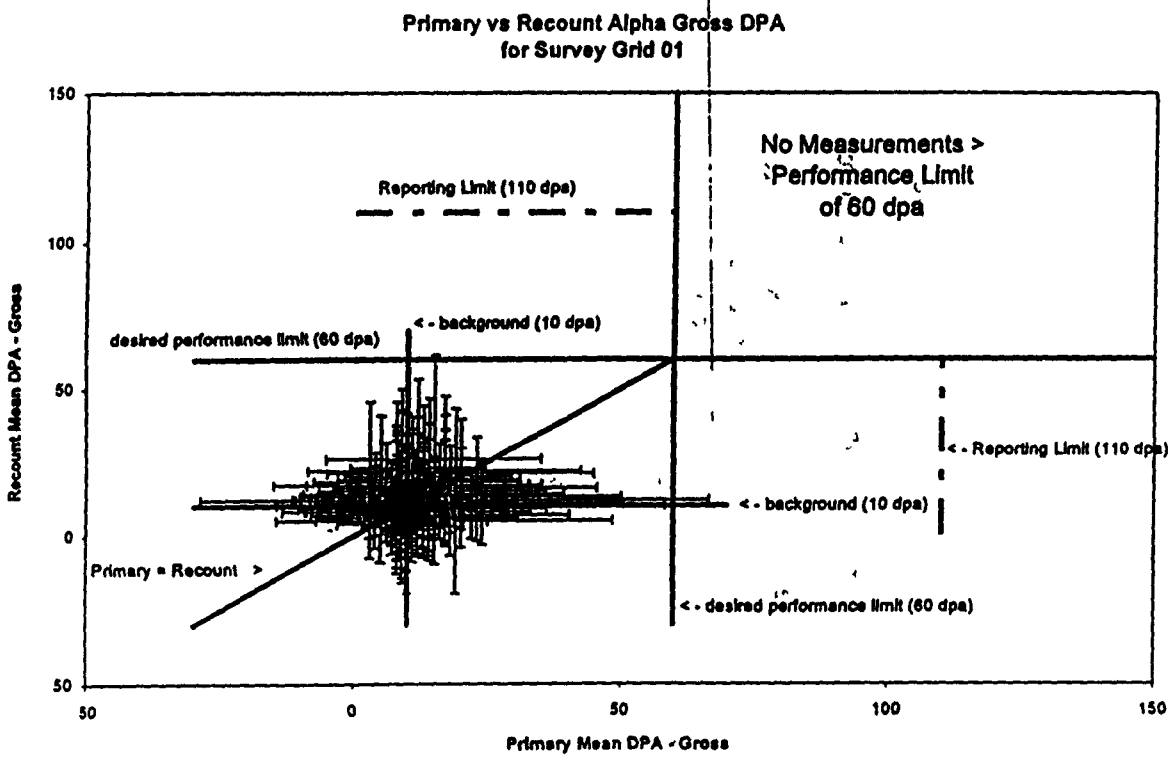


Figure 2 Demonstration of *a posteriori* Alpha Detection Limit

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The Figure 2 shows the data for the alpha survey of the same block. The background was 10 dpa, and no measurements were recorded greater than 26 dpa. As can be seen from the figure, the data is more variable, reflecting the Poisson distribution of count rate data. Because the count rate data is so low, the counting statistics dominate the error bars that are shown

This memo documents the performance of the SCM/SIMS in meeting the Test Measurements requirements of the Test Plan. It also provides our assertion of the *a posteriori* detection limit that was achieved in the survey We provided documented measurements for more than 750 square meters in our survey reports for Building 123. We found only one area with residual contamination. Our survey required 5 shifts to complete the acceptance tests, the alpha measurements, and the alpha plus beta measurements. This is a rate just under 20 square meters per hour. The rate of coverage achieved during actual survey measurements was around 100 square meters per hour. The reduction to an average rate of 20 included all operational issues, special tests, etc The SCM sweeps 180 square meters per hour for alpha surveys and 360 square meters per hour for beta surveys when outfitted with the two meter detectors.

3. Obtain 20 Measurements of NIST traceable alpha and beta sources

We took more than 20 measurements each of high and low activity sources of beta radiation and also similar measurements for alpha radiation. We selected sources that were 100 cm^2 in area. The data are summarized in Table 1. To generate the values in Table 1, we used 4π emission rates for Sr-90 (included the Y-90). We used the Cs-137 source since it was 100 cm^2 in area. We used the Sr-90 efficiency for Cs-137, however, we divided the NIST traceable Cs-137 activity by 2 to place it on a common basis with Sr-90 (but made no energy correction to account for slight differences in beta efficiency). We used the mean 3300 dpa for beta background taken from the survey that is documented in the executive summary of the Building 123 survey. We did not subtract the 10 dpa alpha background from the data. The low activity alpha source has large statistical uncertainty, and the background is moot for the high activity alpha source

We measured the sources by rolling over them in 4 strips, with a single source placed 5 times as the SCM rolled forward on a strip The sources that did not have a knob on the back were placed on RFETS survey grid locations 72 through 76 (with the source placed on the grid numbers) in the North wing, outside of the bathrooms. The strips were stitched together to form a block that had 20 occurrences of the same source in the data set in four rows of 5 spots. The sources that had a knob on the back were located elsewhere in the building in a hole in the floor and were rolled over 20 times in the same location.

We attempted to measure the sources on the wall by "taping" the back of the sources with duct tape. The data was taken several times and is included in the QA charts of the executive summary, however, the sources tended to loosen and begin to drop because the wall was not a good surface for testing. We suspended the wall portion of the tests to avoid damage to the sources We believe that the data in the executive summary demonstrates that equivalent performance is obtained in the wall mount configuration as is shown for the floor mount.

The data were taken under field conditions. In a conventional "daily source check" performed by the RCTs on a portable survey instrument, the instrument is generally positioned in a source holding fixture Care is taken to assure that both the instrument and source are held in the same position as previous measurements. (INEEL even controls the rotation of the source relative to the instrument probe.) These measurements eliminate variables that occur under field conditions and score the variability of the response of the instrument alone. Under these conditions, general industry practice and standards dictate that rate meter class instruments respond within 20% to the same source. Meters which integrate counts (scalers) should respond within three standard deviations of a nominal value established during calibration and should be re-tested if the response is more than two standard deviations off nominal. We did not do this, but tested the instrument variability with field variability added.

The instrument was tested immediately after all of the surveys were completed. The system was not adjusted or otherwise improved.

Table 1 Results of 20 Measurements of Low and High Activity Alpha and Beta Sources

Mx #	Primary		Primary		Primary		Primary	
1	6096		97738		191217		696	
2	7620		101490		199438		433	
3	5839		103183		184330		340	
4	8635		108130		183301		958	
5	7876		101752		181434		617	
6	6120		105891		163147		689	
7	8322		99772		184617		460	
8	8873		103893		172485		526	
9	7337		107236		176533		321	
10	7457		99142		161786		723	
11	9457		101694		166156		385	
12	11037		108872		171800		227	
13	9257		108310		178616		469	
14	7274		95912		172981		594	
15	8285		101382		184152		880	
16	8960		127094		188902		534	
17	8640		104316		180764		462	
18	8976		110602		193480		310	
19	8938		102533		180760		246	
20	11153		107328		167718		526	
Mean.	8308		104814		179181		520	
Std. Dev	17 2%		6.3%		5 7%		38 2%	
Bias	-7 8%		5 6%		-13 7%		-1 4%	
Area (cm^2)	100		100		100		100	
4 pi DPM	9010		99266	(4pi/2)	207600		527	
File #	Beta16		Beta12		Alpha11		Alpha12	
Source #	DK794		SRA2676		DK795		DK792	
Type	Sr90		Cs137*		Pu239		Pu239	

Attachment 3

Letter from Dr Shonka

SRA
Shonka Research Associates, Inc

April 20, 1998

To Bob Morris

From Joe Shonka

Subject Source testing with SRA's SCM/SIMS at RFETS Building 123

Ref Acceptance Test Plan for Shonka Research Associates Surface Contamination Monitor for Use in Building 123 Closeout Surveys, March 31, 1998 (rev 1)

cc Joan Stewart-Bell

A test was performed in accordance with the revised Test Plan The test plan required confirmatory measurements for up to ten areas that had residual contamination, qualitative and quantitative comparisons with site RCT surveys, demonstration of MDCs for beta of 375 dpa and 50 dpa for alpha measurements, and 20 test measurements for four NIST traceable sources as specified in the test plan The test plan provided for allowances (changes) for field conditions

The requirements are listed in a summary form, followed by the test results and discussion

1 Confirmatory measurements should be made for up to ten square meters with residual contamination by RFETS RCTs

The survey results which were provided under separate cover included documentation on more than 750 partial or full square meters for which 1600 measurements were made (400 measurements per square meter; primary and recount detector; alpha and beta plus alpha surveys) There was only one area with detectable residual contamination, a small spot of alpha contamination of approximately 400 dpm activity. There was a survey of this contamination by site RCTs, and similar results were obtained. If the site desires more measurements, any of the areas we surveyed could be subjected to confirmatory surveys by site RCTs Assuming that the site RCTs find no evidence of residual contamination, the primary finding would be that neither method found evidence of residual contamination It is likely that these will simply be comparisons of backgrounds for the two methods. Our data gives strong evidence that background is spatially variable Thus, the ratio of the gross counts observed in measurements by the site RCTs should trend with our data, which is expressed as gross dpa Without residual contamination, this is about the only additional test that can be quantified We believe that you have all of the documentation that you need from us Please let us know if there is more information that is required

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2. The MDC for ^{239}Pu alpha contamination shall be 50 dpm / 100 cm^2 (dpa) or better and the MDC for $^{90}Sr/^{90}Y$ beta contamination shall be 375 dpm / 100 cm^2 (dpa) or better

SRA surveys scan and record data, rather than report the results of fixed location counts acquired through a scaler function as is commonly evaluated for lab measurements. As such, the MDC SRA asserts is based on a method that we call the *a posteriori* method, to differentiate it from the *a priori* method commonly used We could compute an *a priori* MDC in a traditional fashion, however, we believe this number is not applicable because contamination and background is not distributed normally, but is log-normal in character. Also, background is spatially variable, and different areas of the same survey grid exhibit real differences in background levels Additionally, the typical criteria used (Type I Error = Type II Error = 5%) is not relevant in that we took over 1.2 million measurements with a computerized logging radiation detector. If the background was normally distributed we would have encountered 60,000 false positive indications at the conventionally calculated MDC at the 5% level.

We choose to demonstrate our detection limit in a practical way. Figure 1 shows data taken from the beta survey of the southern end of the West wing of Building 123. Shown on the figure is (gross count rate converted to $^{90}Sr/^{90}Y$ equivalent-dpa) data from the primary and recount detectors for each meter measured (180 meters shown). The conventionally calculated standard deviation of the 400 measurements is shown as "error bars" for both the primary and recount data. It is interesting to observe that the cluster of measured values (data points) appear to be more tightly grouped than would be inferred from the standard deviation as shown. (2/3 of the data points variability appears to be due to causes other that statistical fluctuations due to count rate effects). Shown also on the figure is the mean background (3300 dpa) which was derived in the executive summary based on all of the survey data for the building. We have labeled the RFETS desired MDC (375 dpa) as a "performance limit", and also show the site reporting criteria of 750 dpa. As can be seen from the image, background is clustered between 2500 dpa and 3500 dpa. There are a few lower values, which come from meter areas that were not concrete (steel or wood covers over drains or sumps, etc.). The background is not "random" since the data show that the primary detector exhibits a high count rate per meter for the same meters as the recount detector (data follow the indicated primary = recount line). The highest measured data (upper right data points in the figure) are 200 dpa above background, and appear to be part of the distribution exhibited by most meter areas. Any measurement that would lie above the desired performance limit of 375 dpa would clearly be above the distribution of background, and could easily have been identified for further confirmatory measurements. A practical performance limit of 200 dpa would have dictated that two of the 180 meters (1%, not 5%) be studied to determine if contamination were present or not.

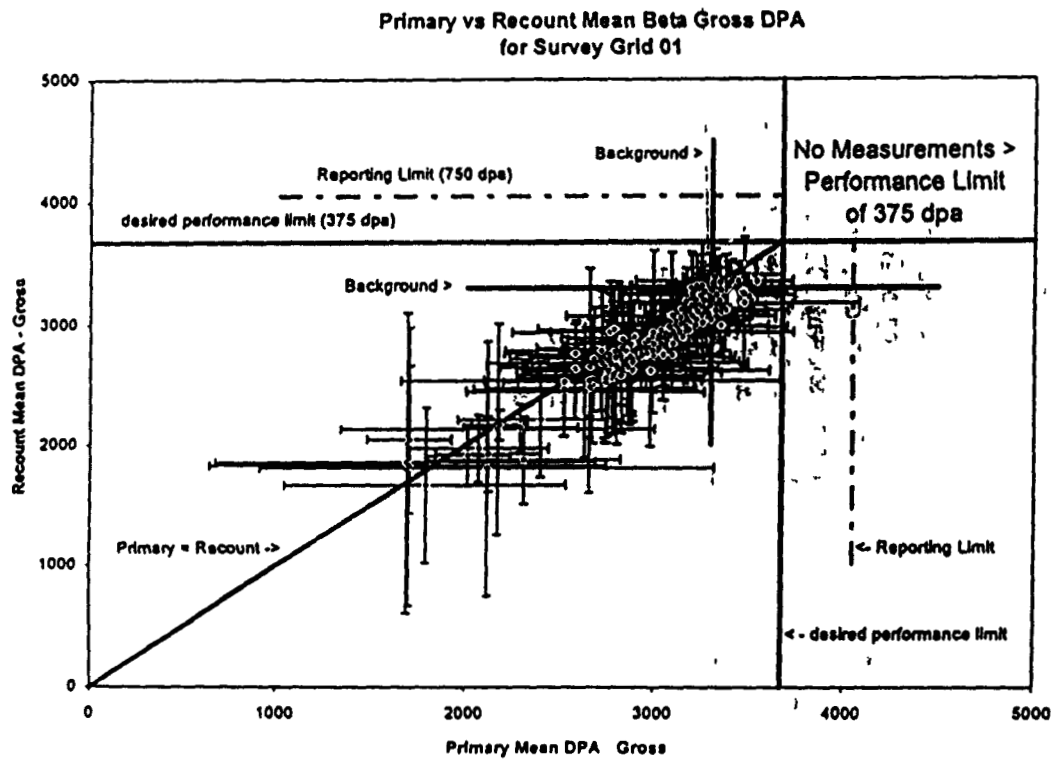

Figure 1 Demonstration of *a posteriori* Beta Detection Limit