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Rev. 0

River Corridor
Closure Contract

324 Building Baseline Radiological Characterization

June 2010

For Public Release

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor

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EXECUTIVE SUMMARY

This report documents the analysis of radiological data collected as part of the characterization study performed in 1998. The study was performed to create a baseline of the radiological conditions in the 324 Building.

A total of 85 technical [100 square centimeter (cm^2)] smears were collected from the Room 147 hoods, the Shielded Materials Facility (SMF), and the Radiochemical Engineering Cells (REC). Exposure rate readings (window open and window closed) were taken at a distance of 2.5 centimeters (cm) and 30 cm from the surface of each smear. Gross beta-gamma and alpha counts of each smear were also performed. The smear samples were analyzed by gamma energy analysis (GEA). Alpha energy analysis (AEA) and strontium-90 (^{90}Sr) analysis were also performed on selected smears. GEA results for one or more samples reported the presence of manganese-54 (^{54}Mn), cobalt-60 (^{60}Co), silver-108m (^{108m}Ag), antimony-125 (^{125}Sb), cesium-134 (^{134}Cs), cesium-137 (^{137}Cs), europium-154 (^{154}Eu), europium-155 (^{155}Eu), and americium-241 (^{241}Am). AEA results reported the presence of plutonium-239/240 ($^{239/240}Pu$), plutonium-238 (^{238}Pu)/^{241}Am, curium-243/244 ($^{243/244}Cm$), curium-242 (^{242}Cm), and americium-243 (^{243}Am).

Tables 5 through 9 present a summary by location of the estimated maximum removable and total contamination levels in the Room 147 hoods, the SMF, and the REC. The smear sample survey data and laboratory analytical results are presented in tabular form by sample in Appendix A. The Appendix A tables combine survey data documented in radiological survey reports found in Appendix B and laboratory analytical results reported in the *324 Building Physical and Radiological Characterization Study* (Berk, Hill, and Landsman 1998), supplemented by the laboratory analytical results found in Appendix C.

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ACRONYMS AND ABBREVIATIONS

AEA	alpha energy analysis
Ag	silver (e.g., ^{108m}Ag)
Am	americium (e.g., ^{241}Am)
Ba	barium (e.g., ^{137m}Ba)
Cm	curium (e.g. ^{243}Cm)
cm	centimeter
cm^2	square centimeter
Co	cobalt (e.g., ^{60}Co)
Cs	cesium (e.g., ^{137}Cs)
CsCl	cesium chloride
dpm	disintegrations per minute
Eu	europium (e.g., ^{155}Eu)
g	grams
GEA	gamma energy analysis
HCl	hydrochloric acid
HNO_3	nitric acid
M	molar
Mn	manganese (e.g. ^{54}Mn)
nCi	nanocuries
Pu	plutonium (e.g., ^{239}Pu)
REC	Radiochemical Engineering Cells
Se	selenium (e.g., ^{79}Se)
Sb	antimony (e.g. ^{125}Sb)
Sr	strontium (e.g., ^{90}Sr)
SMF	Shielded Materials Facility
Tc	technetium (e.g., ^{99}Tc)
WCH	Washington Closure Hanford
Y	yttrium (e.g. ^{90}Y)

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerel	millibecquerels	0.027	picocuries

1.0 INTRODUCTION AND SCOPE

This report documents the analysis of radiological data collected as part of the 1998 characterization study performed of the 324 Building. Radiological data were collected from the Room 147 hoods, the Shielded Materials Facility (SMF), and the Radiochemical Engineering Cells (REC). Data collected as part of the study from the SMF and the REC, specifically B-Cell and D-Cell, were analyzed and reported previously[1], but are included here for completeness.

2.0 BACKGROUND

The characterization study performed in 1998 created a baseline of the radiological conditions in the 324 Building. The study, documented as Appendix D to the *324/327 Buildings Stabilization/ Deactivation Project Management Plan* (Bechtel Hanford 1998)[2], was conducted in two parts. First, radiological survey reports, chemical and radiological analytical reports, and historical records such as occurrence reports and program records were reviewed for data or conditions that may have affected the radiological status of the building. The information was assessed to determine which building areas required further characterization. The areas identified were the Room 147 hoods, the SMF, and the REC. Second, a sampling plan was developed to collect data from the building areas requiring further characterization. The sampling plan involved the collection of smear samples, performance of radiological field readings of the smears, and laboratory analysis of the smear samples.

3.0 CHARACTERIZATION DATA

A total of 85 technical [100 square centimeter (cm^2)] smear samples were collected. The smear samples collected and laboratory analyses performed are summarized in Table 1. The smear sample data are presented in tabular form in Appendix A. The Appendix A tables combine survey data documented in radiological survey reports found in Appendix B and laboratory analytical results reported in the *324 Building Physical and Radiological Characterization Study* (Berk, Hill, and Landsman 1998), supplemented by the laboratory analytical results found in Appendix C.

[1] The 1998 characterization study data analyzed and reported previously are:

- SMF data: *Radiological Characterization of the Shielded Material Facility* (Mantooth 2003).
- REC B-Cell data: *Data Analysis and Radiological Scaling Factor for the B-Cell Waste Stream,* (Hill and Hobart 2000).
- REC D-Cell data: *Radiological Characterization of the HLV Waste Treatment Skid in the 324 Facility* (Hill 2001).

[2] The 1998 characterization study was removed with Revision 3 to the document. References to the 1998 characterization study are also found identifying it by the document number "HNF-3434." However, a search of archived records did not reveal a document by that number having ever been issued.

Table 1. Summary of Smear Samples Collected and Analyses Performed

Room or Location	Sample Location Description	Samples Collected	Samples Analyzed		
			GEA[a]	^{90}Sr[b]	AEA[c]
Room 147	Hood #1	2	2	1	2
	Hood #2	2	2	1	2
	Hood #3	2	2	1	2
SMF	Airlock	1	1	0	0
	East Cell	2	2	1	0
	South Cell	12	12	2	0
	Compartment 1	4	4	1	0
	Compartment 2	4	4	1	0
	Compartment 3	4	4	1	0
	Compartment 4	4	4	1	0
REC	Airlock	10	10	4	4
	A-Cell	6	6	2	2
	B-Cell	12	12	6	6
	C-Cell	10	10	5	6
	D-Cell	10	10	10	10

[a] Gamma energy analysis
[b] Strontium-90 analysis
[c] Alpha energy analysis

The data collected as part of the 1998 characterization study that were reported previously, but are also incorporated in Appendix A for completeness, include:

- SMF data: Mantooth (2003), Table 3-1, Summary of Analytical Results.
- REC B-Cell data: Hill and Hobart (2000), Table 7, Summary of Radiochemical Analysis of B-Cell Rack Metal Samples; and Table 9, Summary of Radiochemical Analysis of B-Cell Smears of Removable Contamination.
- REC D-Cell data: Hill (2001), Table 1, D-Cell Removable Contamination Characterization Data.

3.1 SURVEY DATA

Exposure rate readings (window open and window closed) were taken at a distance of 2.5 centimeters (cm) and 30 cm from the surface of each smear. The window closed readings are reported in Appendix A as gamma (penetrating radiation) exposure rates in units of milliroentgen per hour (mR/hr). Beta correction factors were used to convert the window open exposure rate readings to absorbed (non-penetrating radiation) dose rates, which are reported in units of millirads per hour (mrad/hr). The beta correction factors used are documented on the individual radiological survey reports in Appendix B.

Gross beta-gamma and alpha counts of each smear were also performed and, in some cases, performed multiple times (e.g, initial count plus 24-hour and/or 72-hour counts). Where more

than one count was performed, the most recent values are reported in Appendix A (e.g., 24-hour count results used in lieu of initial count results). The readings are reported in units of disintegrations per minute per 100 cm^2 (dpm/100 cm^2).

3.2 LABORATORY ANALYSES

The smear samples were analyzed by gamma energy analysis (GEA). Alpha energy analysis (AEA) and strontium-90 (^{90}Sr) analysis were also performed on selected samples. GEA results for one or more samples reported the presence of manganese-54 (^{54}Mn), cobalt-60 (^{60}Co), silver-108m (^{108m}Ag), antimony-125 (^{125}Sb), cesium-134 (^{134}Cs), cesium-137 (^{137}Cs), europium-154 (^{154}Eu), europium-155 (^{155}Eu), and americium-241 (^{241}Am). AEA results reported the presence of plutonium-239/240 ($^{239/240}Pu$), plutonium-238 (^{238}Pu)/^{241}Am, curium-243/244 ($^{243/244}Cm$), curium-242 (^{242}Cm), and americium-243 (^{243}Am). The measured isotopic activities in Appendix A are reported in units of microcuries per 100 cm^2 (µCi/100 cm^2).

Table 2 qualitatively summarizes the laboratory analytical results showing the radionuclides detected (i.e., activity reported above the detection limit) in one or more samples at each sample location.

4.0 DATA CALCULATIONS

The purpose of the baseline radiological characterization of the 324 Building was to obtain statistically reliable and defensible data to support waste classification in preparation for building dismantlement and demolition. Since direct measurement of all alpha-, beta-, and gamma-emitting radionuclides in the waste was not economical or practical, indirect methods were used to complete the radiological profile. See Hill and Hobart (2000). The treatment of Appendix A data is described below. Neither the data nor the ratios and scaling factors used to complete the radiological profile were decay corrected.

4.1 PAIRED RADIONUCLIDE RATIOS

AEA results reported several radionuclides in pairs, i.e., $^{239}Pu/^{240}Pu$, $^{238}Pu/^{241}Am$, and $^{243}Cm/^{244}Cm$. These results were separated into individual radionuclide activity values using assumptions applied in previous analyses of 324 Building radiological data. The assumptions and their sources are given below.

- $^{239}Pu/^{240}Pu$: 50.5% of total activity is ^{239}Pu and 49.5% is ^{240}Pu. Source: *Radiological Profile Methodology for Remote-Handled Transuranic Mixed Waste from 324 Facility B-Cell* (Hill, et. al., 2000), pg. C-3. Assumption based on a ratio from commercial fuel sheared during the Nuclear Waste Vitrification Project.

- $^{238}Pu/^{241}Am$: 18.5% of total activity is ^{238}Pu and 81.5% is ^{241}Am. Source: Hill, R. L., et. al. (2000), pgs. 22, 23. Assumption based relative isotopic concentrations on waste manifests of B-Cell dispersible material disposed of in 1996.

- ^{243}Cm/^{244}Cm: 1.43% of total activity is ^{243}Cm and 98.6% is ^{244}Cm. Source: Hill and Hobart (2000), pg. 34. Assumption based an estimated ^{243}Cm to ^{244}Cm ratio of 1:70 using process knowledge of the fuel that was used as a source of material added to B-Cell during its operational history.

Table 2. Qualitative Summary of Measured Smear Results

Sample Location	Gamma Energy Analysis						^{90}Sr Analysis	Alpha Energy Analysis			
	^{54}Mn	^{60}Co	^{134}Cs	^{137}Cs	^{154}Eu	^{241}Am		^{239}Pu/ ^{240}Pu	^{238}Pu/ ^{241}Am	^{243}Cm/ ^{244}Cm	^{242}Cm
Room 147 Hoods [a]											
Hood #1				✓			✓				
Hood #2		✓		✓			✓		✓		
Hood #3	✓	✓		✓			✓				
SMF [a]											
Airlock							---	---	---	---	---
East Cell		✓	✓	✓			✓	---	---	---	---
South Cell	✓	✓	✓	✓			✓	---	---	---	---
Comp. #1				✓			✓	---	---	---	---
Comp. #2		✓	✓	✓			✓	---	---	---	---
Comp. #3	✓	✓	✓	✓			✓	---	---	---	---
Comp. #4	✓	✓	✓	✓			✓	---	---	---	---
REC [a]											
Airlock [b]		✓	✓	✓	✓		✓	✓	✓	✓	✓
A-Cell		✓		✓			✓		✓	✓	
B-Cell		✓	✓	✓	✓	✓	✓	✓	✓	✓	
C-Cell [c]		✓	✓	✓	✓	✓	✓	✓	✓	✓	
D-Cell [d]		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

[a] Check mark indicates radionuclide detected, i.e., reported activity above detection limit; blank cell indicates reported activity below detection limit; and dashed line indicates no analyses performed.
[b] Detectable levels of ^{243}Am identified in three samples.
[c] Detectable levels of ^{155}Eu also identified in five samples.
[d] Detectable levels of ^{108m}Ag also identified in one sample.

4.2 RADIONUCLIDE SCALING FACTORS

Isotopic activity values for ^{241}Pu, ^{242}Pu, selenium-79 (^{79}Se), technetium-99 (^{99}Tc), and ^{90}Sr were calculated based on previously determined scaling factors used in Hill and Hobart (2000). The scaling factors and their surrogate radionuclides are given in Table 3. The basis for inclusion of the radionuclides in Table 3 is given in Hill and Hobart (2000).

The individual bases for the radionuclide scaling factors are as follows:

- ^{241}Pu, ^{242}Pu: The isotopic composition of the light water reactor fuel assemblies used in the Nuclear Waste Vitrification Project source term was assumed to bound the work

done throughout the work life-time of B-Cell and was therefore used as the plutonium composition for waste classification purposes (Hill and Hobart 2000, pg. 41).

- ^{79}Se, ^{99}Tc: A ratioing method using ORIGEN data was used for these mobile radionuclides that could not be entirely dismissed in earlier B-Cell waste characterization efforts (Hill and Hobart 2000, pg. 40).

- ^{90}Sr: The relationship between ^{90}Sr and ^{137}Cs was established based on the analysis of smears of removable contamination collected in B-Cell obtained under controlled conditions (Hill and Hobart 2000, pg. 52). This relationship does not hold for the SMF where cesium chloride (CsCl) was processed and encapsulated (Mantooth 2003, pg. 1). Accordingly, this scaling factor was not applied to SMF data.

Table 3. Radionuclide Scaling Factors

Radionuclide	Scaling Factor	Surrogate Radionuclide
^{241}Pu	2.47E+01	$^{239/240}$Pu
^{242}Pu	8.28E-04	$^{239/240}$Pu
^{79}Se	2.36E-04	^{241}Am
^{99}Tc	7.83E-03	^{241}Am
^{90}Sr	6.00E-01	^{137}Cs

4.3 AVERAGE AND MAXIMUM ACTIVITY VALUES

Average and maximum removable activity values were calculated by sample location for each radionuclide. Samples with reported activity below the detection limit, i.e., less-than values, were not used in the statistical calculations. Average and maximum total activity values were calculated by multiplying the removable activity values by a factor of 30. This factor is based on the total to removable activity ratio developed as described below.

4.4 TOTAL TO REMOVABLE ACTIVITY RATIO

The total to removable activity ratio of 30:1 was developed using data reported in Hill and Hobart (2000). Fixed radioactive contamination on the surface of metal coupon samples collected from B-Cell process equipment was removed by etching the surface of the coupon with diluted Aqua Regia [3 molar (M) nitric acid (HNO_3) and 3M hydrochloric (HCl) mixture]. The resulting solutions were analyzed by GEA, AEA, beta counting (^{90}Sr), proportional counting (gross alpha), inductively coupled plasma mass spectrometry (^{243}Cm, ^{244}Cm), and laser kinetic phosphorescence (total uranium). Results above detection levels were reported for ^{90}Sr, ^{125}Sb, ^{137}Cs, ^{154}Eu, ^{238}Pu, $^{239/240}$Pu, ^{241}Am, ^{243}Cm, and ^{244}Cm.

Hill and Hobart (2000), Table 7, reported the results in units of nanocuries per gram (nCi/g). The results were converted from nCi/g to nCi/100 cm^2 using the effective etched surface area (cm^2), and the corresponding etched area mass (g) of each sample. Now in compatible units, the fixed contamination results were compared to the analytical results of the removable contamination smear samples collected from B-Cell. The removable contamination results are

reported in Hill and Hobart (2000), Table 9, in units of nCi/100 cm^2. The total to removable activity ratio calculations are found in Appendix D.

4.5 SAMPLE CALCULATION

The manipulation of the laboratory analytical results to arrive at the calculated activities reported in Appendix A is illustrated in Table 4. Sample 18a, collected from REC C-Cell, is used as the example. Three types of analyses were performed on the sample, from which 8 results were reported above the corresponding detection limit. The measured activities were used in conjunction with the ratios and scaling factors described in Sections 4.1 and 4.2 to complete the radiological profile of the sample.

The three columns on the left-hand side of Table 4 show the types of analyses performed on the smear sample, the radionuclides detected, and their measured activities. The three columns on the right-hand side of the table list the inferred radionuclides, the ratio or scaling factor equation used to calculate their activities, and their calculated activities.

For the sample used in the example, ^{90}Sr analysis was not performed. Since directly measured ^{90}Sr data were not available, an activity for ^{90}Sr was calculated using the scaling factor based on ^{137}Cs. GEA analysis was performed and reported a measured activity for ^{241}Am. Since directly measured data for ^{241}Am were available, the ratio based on the measured $^{238}Pu/^{241}Am$ activity was not used.

Table 4. C-Cell Sample 18a Measured and Calculated Activities

Analysis	Surrogate Radionuclide	Measured Activity (µCi/100 cm^2)	Inferred Radionuclide	Ratio/Scaling Factor Equation	Calculated Activity (µCi/100 cm^2)
GEA	^{134}Cs	4.09E-03	---	---	---
	^{137}Cs	1.10E+00	^{90}Sr	6.00E-01 x ^{137}Cs	6.60E-01
	^{154}Eu	2.25E-03	---	---	---
	^{241}Am	1.51E-03	^{79}Se	2.36E-04 x ^{241}Am	3.56E-07
			^{99}Tc	7.83E-03 x ^{241}Am	1.18E-05
AEA	$^{238}Pu/^{241}Am$	3.27E-03	^{238}Pu	1.85E-01 x $^{238}Pu/^{241}Am$	6.05E-04
	$^{239}Pu/^{240}Pu$	5.69E-04	^{239}Pu	5.05E-01 x $^{239}Pu/^{240}Pu$	2.87E-04
			^{240}Pu	4.95E-01 x $^{239}Pu/^{240}Pu$	2.82E-04
			^{241}Pu	2.47E+01 x $^{239}Pu/^{240}Pu$	1.41E-02
			^{242}Pu	8.28E-04 x $^{239}Pu/^{240}Pu$	4.71E-07
	$^{243}Cm/^{244}Cm$	1.15E-02	^{243}Cm	1.43E-02 x $^{243}Cm/^{244}Cm$	1.64E-04
			^{244}Cm	9.86E-01 x $^{243}Cm/^{244}Cm$	1.13E-02
Gross Alpha	Alpha	1.53E-02	Beta/Gamma	^{90}Sr + ^{134}Cs + ^{137}Cs + ^{154}Eu	1.77E+00
			Total Activity	Alpha + Beta/Gamma	1.78E+00

5.0 SUMMARY OF RESULTS

Tables 5 through 9 present a summary by location of the estimated maximum removable and total contamination levels in the Room 147 hoods, the SMF, and the REC. The results by individual sample are found in Appendix A.

Table 5. Estimated Maximum Removable and Total Contamination – Room 147 Hoods

Radionuclide	Removable (µCi/100 cm^2)			Total (µCi/100 cm^2)		
	Hood #1	Hood #2	Hood #3	Hood #1	Hood #2	Hood #3
^{54}Mn	ND	ND	1.05E-05	ND	ND	3.15E-04
^{60}Co	ND	9.11E-04	5.97E-04	ND	2.73E-02	1.79E-02
^{79}Se	---	1.79E-09	---	---	5.37E-08	---
^{90}Sr [a]	8.46E-03	1.16E-02	1.44E-03	2.54E-01	3.47E-01	4.32E-02
^{99}Tc	---	5.94E-08	---	---	1.78E-06	---
^{108m}Ag	---	---	---	---	---	---
^{125}Sb	ND	ND	ND	ND	ND	ND
^{134}Cs	ND	ND	ND	ND	ND	ND
^{137}Cs [b]	1.41E-02	1.93E-02	3.61E-03	4.23E-01	5.79E-01	1.08E-01
^{154}Eu	ND	ND	ND	ND	ND	ND
^{155}Eu	ND	ND	ND	ND	ND	ND
^{238}Pu	---	1.72E-06	---	---	5.17E-05	---
^{239}Pu	---	---	---	---	---	---
^{240}Pu	---	---	---	---	---	---
^{241}Pu	---	---	---	---	---	---
^{242}Pu	---	---	---	---	---	---
^{241}Am	---	7.59E-06	---	---	2.28E-04	---
^{242}Cm	ND	ND	ND	ND	ND	ND
^{243}Cm	---	---	---	---	---	---
^{244}Cm	---	---	---	---	---	---
Alpha	ND	1.49E-05	ND	ND	4.47E-04	ND
Beta-Gamma	2.26E-02	3.10E-02	4.45E-03	6.77E-01	9.31E-01	1.33E-01
Total Activity [c]	2.26E-02	3.11E-02	4.45E-03	6.77E-01	9.32E-01	1.33E-01

ND = not detected
--- = not reported
[a] assumed to include yttrium-90 (^{90}Y) in secular equilibrium
[b] assumed to include barium-137m (^{137m}Ba) in secular equilibrium
[c] alpha + beta-gamma activity

Table 6. Estimated Maximum Removable Contamination Levels - SMF

Radionuclide	Removable Contamination (µCi/100 cm^2)						
	Airlock	East Cell	South Cell	Comp. #1	Comp. #2	Comp. #3	Comp. #4
^{54}Mn	ND	ND	1.93E-01	ND	ND	3.59E-04	9.22E-04
^{60}Co	ND	1.81E-05	1.34E+01	ND	1.49E-03	9.58E-03	3.21E-02
^{79}Se	---	---	---	---	---	---	---
^{90}Sr [a]	---	4.59E-02	8.34E+00	4.81E+00	1.30E-03	1.09E-03	4.90E-03
^{99}Tc	---	---	---	---	---	---	---
^{108m}Ag	---	---	---	---	---	---	---
^{125}Sb	ND	ND	ND	ND	ND	ND	2.47E-03
^{134}Cs	ND	1.53E-05	2.21E+00	ND	2.11E-04	5.63E-04	3.48E-03
^{137}Cs [b]	ND	1.53E-03	2.76E+02	1.04E+03	1.49E-01	2.08E-01	2.19E-01
^{154}Eu	ND	ND	ND	ND	ND	ND	ND
^{155}Eu	ND	ND	ND	ND	ND	ND	ND
^{238}Pu	---	---	---	---	---	---	---
^{239}Pu	---	---	---	---	---	---	---
^{240}Pu	---	---	---	---	---	---	---
^{241}Pu	---	---	---	---	---	---	---
^{242}Pu	---	---	---	---	---	---	---
^{241}Am	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---
^{243}Cm	---	---	---	---	---	---	---
^{244}Cm	---	---	---	---	---	---	---
Alpha	ND	1.03E-05	4.81E-03	4.06E-03	ND	ND	ND
Beta-Gamma	ND	4.72E-02	2.88E+02	1.04E+03	1.50E-01	2.16E-01	2.25E-01
Total Activity [c]	ND	4.73E-02	2.88E+02	1.04E+03	1.50E-01	2.16E-01	2.25E-01

ND = not detected
--- = not reported
[a] assumed to include ^{90}Y in secular equilibrium
[b] assumed to include ^{137m}Ba in secular equilibrium
[c] alpha + beta-gamma activity

Table 7. Estimated Maximum Total Contamination Levels - SMF

Radionuclide	Total Contamination (µCi/100 cm^2)						
	Airlock	East Cell	South Cell	Comp. #1	Comp. #2	Comp. #3	Comp. #4
^{54}Mn	ND	ND	5.79E+00	ND	ND	1.08E-02	2.77E-02
^{60}Co	ND	5.43E-04	4.02E+02	ND	4.47E-02	2.87E-01	9.63E-01
^{79}Se	---	---	---	---	---	---	---
^{90}Sr [a]	---	1.38E+00	2.50E+02	1.44E+02	3.90E-02	3.27E-02	1.47E-01
^{99}Tc	---	---	---	---	---	---	---
^{108m}Ag	---	---	---	---	---	---	---
^{125}Sb	ND	ND	ND	ND	ND	ND	7.41E-02
^{134}Cs	ND	4.59E-04	6.63E+01	ND	6.33E-03	1.69E-02	1.04E-01
^{137}Cs [b]	ND	4.59E-02	8.28E+03	3.12E+04	4.47E+00	6.24E+00	6.57E+00
^{154}Eu	ND	ND	ND	ND	ND	ND	ND
^{155}Eu	ND	ND	ND	ND	ND	ND	ND
^{238}Pu	---	---	---	---	---	---	---
^{239}Pu	---	---	---	---	---	---	---
^{240}Pu	---	---	---	---	---	---	---
^{241}Pu	---	---	---	---	---	---	---
^{242}Pu	---	---	---	---	---	---	---
^{241}Am	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---
^{243}Cm	---	---	---	---	---	---	---
^{244}Cm	---	---	---	---	---	---	---
Alpha	ND	3.09E-04	1.44E-01	1.22E-01	ND	ND	ND
Beta-Gamma	ND	1.42E+00	8.64E+03	3.12E+04	4.51E+00	6.47E+00	6.76E+00
Total Activity [c]	ND	1.42E+00	8.64E+03	3.12E+04	4.51E+00	6.47E+00	6.76E+00

ND = not detected
--- = not reported
[a] assumed to include ^{90}Y in secular equilibrium
[b] assumed to include ^{137m}Ba in secular equilibrium
[c] alpha + beta-gamma activity

Table 8. Estimated Maximum Removable Contamination Levels - REC

Radionuclide	Removable Contamination (µCi/100 cm^2)				
	A-Cell	B-Cell	C-Cell	D-Cell	Airlock
^{54}Mn	ND	ND	ND	ND	ND
^{60}Co	1.25E-04	6.50E-02	8.49E-04	1.31E+00	5.19E-03
^{79}Se	3.29E-08	1.53E-04	8.66E-07	1.79E-04	6.37E-06
^{90}Sr [a]	1.47E-01	1.97E+02	6.60E-01	2.50E+02	1.55E+01
^{99}Tc	1.09E-06	5.08E-03	2.87E-05	5.93E-03	2.11E-04
^{108m}Ag	---	---	---	1.59E-02	---
^{125}Sb	ND	ND	ND	ND	ND
^{134}Cs	ND	1.09E-01	5.55E-03	2.17E-01	1.46E-03
^{137}Cs [b]	3.46E-01	3.29E+02	1.10E+00	1.25E+03	3.76E+01
^{154}Eu	ND	5.25E-01	6.98E-03	6.99E+00	1.72E-02
^{155}Eu	ND	ND	2.10E-03	ND	ND
^{238}Pu	3.16E-05	4.70E-02	1.70E-03	1.72E-01	6.12E-03
^{239}Pu	ND	9.04E-03	3.61E-04	7.02E-02	2.19E-03
^{240}Pu	ND	8.86E-03	3.53E-04	6.88E-02	2.15E-03
^{241}Pu	ND	4.42E-01	1.76E-02	3.43E+00	1.07E-01
^{242}Pu	ND	1.48E-05	5.91E-07	1.15E-04	3.59E-06
^{241}Am	1.39E-04	6.49E-01	3.67E-03	7.57E-01	2.70E-02
^{242}Cm	ND	ND	ND	5.75E-03	9.01E-05
^{243}Cm	1.25E-06	1.18E-03	4.15E-04	2.20E-02	1.40E-04
^{244}Cm	8.60E-05	8.11E-02	2.86E-02	1.52E+00	9.64E-03
Alpha	1.48E-03	1.16E+00	7.90E-02	2.28E+00	5.36E-02
Beta-Gamma	4.32E-01	5.27E+02	1.77E+00	1.51E+03	5.05E+01
Total Activity [c]	4.32E-01	5.27E+02	1.78E+00	1.51E+03	5.06E+01

ND = not detected
--- = not reported
[a] assumed to include ^{90}Y in secular equilibrium
[b] assumed to include ^{137m}Ba in secular equilibrium
[c] alpha + beta-gamma activity

Table 9. Estimated Maximum Total Contamination Levels - REC

Radionuclide	Total Contamination (µCi/100 cm^2)				
	A-Cell	B-Cell	C-Cell	D-Cell	Airlock
^{54}Mn	ND	ND	ND	ND	ND
^{60}Co	3.75E-03	1.95E+00	2.55E-02	3.93E+01	1.56E-01
^{79}Se	9.87E-07	4.59E-03	2.60E-05	5.36E-03	1.91E-04
^{90}Sr [a]	4.41E+00	5.92E+03	1.98E+01	7.50E+03	4.64E+02
^{99}Tc	3.27E-05	1.52E-01	8.62E-04	1.78E-01	6.34E-03
^{108m}Ag	---	---	---	4.77E-01	---
^{125}Sb	ND	ND	ND	ND	ND
^{134}Cs	ND	3.27E+00	1.67E-01	6.51E+00	4.38E-02
^{137}Cs [b]	1.04E+01	9.87E+03	3.30E+01	3.75E+04	1.13E+03
^{154}Eu	ND	1.58E+01	2.09E-01	2.10E+02	5.16E-01
^{155}Eu	ND	ND	6.30E-02	ND	ND
^{238}Pu	9.49E-04	1.41E+00	5.11E-02	5.16E+00	1.84E-01
^{239}Pu	ND	2.71E-01	1.08E-02	2.11E+00	6.58E-02
^{240}Pu	ND	2.66E-01	1.06E-02	2.06E+00	6.44E-02
^{241}Pu	ND	1.33E+01	5.29E-01	1.03E+02	3.22E+00
^{242}Pu	ND	4.45E-04	1.77E-05	3.45E-03	1.08E-04
^{241}Am	4.18E-03	1.95E+01	1.10E-01	2.27E+01	8.09E-01
^{242}Cm	ND	ND	ND	1.73E-01	2.70E-03
^{243}Cm	3.74E-05	3.53E-02	1.24E-02	6.61E-01	4.20E-03
^{244}Cm	2.58E-03	2.43E+00	8.58E-01	4.55E+01	2.89E-01
Alpha	4.44E-02	3.48E+01	2.37E+00	6.84E+01	1.61E+00
Beta-Gamma	1.29E+01	1.58E+04	5.30E+01	4.52E+04	1.52E+03
Total Activity [c]	1.30E+01	1.58E+04	5.34E+01	4.53E+04	1.52E+03

ND = not detected
--- = not reported
[a] assumed to include ^{90}Y in secular equilibrium
[b] assumed to include ^{137m}Ba in secular equilibrium
[c] alpha + beta-gamma activity

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APPENDIX A

BASELINE RADIOLOGICAL CHARACTERIZATION DATA

(TABULATED)

Room 147 Hood 1 ..... A-1
Room 147 Hood 2 ..... A-2
Room 147 Hood 3 ..... A-3
SMF Airlock A-4
SMF East Cell A-5
SMF South Cell A-6
SMF Compartment 1 ..... A-8
SMF Compartment 2 ..... A-9
SMF Compartment 3 ..... A-10
SMF Compartment 4 ..... A-11
REC Airlock A-12
REC A-Cell A-14
REC B-Cell A-16
REC C-Cell A-18
REC D-Cell A-20

Rm 147 Hood 1

Sample No.	03a	03b	Estimated Isotopic Activity (µCi/100 cm^2)			
Sample Location	Hood #1	Hood #1	Removable		Total[p]	
			Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)						
Beta/Gamma	45,000	95,000	NA	NA	NA	NA
Alpha	<20	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)						
2.5 cm	---	---	NA	NA	NA	NA
30 cm	---	---	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)						
2.5 cm	---	---	NA	NA	NA	NA
30 cm	---	---	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)						
^{54}Mn	<4.E-06	<5.E-06	ND	ND	ND	ND
^{60}Co	<6.E-06	<7.E-06	ND	ND	ND	ND
^{90}Sr[a,b]	1.78E-03	8.46E-03	5.12E-03	8.46E-03	1.54E-01	2.54E-01
^{108m}Ag	---	---	---	---	---	---
^{125}Sb	<4.E-05	<8.E-05	ND	ND	ND	ND
^{134}Cs	<5.E-06	<6.E-06	ND	ND	ND	ND
^{137}Cs	4.81E-03	1.41E-02	9.46E-03	1.41E-02	2.84E-01	4.23E-01
^{154}Eu	<2.E-05	<2.E-05	ND	ND	ND	ND
^{155}Eu	<3.E-05	<5.E-05	ND	ND	ND	ND
^{241}Am	<6.E-05	<2.E-04	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)						
^{239}Pu/^{240}Pu	<1.E-05	<1.E-05	ND	ND	ND	ND
^{238}Pu/^{241}Am	<1.E-05	<1.E-05	ND	ND	ND	ND
^{243}Cm/^{244}Cm	<1.E-05	<1.E-05	ND	ND	ND	ND
^{242}Cm	<1.E-05	<1.E-05	ND	ND	ND	ND
Measured Gross Activity (µCi/100 cm^2)						
Alpha	<2.E-05	<2.E-05	ND	ND	ND	ND
Beta/Gamma	6.59E-03	2.26E-02	1.46E-02	2.26E-02	4.37E-01	6.77E-01
Total	6.59E-03	1.41E-02	1.03E-02	1.41E-02	3.10E-01	4.23E-01
Calculated Isotopic Activity (µCi/100 cm^2)						
^{238}Pu[c]	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

Rm 147 Hood 2

Sample No.	05a	05b	Estimated Isotopic Activity (µCi/100 cm^2)			
Sample Location	Hood #2	Hood #2	Removable		Total[p]	
			Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)						
Beta/Gamma	15,000	85,000	NA	NA	NA	NA
Alpha	35	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)						
2.5 cm	---	---	NA	NA	NA	NA
30 cm	---	---	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)						
2.5 cm	---	---	NA	NA	NA	NA
30 cm	---	---	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)						
^{54}Mn	<1.E-05	<7.E-06	ND	ND	ND	ND
^{60}Co	9.11E-04	1.61E-04	5.36E-04	9.11E-04	1.61E-02	2.73E-02
^{90}Sr[a,b]	7.23E-04	1.16E-02	6.15E-03	1.16E-02	1.85E-01	3.47E-01
^{108m}Ag	---	---	---	---	---	---
^{125}Sb	<4.E-05	<8.E-05	ND	ND	ND	ND
^{134}Cs	<2.E-05	<8.E-06	ND	ND	ND	ND
^{137}Cs	2.20E-03	1.93E-02	1.08E-02	1.93E-02	3.23E-01	5.79E-01
^{154}Eu	<3.E-05	<3.E-05	ND	ND	ND	ND
^{155}Eu	<2.E-05	<3.E-05	ND	ND	ND	ND
^{241}Am	<2.E-05	<2.E-05	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)						
^{239}Pu/^{240}Pu	<3.E-05	<8.E-06	ND	ND	ND	ND
^{238}Pu/^{241}Am	<3.E-05	9.31E-06	9.31E-06	9.31E-06	2.79E-04	2.79E-04
^{243}Cm/^{244}Cm	<3.E-05	<4.E-06	ND	ND	ND	ND
^{242}Cm	<3.E-05	<2.E-06	ND	ND	ND	ND
Measured Gross Activity (µCi/100 cm^2)						
Alpha	<3.E-05	1.49E-05	1.49E-05	1.49E-05	4.47E-04	4.47E-04
Beta/Gamma	3.83E-03	3.10E-02	1.74E-02	3.10E-02	5.23E-01	9.31E-01
Total	3.83E-03	3.11E-02	1.74E-02	3.11E-02	5.23E-01	9.32E-01
Calculated Isotopic Activity (µCi/100 cm^2)						
^{238}Pu[c]	---	1.72E-06	1.72E-06	1.72E-06	5.17E-05	5.17E-05
^{239}Pu[d]	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---
^{241}Am[a,h]	---	7.59E-06	7.59E-06	7.59E-06	2.28E-04	2.28E-04
^{243}Cm[j]	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---
^{79}Se[m]	---	1.79E-09	1.79E-09	1.79E-09	5.37E-08	5.37E-08
^{99}Tc[n]	---	5.94E-08	5.94E-08	5.94E-08	1.78E-06	1.78E-06

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

Rm 147 Hood 3

Sample No.	04a	04b	Estimated Isotopic Activity (µCi/100 cm^2)			
Sample Location	Hood #3	Hood #3	Removable		Total[p]	
			Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)						
Beta/Gamma	15,000	12,500	NA	NA	NA	NA
Alpha	<20	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)						
2.5 cm	---	---	NA	NA	NA	NA
30 cm	---	---	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)						
2.5 cm	---	---	NA	NA	NA	NA
30 cm	---	---	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)						
^{54}Mn	<3.E-06	1.05E-05	1.05E-05	1.05E-05	3.15E-04	3.15E-04
^{60}Co	<4.E-06	5.97E-04	5.97E-04	5.97E-04	1.79E-02	1.79E-02
^{90}Sr[a,b]	2.58E-04	1.44E-03	8.49E-04	1.44E-03	2.55E-02	4.32E-02
^{108m}Ag	---	---	---	---	---	---
^{125}Sb	<3.E-05	<3.E-05	ND	ND	ND	ND
^{134}Cs	<4.E-06	<7.E-06	ND	ND	ND	ND
^{137}Cs	3.61E-03	2.40E-03	3.01E-03	3.61E-03	9.02E-02	1.08E-01
^{154}Eu	<9.E-06	<2.E-05	ND	ND	ND	ND
^{155}Eu	<3.E-05	<3.E-05	ND	ND	ND	ND
^{241}Am	<2.E-04	<2.E-04	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)						
^{239}Pu/^{240}Pu	<3.E-06	<2.E-05	ND	ND	ND	ND
^{238}Pu/^{241}Am	<3.E-06	<2.E-05	ND	ND	ND	ND
^{243}Cm/^{244}Cm	<3.E-06	<2.E-05	ND	ND	ND	ND
^{242}Cm	<3.E-06	<2.E-05	ND	ND	ND	ND
Measured Gross Activity (µCi/100 cm^2)						
Alpha	<2.E-05	<2.E-05	ND	ND	ND	ND
Beta/Gamma	3.87E-03	4.45E-03	4.16E-03	4.45E-03	1.25E-01	1.33E-01
Total	3.87E-03	3.01E-03	3.44E-03	3.87E-03	1.03E-01	1.16E-01
Calculated Isotopic Activity (µCi/100 cm^2)						
^{238}Pu[c]	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF Airlock

Sample No.	38b	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	Ctr of Floor	Removable		Total	
		Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)					
Beta/Gamma	2,000	NA	NA	NA	NA
Alpha	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)					
2.5 cm	<0.5	NA	NA	NA	NA
30 cm	<0.5	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)					
2.5 cm	<0.5	NA	NA	NA	NA
30 cm	<0.5	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)					
^{54}Mn	<3.E-06	ND	ND	ND	ND
^{60}Co	<5.E-06	ND	ND	ND	ND
^{90}Sr[a]	---	---	---	---	---
^{108m}Ag	---	---	---	---	---
^{125}Sb	<8.E-06	ND	ND	ND	ND
^{134}Cs	<4.E-06	ND	ND	ND	ND
^{137}Cs	<4.E-06	ND	ND	ND	ND
^{154}Eu	<9.E-06	ND	ND	ND	ND
^{155}Eu	<2.E-05	ND	ND	ND	ND
^{241}Am	<6.E-05	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)					
^{239}Pu/^{240}Pu	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---
^{242}Cm	---	---	---	---	---
Measured Gross Activity (µCi/100 cm^2)					
Alpha	<2.E-05	ND	ND	ND	ND
Beta/Gamma	ND	ND	ND	ND	ND
Total	ND	ND	ND	ND	ND
Calculated Isotopic Activity (µCi/100 cm^2)					
^{238}Pu[c]	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---

Assumptions: (a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF East Cell

Sample No.	32a	32b	Estimated Isotopic Activity (µCi/100 cm^2)			
Sample Location	Ctr of Floor	Ctr of Floor	Removable		Total[p]	
			Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)						
Beta/Gamma	5,500	3,500	NA	NA	NA	NA
Alpha	<20	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)						
2.5 cm	<0.5	<0.5	NA	NA	NA	NA
30 cm	<0.5	<0.5	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)						
2.5 cm	<0.5	<0.5	NA	NA	NA	NA
30 cm	<0.5	<0.5	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)						
^{54}Mn	<5.E-06	<4.E-06	ND	ND	ND	ND
^{60}Co	1.81E-05	6.40E-06	1.23E-05	1.81E-05	3.68E-04	5.43E-04
^{90}Sr[a]	---	4.59E-02	4.59E-02	4.59E-02	1.38E+00	1.38E+00
^{108m}Ag	---	---	---	---	---	---
^{125}Sb	<3.E-05	<3.E-05	ND	ND	ND	ND
^{134}Cs	<8.E-06	1.53E-05	1.53E-05	1.53E-05	4.59E-04	4.59E-04
^{137}Cs	1.53E-03	1.32E-03	1.43E-03	1.53E-03	4.28E-02	4.59E-02
^{154}Eu	<2.E-05	<9.E-06	ND	ND	ND	ND
^{155}Eu	<2.E-05	<2.E-05	ND	ND	ND	ND
^{241}Am	<9.E-06	<4.E-05	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)						
^{239}Pu/^{240}Pu	---	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---
Measured Gross Activity (µCi/100 cm^2)						
Alpha	<2.E-05	1.03E-05	1.03E-05	1.03E-05	3.09E-04	3.09E-04
Beta/Gamma	1.55E-03	4.72E-02	2.44E-02	4.72E-02	7.32E-01	1.42E+00
Total	1.55E-03	4.73E-02	2.44E-02	4.73E-02	7.32E-01	1.42E+00
Calculated Isotopic Activity (µCi/100 cm^2)						
^{238}Pu[c]	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF So Cell

Sample No.	47a	47b	48a	48b	49a	49b	50a	50b
Sample Location	Station3	Station 3	Station 4	Station 4	Station 11	Station 11	Station 12	Station 12
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	---	---	---	----	---	---	---	---
Alpha	700	700	350	350	350	<20	<20	350
Gamma Exposure Rate (mR/hr)								
2.5 cm	40.5	42	6	3.5	3.8	1.5	5.3	9
30 cm	2	2.0	1.2	0.8	0.8	1	1	1.2
Absorbed Dose Rate (mrad/hr)								
2.5 cm	6,860	8,658	444	237	416	50	235	471
30 cm	104	131	9.6	10.4	11.9	5.2	8.5	12.6
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	1.34E-01	1.25E-01	4.93E-02	1.86E-02	2.60E-02	<4.E-03	7.20E-03	3.70E-02
^{60}Co	1.34E+01	9.75E+00	2.77E+00	7.77E-01	2.70E-01	1.67E-01	8.08E-01	3.64E+00
^{90}Sr$^{(a)}$	8.34E+00	---	---	---	---	---	---	---
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<4.E-01	<5.E-01	<4.E-02	<4.E-02	<3.E-02	<2.E-02	<3.E-02	<4.E-02
^{134}Cs	2.21E+00	2.14E+00	2.76E-01	4.24E-01	1.62E-02	1.07E-02	6.78E-02	2.44E-01
^{137}Cs	1.98E+02	2.76E+02	6.90E+00	8.66E+00	4.94E+00	1.21E+00	3.38E+00	4.98E+00
^{154}Eu	<7.E-02	<6.E-02	<2.E-02	<8.E-03	<5.E-03	<5.E-03	<8.E-03	<2.E-02
^{155}Eu	<3.E-01	<3.E-01	<2.E-02	<2.E-02	<2.E-02	<7.E-03	<2.E-02	<2.E-02
^{241}Am	<3.E-01	<4.E-01	<3.E-02	<3.E-02	<2.E-02	<9.E-03	<2.E-02	<3.E-02
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	---	---	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---	---
Measured Gross Activity (µCi/100 cm^2)								
Alpha	2.14E-03	---	4.81E-03	---	1.25E-03	---	1.95E-03	---
Beta/Gamma	2.22E+02	2.88E+02	1.00E+01	9.88E+00	5.25E+00	1.39E+00	4.26E+00	8.90E+00
Total	2.22E+02	2.88E+02	1.00E+01	9.88E+00	5.25E+00	1.39E+00	4.26E+00	8.90E+00
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu$^{(c)}$	---	---	---	---	---	---	---	---
^{239}Pu$^{(d)}$	---	---	---	---	---	---	---	---
^{240}Pu$^{(e)}$	---	---	---	---	---	---	---	---
^{241}Pu$^{(f)}$	---	---	---	---	---	---	---	---
^{242}Pu$^{(g)}$	---	---	---	---	---	---	---	---
^{241}Am$^{(a,h)}$	---	---	---	---	---	---	---	---
^{243}Cm$^{(j)}$	---	---	---	---	---	---	---	---
^{244}Cm$^{(k)}$	---	---	---	---	---	---	---	---
^{79}Se$^{(m)}$	---	---	---	---	---	---	---	---
^{99}Tc$^{(n)}$	---	---	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF So Cell

Sample No.	51a	51b	52a	52b	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	Station 10	Station 10	Station 13	Station 13	Removable		Total	
					Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	---	---	---	---	NA	NA	NA	NA
Alpha	350	350	350	1,400	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)								
2.5 cm	1.8	2.3	23	10.5	NA	NA	NA	NA
30 cm	1	0.7	1.5	1.2	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)								
2.5 cm	143	298	5,078	1,490	NA	NA	NA	NA
30 cm	8.5	10.6	87	27.6	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	<2.E-03	<2.E-03	1.20E-01	1.93E-01	7.89E-02	1.93E-01	2.37E+00	5.79E+00
^{60}Co	4.42E-02	3.14E-02	1.89E+00	2.53E+00	3.01E+00	1.34E+01	9.02E+01	4.02E+02
^{90}Sr[a]	---	---	2.32E+00	---	5.33E+00	8.34E+00	1.60E+02	2.50E+02
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<2.E-02	<4.E-02	<4.E-01	<2.E-01	ND	ND	ND	ND
^{134}Cs	5.33E-03	7.01E-03	1.52E-01	1.15E-01	4.72E-01	2.21E+00	1.42E+01	6.63E+01
^{137}Cs	2.95E+00	9.77E+00	1.66E+02	4.01E+01	6.02E+01	2.76E+02	1.81E+03	8.28E+03
^{154}Eu	<4.E-03	<4.E-03	<4.E-02	<3.E-02	ND	ND	ND	ND
^{155}Eu	<9.E-03	<2.E-02	<3.E-01	<2.E-01	ND	ND	ND	ND
^{241}Am	<2.E-02	<3.E-02	<4.E-01	<2.E-01	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	---	---	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---	---
Measured Gross Activity (µCi/10(				---	---	---	---	
Alpha	8.10E-04	---	3.03E-03	---	2.33E-03	4.81E-03	7.00E-02	1.44E-01
Beta/Gamma	3.00E+00	9.81E+00	1.70E+02	4.29E+01	6.47E+01	2.88E+02	1.94E+03	8.64E+03
Total	3.00E+00	9.81E+00	1.70E+02	4.29E+01	6.47E+01	2.88E+02	1.94E+03	8.64E+03
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu[c]	---	---	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF Comp 1

Sample No.	60a	60b	61a	61b	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	Station 9 Wall	Station 9 Wall	Station 8	Station 8	Removable		Total	
					Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	---	---	---	---	NA	NA	NA	NA
Alpha	<20	<20	<20	350	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)								
2.5 cm	26	120	120	195	NA	NA	NA	NA
30 cm	2	4	5	7	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)								
2.5 cm	3,875	35,580	35,580	53,805	NA	NA	NA	NA
30 cm	56	352	471	646	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	<7.E-03	<7.E-02	<6.E-02	<9.E-02	ND	ND	ND	ND
^{60}Co	<4.E-03	<2.E-02	<1.E-02	<2.E-02	ND	ND	ND	ND
^{90}Sr[a]	---	4.81E+00	---	---	4.81E+00	4.81E+00	1.44E+02	1.44E+02
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<3.E-01	<7.E-01	<7.E-01	<9.E-01	ND	ND	ND	ND
^{134}Cs	<1.E-02	<8.E-02	<7.E-02	<2.E-01	ND	ND	ND	ND
^{137}Cs	7.66E+01	7.73E+02	6.44E+02	1.04E+03	6.33E+02	1.04E+03	1.90E+04	3.12E+04
^{154}Eu	<2.E-02	<1.E-01	<8.E-02	<2.E-01	ND	ND	ND	ND
^{155}Eu	<2.E-01	<5.E-01	<5.E-01	<6.E-01	ND	ND	ND	ND
^{241}Am	<3.E-01	<8.E-01	<7.E-01	<9.E-01	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	---	---	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---	---
Measured Gross Activity (µCi/100 cm^2)								
Alpha	---	1.25E-03	4.06E-03	---	2.66E-03	4.06E-03	7.97E-02	1.22E-01
Beta/Gamma	7.66E+01	7.78E+02	6.44E+02	1.04E+03	6.35E+02	1.04E+03	1.90E+04	3.12E+04
Total	7.66E+01	7.78E+02	6.44E+02	1.04E+03	6.35E+02	1.04E+03	1.90E+04	3.12E+04
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu[c]	---	---	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF Comp 2

Sample No.	55a	55b	56a	56b	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	Floor	Floor	E Wall	E Wall	Removable		Total	
					Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	200,000	225,000	50,000	60,000	NA	NA	NA	NA
Alpha	<20	<20	<20	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)								
2.5 cm	1.2	1.2	1.5	1.0	NA	NA	NA	NA
30 cm	0.8	0.8	1.0	0.7	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)								
2.5 cm	4.8	5.1	3.0	3.4	NA	NA	NA	NA
30 cm	2.0	2.0	1.0	1.0	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	<8.E-05	<7.E-05	<7.E-05	<9.E-05	ND	ND	ND	ND
^{60}Co	1.20E-03	1.49E-03	1.23E-03	1.36E-03	1.32E-03	1.49E-03	3.96E-02	4.47E-02
^{90}Sr[a,b]	1.30E-03	---	---	---	1.30E-03	1.30E-03	3.90E-02	3.90E-02
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<7.E-04	<7.E-04	<9.E-04	<8.E-04	ND	ND	ND	ND
^{134}Cs	1.36E-04	1.62E-04	1.83E-04	2.11E-04	1.73E-04	2.11E-04	5.19E-03	6.33E-03
^{137}Cs	1.02E-01	9.35E-02	1.49E-01	1.29E-01	1.18E-01	1.49E-01	3.55E+00	4.47E+00
^{154}Eu	<2.E-04	<3.E-04	<2.E-04	<2.E-04	ND	ND	ND	ND
^{155}Eu	<4.E-04	<4.E-04	<4.E-04	<4.E-04	ND	ND	ND	ND
^{241}Am	<6.E-04	<6.E-04	<7.E-04	<6.E-04	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	---	---	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---	---
Measured Gross Activity (µCi/100 cm^2)								
Alpha	<5.00E-06	---	<5.00E-06	---	ND	ND	ND	ND
Beta/Gamma	1.05E-01	9.52E-02	1.50E-01	1.31E-01	1.20E-01	1.50E-01	3.61E+00	4.51E+00
Total	1.05E-01	9.52E-02	1.50E-01	1.31E-01	1.20E-01	1.50E-01	3.61E+00	4.51E+00
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu[c]	---	---	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF Comp 3

Sample No.	57a	57b	58a	58b	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	Table	Table	Floor	Floor	Removable		Total	
					Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	90,000	250,000	100,000	150,000	NA	NA	NA	NA
Alpha	<20	<20	<20	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)								
2.5 cm	1.2	1.0	1.2	1.4	NA	NA	NA	NA
30 cm	0.7	0.7	0.8	0.9	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)								
2.5 cm	3.3	4.3	2.7	4.1	NA	NA	NA	NA
30 cm	1.9	2.2	1.4	3.6	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	<1.E-04	3.59E-04	1.77E-04	<2.E-04	2.68E-04	3.59E-04	8.04E-03	1.08E-02
^{60}Co	5.35E-03	9.58E-03	1.73E-03	5.46E-03	5.53E-03	9.58E-03	1.66E-01	2.87E-01
^{90}Sr[a]	1.09E-03	---	---	---	1.09E-03	1.09E-03	3.27E-02	3.27E-02
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<5.E-04	<1.E-03	<7.E-04	<1.E-03	ND	ND	ND	ND
^{134}Cs	2.77E-04	5.63E-04	1.50E-04	3.64E-04	3.39E-04	5.63E-04	1.02E-02	1.69E-02
^{137}Cs	4.42E-02	2.05E-01	9.16E-02	2.08E-01	1.37E-01	2.08E-01	4.12E+00	6.24E+00
^{154}Eu	<2.E-04	<2.E-04	<2.E-04	<3.E-04	ND	ND	ND	ND
^{155}Eu	<3.E-04	<5.E-04	<4.E-04	<5.E-04	ND	ND	ND	ND
^{241}Am	<4.E-04	<8.E-04	<6.E-04	<8.E-04	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	---	---	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---	---
Measured Gross Activity (µCi/100 cm^2)								
Alpha	<5.00e-06	---	<5.00E-06	---	ND	ND	ND	ND
Beta/Gamma	5.09E-02	2.16E-01	9.37E-02	2.14E-01	1.43E-01	2.16E-01	4.30E+00	6.47E+00
Total	5.09E-02	2.16E-01	9.37E-02	2.14E-01	1.43E-01	2.16E-01	4.30E+00	6.47E+00
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu[c]	---	---	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

SMF Comp 4

Sample No.	53a	53b	54a	54b	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	E Wall	E Wall	Floor	Floor	Removable		Total	
					Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	200,000	125,000	450,000	350,000	NA	NA	NA	NA
Alpha	<20	<20	<20	<20	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)								
2.5 cm	1.2	1.0	1.4	1.2	NA	NA	NA	NA
30 cm	0.8	0.7	0.9	0.8	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)								
2.5 cm	3.6	6.4	6.5	5.4	NA	NA	NA	NA
30 cm	2.0	2.2	1.5	2.0	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	1.84E-04	1.56E-04	9.22E-04	4.08E-04	4.18E-04	9.22E-04	1.25E-02	2.77E-02
^{60}Co	8.39E-03	5.60E-03	3.21E-02	2.41E-02	1.75E-02	3.21E-02	5.26E-01	9.63E-01
^{90}Sr[a]	4.90E-03	---	---	---	4.90E-03	4.90E-03	1.47E-01	1.47E-01
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<6.E-04	<2.E-03	2.47E-03	<9.E-04	2.47E-03	2.47E-03	7.41E-02	7.41E-02
^{134}Cs	4.51E-04	6.10E-04	3.48E-03	2.30E-03	1.71E-03	3.48E-03	5.13E-02	1.04E-01
^{137}Cs	5.85E-02	2.19E-01	1.35E-01	1.29E-01	1.35E-01	2.19E-01	4.06E+00	6.57E+00
^{154}Eu	<2.E-04	<2.E-04	<3.E-04	<3.E-04	ND	ND	ND	ND
^{155}Eu	<3.E-04	<5.E-04	<5.E-04	<5.E-04	ND	ND	ND	ND
^{241}Am	<5.E-04	<8.E-04	<7.E-04	<7.E-04	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	---	---	---	---	---	---	---
^{238}Pu/^{241}Am	---	---	---	---	---	---	---	---
^{243}Cm/^{244}Cm	---	---	---	---	---	---	---	---
^{242}Cm	---	---	---	---	---	---	---	---
Measured Gross Activity (µCi/100 cm^2)								
Alpha	<5.00E-06	---	<5.00E-06	---	ND	ND	ND	ND
Beta/Gamma	7.24E-02	2.25E-01	1.74E-01	1.56E-01	1.57E-01	2.25E-01	4.71E+00	6.76E+00
Total	7.24E-02	2.25E-01	1.74E-01	1.56E-01	1.57E-01	2.25E-01	4.71E+00	6.76E+00
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu[c]	---	---	---	---	---	---	---	---
^{239}Pu[d]	---	---	---	---	---	---	---	---
^{240}Pu[e]	---	---	---	---	---	---	---	---
^{241}Pu[f]	---	---	---	---	---	---	---	---
^{242}Pu[g]	---	---	---	---	---	---	---	---
^{241}Am[a,h]	---	---	---	---	---	---	---	---
^{243}Cm[j]	---	---	---	---	---	---	---	---
^{244}Cm[k]	---	---	---	---	---	---	---	---
^{79}Se[m]	---	---	---	---	---	---	---	---
^{99}Tc[n]	---	---	---	---	---	---	---	---

Assumptions:

(a) measured activity used, if available
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC Airlock

Sample No.	63a	63b	64a	64b	65a	65b	66a
Sample Location	W Wall	W Wall	N wall door	N wall door	Floor rt side	Floor rt side	Left side door
Smear Gross Count (dpm/100 cm^2)							
Beta/Gamma	---	---	---	---	---	---	---
Alpha	2,100	1,750	17,500	17,500	49,000	49,000	1,050
Gamma Exposure Rate (mR/hr)							
2.5 cm	2.3	1.8	12.0	24.0	49.5	42.0	2.1
30 cm	0.7	0.7	1.0	1.1	1.5	1.5	0.8
Absorbed Dose Rate (mrad/hr)							
2.5 cm	58	43	738	1,776	3,250	2,658	37
30 cm	3.1	3.1	16.0	21.8	48.0	42.0	2.6
GEA Measured Isotopic Activity (µCi/100 cm^2)							
^{54}Mn	<6.E-4	<6.E-04	<9.E-04	<9.E-04	<2.E-03	<2.E-03	<6.E-04
^{60}Co	<8.E-04	<8.E-04	<1.E-03	<1.E-03	2.25E-03	<2.E-03	<7.E-04
^{90}Sr$^{(a,b)}$	3.79E-01	6.18E-01	4.22E+00	1.03E+01	1.29E+01	1.55E+01	6.46E-01
^{108m}Ag	---	---	---	---	---	---	---
^{125}Sb	<7.E-03	<8.E-03	<4.E-02	<5.E-02	<7.E-02	<6.E-02	<6.E-03
^{134}Cs	<2.E-03	<2.E-03	<7.E-03	<9.E-03	<2.E-02	<2.E-02	<2.E-03
^{137}Cs	6.31E-01	1.03E+00	9.34E+00	1.71E+01	3.76E+01	2.58E+01	4.42E-01
^{154}Eu	<2.E-03	<2.E-03	5.54E-03	<5.E-03	1.68E-02	1.72E-02	<2.E-03
^{155}Eu	<5.E-03	<6.E-03	<3.E-02	<3.E-02	<5.E-02	<4.E-02	<5.E-03
^{241}Am	<7.E-03	<8.E-03	<3.E-02	<3.E-02	<5.E-02	<4.E-02	<6.E-03
AEA Measured Isotopic Activity (µCi/100 cm^2)							
^{243}Am	---	---	5.16E-05	---	5.83E-05	---	<2.E-06
^{239}Pu/^{240}Pu	---	---	6.60E-04	---	4.34E-03	---	4.91E-04
^{238}Pu/^{241}Am	---	---	9.30E-03	---	3.31E-02	---	1.57E-03
^{243}Cm/^{244}Cm	---	---	3.75E-03	---	9.78E-03	---	3.96E-04
^{242}Cm	---	---	4.09E-05	---	9.01E-05	---	3.50E-06
Measured Gross Activity (µCi/100 cm^2)							
Alpha	4.54E-03	---	1.38E-02	1.35E-02	4.74E-02	5.36E-02	2.46E-03
Beta/Gamma	1.01E+00	1.65E+00	1.36E+01	2.74E+01	5.05E+01	4.13E+01	1.09E+00
Total	1.01E+00	1.65E+00	1.36E+01	2.74E+01	5.06E+01	4.14E+01	1.09E+00
Calculated Isotopic Activity (µCi/100 cm^2)							
^{238}Pu$^{(c)}$	---	---	1.72E-03	---	6.12E-03	---	2.90E-04
^{239}Pu$^{(d)}$	---	---	3.33E-04	---	2.19E-03	---	2.48E-04
^{240}Pu$^{(e)}$	---	---	3.27E-04	---	2.15E-03	---	2.43E-04
^{241}Pu$^{(f)}$	---	---	1.63E-02	---	1.07E-01	---	1.21E-02
^{242}Pu$^{(g)}$	---	---	5.46E-07	---	3.59E-06	---	4.07E-07
^{241}Am$^{(a,h)}$	---	---	7.58E-03	---	2.70E-02	---	1.28E-03
^{243}Cm$^{(j)}$	---	---	5.36E-05	---	1.40E-04	---	5.66E-06
^{244}Cm$^{(k)}$	---	---	3.70E-03	---	9.64E-03	---	3.90E-04
^{79}Se$^{(m)}$	---	---	1.79E-06	---	6.37E-06	---	3.02E-07
^{99}Tc$^{(n)}$	---	---	5.93E-05	---	2.11E-04	---	1.00E-05

Assumptions:
(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC Airlock

Sample No.	66b	67a	67b	Estimated Isotopic Activity (µCi/100 cm^2)$^{(p)}$			
Sample Location	Left side door	S Wall door	S Wall door	Removable		Total	
				Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)							
Beta/Gamma	---	---	---	NA	NA	NA	NA
Alpha	4,900	14,000	17,500	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)							
2.5 cm	2.0	4.5	4.5	NA	NA	NA	NA
30 cm	0.7	0.9	0.9	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)							
2.5 cm	49	205	206	NA	NA	NA	NA
30 cm	3.1	6.3	5.1	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)							
^{54}Mn	<6.E-04	<2.E-03	<1.E-03	ND	ND	ND	ND
^{60}Co	<7.E-04	1.76E-03	5.19E-03	3.07E-03	5.19E-03	9.20E-02	1.56E-01
^{90}Sr$^{(a,b)}$	4.09E-01	5.17E+00	2.02E+00	5.21E+00	1.55E+01	1.56E+02	4.64E+02
^{108m}Ag	---	---	---	---	---	---	---
^{125}Sb	<7.E-03	<3.E-02	<3.E-02	ND	ND	ND	ND
^{134}Cs	<2.E-03	1.46E-03	<2.E-03	1.46E-03	1.46E-03	4.38E-02	4.38E-02
^{137}Cs	6.81E-01	2.35E+00	3.36E+00	9.83E+00	3.76E+01	2.95E+02	1.13E+03
^{154}Eu	<2.E-03	<4.E-03	<5.E-03	1.32E-02	1.72E-02	3.95E-01	5.16E-01
^{155}Eu	<6.E-03	<2.E-02	<2.E-02	ND	ND	ND	ND
^{241}Am	<7.E-03	<2.E-02	<2.E-02	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)							
^{243}Am	---	3.55E-05	---	4.85E-05	5.83E-05	1.45E-03	1.75E-03
^{239}Pu/^{240}Pu	---	8.11E-04	---	1.58E-03	4.34E-03	4.73E-02	1.30E-01
^{238}Pu/^{241}Am	---	4.64E-03	---	1.22E-02	3.31E-02	3.65E-01	9.93E-01
^{243}Cm/^{244}Cm	---	7.90E-03	---	5.46E-03	9.78E-03	1.64E-01	2.93E-01
^{242}Cm	---	1.60E-05	---	3.76E-05	9.01E-05	1.13E-03	2.70E-03
Measured Gross Activity (µCi/100 cm^2)							
Alpha	4.50E-03	1.34E-02	2.42E-02	1.97E-02	5.36E-02	5.91E-01	1.61E+00
Beta/Gamma	1.09E+00	7.52E+00	5.38E+00	1.50E+01	5.05E+01	4.51E+02	1.52E+03
Total	1.09E+00	7.54E+00	5.41E+00	1.51E+01	5.06E+01	4.52E+02	1.52E+03
Calculated Isotopic Activity (µCi/100 cm^2)							
^{238}Pu$^{(c)}$	---	8.58E-04	---	2.25E-03	6.12E-03	6.74E-02	1.84E-01
^{239}Pu$^{(d)}$	---	4.10E-04	---	7.96E-04	2.19E-03	2.39E-02	6.58E-02
^{240}Pu$^{(e)}$	---	4.01E-04	---	7.80E-04	2.15E-03	2.34E-02	6.44E-02
^{241}Pu$^{(f)}$	---	2.00E-02	---	3.89E-02	1.07E-01	1.17E+00	3.22E+00
^{242}Pu$^{(g)}$	---	6.72E-07	---	1.30E-06	3.59E-06	3.91E-05	1.08E-04
^{241}Am$^{(a,h)}$	---	3.78E-03	---	9.90E-03	2.70E-02	2.97E-01	8.09E-01
^{243}Cm$^{(j)}$	---	1.13E-04	---	7.80E-05	1.40E-04	2.34E-03	4.20E-03
^{244}Cm$^{(k)}$	---	7.79E-03	---	5.38E-03	9.64E-03	1.61E-01	2.89E-01
^{79}Se$^{(m)}$	---	8.92E-07	---	2.34E-06	6.37E-06	7.01E-05	1.91E-04
^{99}Tc$^{(n)}$	---	2.96E-05	---	7.76E-05	2.11E-04	2.33E-03	6.34E-03

Assumptions:
(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(i) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(j) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(k) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(l) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(p) total = removable x 3.00E+01

REC A-Cell

Sample No.	47a	47b	48a	48b	49a	49b
Sample Location	Electropolish Skid	Electropolish Skid	FRG Storage Rack	FRG Storage Rack	South Wall	South Wall
Smear Gross Count (dpm/100 cm^2)						
Beta/Gamma	---	---	---	----	20,000	7,500
Alpha	<20	<20	<20	<20	<20	<20
Gamma Exposure Rate (mR/hr)						
2.5 cm	0.7	0.5	<0.5	<0.5	<0.5	<0.5
30 cm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Absorbed Dose Rate (mrad/hr)						
2.5 cm	32	29	6.3	3.3	<0.5	<0.5
30 cm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GEA Measured Isotopic Activity (µCi/100 cm^2)						
^{54}Mn	<1.E-04	<1.E-04	<6.E-05	<3.E-05	<4.E-05	<4.E-05
^{60}Co	1.25E-04	<2.E-04	<9.E-05	<4.E-05	<6.E-05	<8.E-05
^{90}Sr$^{(a,b)}$	8.55E-02	1.47E-01	3.02E-02	1.19E-02	2.07E-03	5.55E-04
^{108m}Ag	---	---	---	---	---	---
^{125}Sb	<2.E-03	<2.E-03	<5.E-04	<4.E-04	<2.E-04	<1.E-04
^{134}Cs	<9.E-05	<2.E-04	<6.E-05	<4.E-05	<4.E-05	<4.E-05
^{137}Cs	3.46E-01	2.45E-01	5.04E-02	3.12E-02	3.45E-03	9.25E-04
^{154}Eu	<3.E-04	<6.E-04	<2.E-04	<2.E-04	<1.E-04	<8.E-05
^{155}Eu	<9.E-04	<8.E-04	<3.E-04	<2.E-04	<2.E-04	<8.E-05
^{241}Am	<2.E-03	<2.E-03	<4.E-04	<3.E-04	<2.E-04	<2.E-04
AEA Measured Isotopic Activity (µCi/100 cm^2)						
^{239}Pu/^{240}Pu	<3.E-05	---	---	<2.E-06	---	---
^{238}Pu/^{241}Am	1.71E-04	---	---	2.07E-05	---	---
^{243}Cm/^{244}Cm	8.72E-05	---	---	7.22E-06	---	---
^{242}Cm	<3.E-06	---	---	<6.E-07	---	---
Measured Gross Activity (µCi/100 cm^2)						
Alpha	2.58E-04	1.48E-03	1.01E-04	2.79E-05	7.60E-06	<2.E-05
Beta/Gamma	4.32E-01	3.92E-01	8.06E-02	4.31E-02	5.52E-03	1.48E-03
Total	4.32E-01	3.93E-01	8.07E-02	4.31E-02	5.53E-03	1.48E-03
Calculated Isotopic Activity (µCi/100 cm^2)						
^{238}Pu$^{(c)}$	3.16E-05	---	---	3.83E-06	---	---
^{239}Pu$^{(d)}$	---	---	---	---	---	---
^{240}Pu$^{(e)}$	---	---	---	---	---	---
^{241}Pu$^{(f)}$	---	---	---	---	---	---
^{242}Pu$^{(g)}$	---	---	---	---	---	---
^{241}Am$^{(a,h)}$	1.39E-04	---	---	1.69E-05	---	---
^{243}Cm$^{(j)}$	1.25E-06	---	---	1.03E-07	---	---
^{244}Cm$^{(k)}$	8.60E-05	---	---	7.12E-06	---	---
^{79}Se$^{(m)}$	3.29E-08	---	---	3.98E-09	---	---
^{99}Tc$^{(n)}$	1.09E-06	---	---	1.32E-07	---	---

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC A-Cell

Sample No.	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	Removable		Total	
	Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)				
Beta/Gamma	NA	NA	NA	NA
Alpha	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)				
2.5 cm	NA	NA	NA	NA
30 cm	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)				
2.5 cm	NA	NA	NA	NA
30 cm	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)				
^{54}Mn	ND	ND	ND	ND
^{60}Co	1.25E-04	1.25E-04	3.75E-03	3.75E-03
^{90}Sr[a,b]	4.62E-02	1.47E-01	1.39E+00	4.41E+00
^{108m}Ag	---	---	---	---
^{125}Sb	ND	ND	ND	ND
^{134}Cs	ND	ND	ND	ND
^{137}Cs	1.13E-01	3.46E-01	3.38E+00	1.04E+01
^{154}Eu	ND	ND	ND	ND
^{155}Eu	ND	ND	ND	ND
^{241}Am	ND	ND	ND	ND
AEA Measured Isotopic Activity (µCi/100 cm^2)				
^{239}Pu/^{240}Pu	ND	ND	ND	ND
^{238}Pu/^{241}Am	9.59E-05	1.71E-04	2.88E-03	5.13E-03
^{243}Cm/^{244}Cm	4.72E-05	8.72E-05	1.42E-03	2.62E-03
^{242}Cm	ND	ND	ND	ND
Measured Gross Activity (µCi/100 cm^2)				
Alpha	3.75E-04	1.48E-03	1.12E-02	4.44E-02
Beta/Gamma	1.59E-01	4.32E-01	4.77E+00	1.29E+01
Total	1.59E-01	4.32E-01	4.78E+00	1.30E+01
Calculated Isotopic Activity (µCi/100 cm^2)				
^{238}Pu[c]	1.77E-05	3.16E-05	5.32E-04	9.49E-04
^{239}Pu[d]	ND	ND	ND	ND
^{240}Pu[e]	ND	ND	ND	ND
^{241}Pu[f]	ND	ND	ND	ND
^{242}Pu[g]	ND	ND	ND	ND
^{241}Am[a,h]	7.81E-05	1.39E-04	2.34E-03	4.18E-03
^{243}Cm[j]	6.75E-07	1.25E-06	2.03E-05	3.74E-05
^{244}Cm[k]	4.65E-05	8.60E-05	1.40E-03	2.58E-03
^{79}Se[m]	1.84E-08	3.29E-08	5.53E-07	9.87E-07
^{99}Tc[n]	6.12E-07	1.09E-06	1.83E-05	3.27E-05

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC B-Cell

Sample No.	39a	39b	40a	40b	42a	42b	43a	43b
Sample Location	S Wall n side	S Wall n side	N side fuel	N side fuel	S Wall center	S Wall center	N fuel storage	N fuel storage
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	---	---	---	---	---	---	---	---
Alpha	49,000	52,500	17,500	17,500	420,000	560,000	245,000	28,000
Gamma Exposure Rate (mR/hr)								
2.5 cm	300	225	12	14	120	300	12	30
30 cm	10	8	2.5	1.5	4	10	3	3.5
Absorbed Dose Rate (mrad/hr)								
2.5 cm	23,700	19,175	738	737	8,880	26,700	438	3,270
30 cm	580	434	19	21	202	490	18	59
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	<3.E-02	<4.E-02	<3.E-03	<3.E-03	<5.E-03	<2.E-02	<2.E-03	<4.E-03
^{60}Co	6.50E-02	<2.E-02	1.02E-02	<5.E-03	<6.E-03	<2.E-02	<4.E-03	<5.E-03
^{90}Sr$^{(a,b)}$	1.43E+02	7.32E+01	4.62E+00	3.84E+00	4.30E+01	7.68E+01	2.57E+00	1.37E+01
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<5.E-01	<4.E-01	<7.E-02	<7.E-02	<2.E-01	<4.E-01	<3.E-02	<2.E-01
^{134}Cs	1.09E-01	<4.E-02	<4.E-03	<4.E-03	<8.E-03	<2.E-02	<2.E-03	<6.E-03
^{137}Cs	2.39E+02	1.68E+02	7.70E+00	7.16E+00	4.30E+01	1.28E+02	1.62E+00	2.29E+01
^{154}Eu	6.26E-02	2.87E-01	2.07E-02	1.73E-02	1.67E-01	5.25E-01	<6.E-03	5.33E-02
^{155}Eu	<3.E-01	<2.E-01	<3.E-02	<4.E-02	<9.E-02	<2.E-01	<2.E-02	<6.E-02
^{241}Am	<7.E-01	<4.E-01	<4.E-02	<6.E-02	1.86E-01	6.49E-01	<3.E-02	<8.E-02
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	1.79E-02	---	1.80E-03	<2.E-02	---	2.15E-03	---
^{238}Pu/^{241}Am	---	1.07E-01	---	7.50E-03	2.54E-01	---	5.64E-03	---
^{243}Cm/^{244}Cm	---	5.34E-02	---	2.69E-03	8.23E-02	---	2.11E-03	---
^{242}Cm	---	<9.E-05	---	<2.E-04	<1.E-03	---	<5.E-05	---
Measured Gross Activity (µCi/100 cm^2)								
Alpha	4.26E-01	1.78E-01	1.15E-02	1.20E-02	3.36E-01	1.16E+00	9.90E-03	4.55E-02
Beta/Gamma	3.83E+02	2.41E+02	1.24E+01	1.10E+01	8.62E+01	2.05E+02	4.19E+00	3.67E+01
Total	3.83E+02	2.42E+02	1.24E+01	1.10E+01	8.65E+01	2.06E+02	4.20E+00	3.67E+01
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu$^{(c)}$	---	1.98E-02	---	1.39E-03	4.70E-02	---	1.04E-03	---
^{239}Pu$^{(d)}$	---	9.04E-03	---	9.09E-04	---	---	1.09E-03	---
^{240}Pu$^{(e)}$	---	8.86E-03	---	8.91E-04	---	---	1.06E-03	---
^{241}Pu$^{(f)}$	---	4.42E-01	---	4.45E-02	---	---	5.31E-02	---
^{242}Pu$^{(g)}$	---	1.48E-05	---	1.49E-06	---	---	1.78E-06	---
^{241}Am$^{(a,h)}$	---	8.72E-02	---	6.11E-03	1.86E-01	6.49E-01	4.60E-03	---
^{243}Cm$^{(j)}$	---	7.64E-04	---	3.85E-05	1.18E-03	---	3.02E-05	---
^{244}Cm$^{(k)}$	---	5.26E-02	---	2.65E-03	8.11E-02	---	2.08E-03	---
^{79}Se$^{(m)}$	---	2.06E-05	---	1.44E-06	4.39E-05	1.53E-04	1.08E-06	---
^{99}Tc$^{(n)}$	---	6.83E-04	---	4.79E-05	1.46E-03	5.08E-03	3.60E-05	---

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC B-Cell

Sample No.	44a	44b	45a	45b	Estimated Isotopic Activity (µCi/100 cm^2)$^{(p)}$			
Sample Location	S fuel storage	S fuel storage	W Wall center	W Wall center	Removable		Total	
					Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)								
Beta/Gamma	---	---	---	---	NA	NA	NA	NA
Alpha	42,000	21,000	140,000	210,000	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)								
2.5 cm	23	10	4	7	NA	NA	NA	NA
30 cm	3.5	3	6	10	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)								
2.5 cm	2,378	439	58	227	NA	NA	NA	NA
30 cm	38	18	168	670	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)								
^{54}Mn	<3.E-03	<2.E-03	<6.E-03	<3.E-02	ND	ND	ND	ND
^{60}Co	<4.E-03	<4.E-03	<1.E-02	<1.E-02	3.76E-02	6.50E-02	1.13E+00	1.95E+00
^{90}Sr$^{(a,b)}$	1.51E+01	1.89E+00	2.89E+01	1.97E+02	5.04E+01	1.97E+02	1.51E+03	5.92E+03
^{108m}Ag	---	---	---	---	---	---	---	---
^{125}Sb	<2.E-01	<4.E-02	<3.E-01	<6.E-01	ND	ND	ND	ND
^{134}Cs	<6.E-03	<3.E-03	<7.E-03	<3.E-02	1.09E-01	1.09E-01	3.27E+00	3.27E+00
^{137}Cs	2.51E+01	4.90E+00	5.34E+01	3.29E+02	8.58E+01	3.29E+02	2.57E+03	9.87E+03
^{154}Eu	6.59E-02	1.16E-02	8.41E-02	1.71E-01	1.33E-01	5.25E-01	4.00E+00	1.58E+01
^{155}Eu	<6.E-02	<2.E-02	<9.E-02	<3.E-01	ND	ND	ND	ND
^{241}Am	<7.E-02	<4.E-02	<2.E-01	2.77E-01	3.71E-01	6.49E-01	1.11E+01	1.95E+01
AEA Measured Isotopic Activity (µCi/100 cm^2)								
^{239}Pu/^{240}Pu	---	4.80E-03	8.47E-03	---	7.02E-03	1.79E-02	2.11E-01	5.37E-01
^{238}Pu/^{241}Am	---	1.46E-02	7.64E-02	---	7.75E-02	2.54E-01	2.33E+00	7.62E+00
^{243}Cm/^{244}Cm	---	3.47E-03	2.41E-02	---	2.80E-02	8.23E-02	8.40E-01	2.47E+00
^{242}Cm	---	<1.E-04	<5.E-04	---	ND	ND	ND	ND
Measured Gross Activity (µCi/100					---	---	---	---
Alpha	4.10E-02	2.29E-02	1.09E-01	3.69E-01	2.27E-01	1.16E+00	6.80E+00	3.48E+01
Beta/Gamma	4.02E+01	6.80E+00	8.24E+01	5.27E+02	1.36E+02	5.27E+02	4.09E+03	1.58E+04
Total	4.03E+01	6.82E+00	8.25E+01	5.27E+02	1.37E+02	5.27E+02	4.10E+03	1.58E+04
Calculated Isotopic Activity (µCi/100 cm^2)								
^{238}Pu$^{(c)}$	---	2.70E-03	1.41E-02	---	1.43E-02	4.70E-02	4.30E-01	1.41E+00
^{239}Pu$^{(d)}$	---	2.42E-03	4.28E-03	---	3.55E-03	9.04E-03	1.06E-01	2.71E-01
^{240}Pu$^{(e)}$	---	2.38E-03	4.19E-03	---	3.48E-03	8.86E-03	1.04E-01	2.66E-01
^{241}Pu$^{(f)}$	---	1.19E-01	2.09E-01	---	1.73E-01	4.42E-01	5.20E+00	1.33E+01
^{242}Pu$^{(g)}$	---	3.97E-06	7.01E-06	---	5.82E-06	1.48E-05	1.74E-04	4.45E-04
^{241}Am$^{(a,h)}$	---	1.19E-02	6.23E-02	2.77E-01	1.61E-01	6.49E-01	4.82E+00	1.95E+01
^{243}Cm$^{(j)}$	---	4.96E-05	3.45E-04	---	4.01E-04	1.18E-03	1.20E-02	3.53E-02
^{244}Cm$^{(k)}$	---	3.42E-03	2.38E-02	---	2.76E-02	8.11E-02	8.28E-01	2.43E+00
^{79}Se$^{(m)}$	---	2.81E-06	1.47E-05	6.54E-05	3.79E-05	1.53E-04	1.14E-03	4.59E-03
^{99}Tc$^{(n)}$	---	9.32E-05	4.88E-04	2.17E-03	1.26E-03	5.08E-03	3.77E-02	1.52E-01

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC C-Cell

Sample No.	18a	18b	19a	19b	20a	20b	21a
Sample Location	Sump trench S	Sump trench S	By treatability	By treatability	W wall n side	W wall n side	Floor 3' in front
Smear Gross Count (dpm/100 cm^2)							
Beta/Gamma	---	---	----	---	---	---	---
Alpha	28,000	14,000	14,000	7,700	8,400	140,000	77,000
Gamma Exposure Rate (mR/hr)							
2.5 cm	1.8	1.9	3.1	1.6	<0.5	1.2	1.5
30 cm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Absorbed Dose Rate (mrad/hr)							
2.5 cm	146	86	174	87	9	28	87
30 cm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GEA Measured Isotopic Activity (µCi/100 cm^2)							
^{54}Mn	<6.E-05	<8.E-05	<9.E-05	<9.E-05	<4.E-05	<2.E-04	<9.E-05
^{60}Co	<1.E-04	<2.E-04	2.93E-04	<2.E-04	<5.E-05	<9.E-05	4.06E-04
^{90}Sr$^{(a,b)}$	6.60E-01	3.71E-01	3.16E-01	3.31E-01	5.83E-03	1.27E-01	3.34E-01
^{108m}Ag	---	---	---	---	---	---	---
^{125}Sb	<3.E-03	<2.E-03	<3.E-03	<3.E-03	<4.E-04	<2.E-03	<2.E-03
^{134}Cs	4.09E-03	7.14E-04	<2E-04	8.05E-04	2.69E-04	5.55E-03	2.34E-03
^{137}Cs	1.10E+00	2.38E-01	5.26E-01	5.77E-01	2.03E-02	2.11E-01	7.04E-01
^{154}Eu	2.25E-03	1.33E-03	2.25E-03	1.60E-03	9.19E-04	6.98E-03	3.96E-03
^{155}Eu	<1.E-03	<8.E-04	1.61E-03	<2.E-03	2.60E-04	2.10E-03	<1.E-03
^{241}Am	1.51E-03	1.37E-03	2.94E-03	<2.E-03	3.53E-04	3.67E-03	1.90E-03
AEA Measured Isotopic Activity (µCi/100 cm^2)							
^{239}Pu/^{240}Pu	5.69E-04	7.14E-04	---	<1.E-03	<1.E-04	---	<1.E-03
^{238}Pu/^{241}Am	3.27E-03	1.79E-03	---	4.18E-03	2.03E-04	---	9.20E-03
^{243}Cm/^{244}Cm	1.15E-02	5.05E-03	---	1.15E-02	1.53E-03	---	2.90E-02
^{242}Cm	<3.E-05	<1.E-05	---	<1.E-04	<1.E-05	---	<1.E-04
Measured Gross Activity (µCi/100 cm^2)							
Alpha	1.53E-02	7.55E-03	5.62E-03	1.57E-02	1.73E-02	6.53E-02	3.82E-02
Beta/Gamma	1.77E+00	6.11E-01	8.46E-01	9.10E-01	2.76E-02	3.52E-01	1.04E+00
Total	1.78E+00	6.19E-01	8.51E-01	9.26E-01	4.49E-02	4.18E-01	1.08E+00
Calculated Isotopic Activity (µCi/100 cm^2)							
^{238}Pu$^{(c)}$	6.05E-04	3.31E-04	---	7.73E-04	3.76E-05	---	1.70E-03
^{239}Pu$^{(d)}$	2.87E-04	3.61E-04	---	---	---	---	---
^{240}Pu$^{(e)}$	2.82E-04	3.53E-04	---	---	---	---	---
^{241}Pu$^{(f)}$	1.41E-02	1.76E-02	---	---	---	---	---
^{242}Pu$^{(g)}$	4.71E-07	5.91E-07	---	---	---	---	---
^{241}Am$^{(a,h)}$	1.51E-03	1.37E-03	2.94E-03	3.41E-03	3.53E-04	3.67E-03	1.90E-03
^{243}Cm$^{(j)}$	1.64E-04	7.22E-05	---	1.64E-04	2.19E-05	---	4.15E-04
^{244}Cm$^{(k)}$	1.13E-02	4.98E-03	---	1.13E-02	1.51E-03	---	2.86E-02
^{79}Se$^{(m)}$	3.56E-07	3.23E-07	6.94E-07	8.04E-07	8.33E-08	8.66E-07	4.48E-07
^{99}Tc$^{(n)}$	1.18E-05	1.07E-05	2.30E-05	2.67E-05	2.76E-06	2.87E-05	1.49E-05

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC C-Cell

Sample No.	21b	22a	22b	Estimated Isotopic Activity (µCi/100 cm^2)[p]			
Sample Location	Floor 3' in front	2' n of filter	2' n of filter	Removable		Total	
				Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)							
Beta/Gamma	---	---	---	NA	NA	NA	NA
Alpha	140,000	98,000	56,000	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)							
2.5 cm	2.5	<0.5	<0.5	NA	NA	NA	NA
30 cm	<0.5	<0.5	<0.5	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)							
2.5 cm	88	4.5	15.0	NA	NA	NA	NA
30 cm	<0.5	<0.5	<0.5	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)							
^{54}Mn	<2.E-04	<7.E-05	<6.E-05	ND	ND	ND	ND
^{60}Co	8.49E-04	4.22E-05	<2.E-05	3.98E-04	8.49E-04	1.19E-02	2.55E-02
^{90}Sr[a,b]	5.43E-01	1.09E-03	4.75E-02	2.74E-01	6.60E-01	8.21E+00	1.98E+01
^{108m}Ag	---	---	---	---	---	---	---
^{125}Sb	<3.E-03	<7.E-04	<7.E-04	ND	ND	ND	ND
^{134}Cs	3.65E-03	2.34E-03	1.10E-03	2.32E-03	5.55E-03	6.95E-02	1.67E-01
^{137}Cs	9.05E-01	9.09E-02	7.91E-02	4.45E-01	1.10E+00	1.34E+01	3.30E+01
^{154}Eu	6.06E-03	2.77E-03	1.98E-03	3.01E-03	6.98E-03	9.03E-02	2.09E-01
^{155}Eu	1.96E-03	8.66E-04	<4.E-04	1.36E-03	2.10E-03	4.08E-02	6.30E-02
^{241}Am	2.94E-03	4.09E-04	1.09E-03	1.80E-03	3.67E-03	5.39E-02	1.10E-01
AEA Measured Isotopic Activity (µCi/100 cm^2)							
^{239}Pu/^{240}Pu	---	<1.E-05	---	6.42E-04	7.14E-04	1.92E-02	2.14E-02
^{238}Pu/^{241}Am	---	4.64E-05	---	3.11E-03	9.20E-03	9.34E-02	2.76E-01
^{243}Cm/^{244}Cm	---	3.97E-04	---	9.83E-03	2.90E-02	2.95E-01	8.70E-01
^{242}Cm	---	<1.E-05	---	ND	ND	ND	ND
Measured Gross Activity (µCi/100 cm^2)							
Alpha	7.90E-02	4.43E-04	1.83E-02	2.63E-02	7.90E-02	7.88E-01	2.37E+00
Beta/Gamma	1.46E+00	9.80E-02	1.30E-01	7.25E-01	1.77E+00	2.17E+01	5.30E+01
Total	1.54E+00	9.85E-02	1.48E-01	7.51E-01	1.78E+00	2.25E+01	5.34E+01
Calculated Isotopic Activity (µCi/100 cm^2)							
^{238}Pu[c]	---	8.58E-06	---	5.76E-04	1.70E-03	1.73E-02	5.11E-02
^{239}Pu[d]	---	---	---	3.24E-04	3.61E-04	9.72E-03	1.08E-02
^{240}Pu[e]	---	---	---	3.18E-04	3.53E-04	9.53E-03	1.06E-02
^{241}Pu[f]	---	---	---	1.58E-02	1.76E-02	4.75E-01	5.29E-01
^{242}Pu[g]	---	---	---	5.31E-07	5.91E-07	1.59E-05	1.77E-05
^{241}Am[a,h]	2.94E-03	4.09E-04	1.09E-03	1.96E-03	3.67E-03	5.88E-02	1.10E-01
^{243}Cm[j]	---	5.68E-06	---	1.41E-04	4.15E-04	4.22E-03	1.24E-02
^{244}Cm[k]	---	3.91E-04	---	9.69E-03	2.86E-02	2.91E-01	8.58E-01
^{79}Se[m]	6.94E-07	9.65E-08	2.57E-07	4.62E-07	8.66E-07	1.39E-05	2.60E-05
^{99}Tc[n]	2.30E-05	3.20E-06	8.53E-06	1.53E-05	2.87E-05	4.60E-04	8.62E-04

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC D-Cell

Sample No.	26a	26b	27a	27b	28a	28b	30a
Sample Location	S wall below window	S wall below window	E wall; window height	E wall; window height	Flr E side; 2' in front of window	Flr E side; 2' in front of window	W wall; 3' above flr; S of filter
Smear Gross Count (dpm/100 cm^2)							
Beta/Gamma	---	---	---	---	---	---	70,000
Alpha	315,000	490,000	350,000	70,000	>700,000	>700,000	70,000
Gamma Exposure Rate (mR/hr)							
2.5 cm	45	60	45	23	540	105	105
30 cm	9	8	8	10	50	10	10
Absorbed Dose Rate (mrad/hr)							
2.5 cm	2,355	2,340	2,955	1,478	74,460	6,795	5,295
30 cm	72	59	59	25	1,700	220	100
GEA Measured Isotopic Activity (µCi/100 cm^2)							
^{54}Mn	<3.E-03	<3.E-03	<4.E-03	<2.E-03	<2.E-01	<9.E-03	<7.E-03
^{60}Co	2.47E-02	4.73E-02	8.35E-02	2.81E-02	1.31E+00	9.41E-02	1.45E-02
^{90}Sr$^{(a,b)}$	9.20E+00	6.04E-02	1.33E+01	2.36E-02	2.50E+02	1.21E-01	1.39E-01
^{108m}Ag	---	1.59E-02	---	---	---	---	---
^{125}Sb	<5.E-02	<5.E-02	<6.E-02	<4.E-02	<4.E+00	<2.E-01	<2.E-01
^{134}Cs	1.69E-02	2.92E-02	2.94E-02	9.75E-03	<3.E-01	4.44E-02	2.28E-02
^{137}Cs	1.31E+01	1.70E+01	2.81E+01	1.26E+01	1.25E+03	4.92E+01	4.36E+01
^{154}Eu	4.20E-02	8.43E-02	6.34E-02	1.84E-02	6.99E+00	8.24E-02	1.46E-02
^{155}Eu	<3.E-02	<3.E-02	<4.E-02	<3.E-02	<2.E+00	<2.E-01	<2.E-01
^{241}Am	7.29E-02	1.51E-01	1.13E-01	<4.E-02	<2.E+00	<2.E-01	<2.E-01
AEA Measured Isotopic Activity (µCi/100 cm^2)							
^{239}Pu/^{240}Pu	2.00E-02	4.02E-02	3.50E-02	9.60E-03	1.39E-01	2.44E-02	5.32E-03
^{238}Pu/^{241}Am	1.27E-01	2.09E-01	1.96E-01	4.69E-02	9.29E-01	1.37E-01	3.39E-02
^{243}Cm/^{244}Cm	1.20E-01	2.66E-01	1.54E-01	5.24E-02	1.54E+00	2.39E-01	4.27E-02
^{242}Cm	5.95E-04	8.49E-04	5.26E-04	1.36E-04	5.75E-03	4.67E-04	2.16E-04
Measured Gross Activity (µCi/100 cm^2)							
Alpha	2.67E-01	5.19E-01	3.20E-01	1.09E-01	2.28E+00	4.04E-01	8.28E-02
Beta/Gamma	2.24E+01	1.72E+01	4.16E+01	1.27E+01	1.51E+03	4.95E+01	4.38E+01
Total	2.27E+01	1.78E+01	4.19E+01	1.28E+01	1.51E+03	4.99E+01	4.39E+01
Calculated Isotopic Activity (µCi/100 cm^2)							
^{238}Pu$^{(c)}$	2.35E-02	3.87E-02	3.63E-02	8.68E-03	1.72E-01	2.53E-02	6.27E-03
^{239}Pu$^{(d)}$	1.01E-02	2.03E-02	1.77E-02	4.85E-03	7.02E-02	1.23E-02	2.69E-03
^{240}Pu$^{(e)}$	9.90E-03	1.99E-02	1.73E-02	4.75E-03	6.88E-02	1.21E-02	2.63E-03
^{241}Pu$^{(f)}$	4.94E-01	9.93E-01	8.65E-01	2.37E-01	3.43E+00	6.03E-01	1.31E-01
^{242}Pu$^{(g)}$	1.66E-05	3.33E-05	2.90E-05	7.95E-06	1.15E-04	2.02E-05	4.40E-06
^{241}Am$^{(a,h)}$	7.29E-02	1.51E-01	1.13E-01	3.82E-02	7.57E-01	1.12E-01	2.76E-02
^{243}Cm$^{(j)}$	1.72E-03	3.80E-03	2.20E-03	7.49E-04	2.20E-02	3.42E-03	6.11E-04
^{244}Cm$^{(k)}$	1.18E-01	2.62E-01	1.52E-01	5.17E-02	1.52E+00	2.36E-01	4.21E-02
^{79}Se$^{(m)}$	1.72E-05	3.56E-05	2.67E-05	9.02E-06	1.79E-04	2.64E-05	6.52E-06
^{99}Tc$^{(n)}$	5.71E-04	1.18E-03	8.85E-04	2.99E-04	5.93E-03	8.74E-04	2.16E-04

Assumptions:

(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

REC D-Cell

Sample No.	30b	31a	31b	Estimated Isotopic Activity (µCi/100 cm^2)$^{(p)}$			
Sample Location	W wall; 3' above flr; S of filter	Lead Storage	Lead Storage	Removable		Total	
				Average	Max	Average	Max
Smear Gross Count (dpm/100 cm^2)							
Beta/Gamma	---	---	---	NA	NA	NA	NA
Alpha	70,000	>700,000	280,000	NA	NA	NA	NA
Gamma Exposure Rate (mR/hr)							
2.5 cm	68	900	330	NA	NA	NA	NA
30 cm	6	25	12	NA	NA	NA	NA
Absorbed Dose Rate (mrad/hr)							
2.5 cm	5,033	59,100	29,670	NA	NA	NA	NA
30 cm	108	1,000	426	NA	NA	NA	NA
GEA Measured Isotopic Activity (µCi/100 cm^2)							
^{54}Mn	<2.E-03	<6.E-02	<3.E-02	ND	ND	ND	ND
^{60}Co	7.28E-03	1.37E-01	6.44E-02	1.81E-01	1.31E+00	5.43E+00	3.93E+01
^{90}Sr$^{(a,b)}$	6.62E+00	1.76E+02	6.86E+01	5.24E+01	2.50E+02	1.57E+03	7.50E+03
^{108m}Ag	---	---	---	1.59E-02	1.59E-02	4.77E-01	4.77E-01
^{125}Sb	<4.E-02	<8.E-01	<6.E-01	ND	ND	ND	ND
^{134}Cs	1.78E-03	2.17E-01	1.09E-01	5.34E-02	2.17E-01	1.60E+00	6.51E+00
^{137}Cs	1.21E+01	4.57E+02	2.39E+02	2.12E+02	1.25E+03	6.37E+03	3.75E+04
^{154}Eu	1.19E-02	1.80E-01	6.26E-02	7.55E-01	6.99E+00	2.26E+01	2.10E+02
^{155}Eu	<3.E-02	<6.E-01	<4.E-01	ND	ND	ND	ND
^{241}Am	4.01E-02	---	---	9.43E-02	1.51E-01	2.83E+00	4.53E+00
AEA Measured Isotopic Activity (µCi/100 cm^2)							
^{239}Pu/^{240}Pu	3.57E-02	2.18E-02	1.36E-02	3.45E-02	1.39E-01	1.03E+00	4.17E+00
^{238}Pu/^{241}Am	4.60E-02	2.53E-01	6.84E-02	2.05E-01	9.29E-01	6.14E+00	2.79E+01
^{243}Cm/^{244}Cm	1.11E-02	1.92E-01	6.84E-02	2.69E-01	1.54E+00	8.06E+00	4.62E+01
^{242}Cm	5.85E-05	1.75E-03	4.24E-04	1.08E-03	5.75E-03	3.23E-02	1.73E-01
Measured Gross Activity (µCi/100 cm^2)							
Alpha	7.81E-02	4.71E-01	1.79E-01	4.71E-01	2.28E+00	1.41E+01	6.84E+01
Beta/Gamma	1.87E+01	6.34E+02	3.08E+02	2.66E+02	1.51E+03	7.97E+03	4.52E+04
Total	1.88E+01	6.34E+02	3.08E+02	2.66E+02	1.51E+03	7.98E+03	4.53E+04
Calculated Isotopic Activity (µCi/100 cm^2)							
^{238}Pu$^{(c)}$	8.51E-03	4.68E-02	1.27E-02	3.79E-02	1.72E-01	1.14E+00	5.16E+00
^{239}Pu$^{(d)}$	1.80E-02	1.10E-02	6.87E-03	1.74E-02	7.02E-02	5.22E-01	2.11E+00
^{240}Pu$^{(e)}$	1.77E-02	1.08E-02	6.73E-03	1.71E-02	6.88E-02	5.12E-01	2.06E+00
^{241}Pu$^{(f)}$	8.82E-01	5.38E-01	3.36E-01	8.51E-01	3.43E+00	2.55E+01	1.03E+02
^{242}Pu$^{(g)}$	2.96E-05	1.81E-05	1.13E-05	2.85E-05	1.15E-04	8.56E-04	3.45E-03
^{241}Am$^{(a,h)}$	4.01E-02	2.06E-01	5.57E-02	1.57E-01	7.57E-01	4.72E+00	2.27E+01
^{243}Cm$^{(j)}$	1.59E-04	2.75E-03	9.78E-04	3.84E-03	2.20E-02	1.15E-01	6.61E-01
^{244}Cm$^{(k)}$	1.09E-02	1.89E-01	6.74E-02	2.65E-01	1.52E+00	7.94E+00	4.55E+01
^{79}Se$^{(m)}$	9.46E-06	4.87E-05	1.32E-05	3.71E-05	1.79E-04	1.11E-03	5.36E-03
^{99}Tc$^{(n)}$	3.14E-04	1.61E-03	4.36E-04	1.23E-03	5.93E-03	3.70E-02	1.78E-01

Assumptions:
(a) measured activity used, if available
(b) ^{90}Sr = ^{137}Cs x 6.00E-01
(c) ^{238}Pu = ^{238}Pu/^{241}Am x 1.85E-01
(d) ^{239}Pu = $^{239/240}$Pu x 5.05E-01
(e) ^{240}Pu = $^{239/240}$Pu x 4.95E-01
(f) ^{241}Pu = $^{239/240}$Pu x 2.47E+01
(g) ^{242}Pu = $^{239/240}$Pu x 8.28E-04
(h) ^{241}Am = ^{238}Pu/^{241}Am x 8.15E-01
(j) ^{243}Cm = $^{243/244}$Cm x 1.43E-02
(k) ^{244}Cm = $^{243/244}$Cm x 9.86E-01
(m) ^{79}Se = ^{241}Am x 2.36E-04
(n) ^{99}Tc = ^{241}Am x 7.83E-03
(p) total = removable x 3.00E+01

APPENDIX B

RADIOLOGICAL SURVEY REPORTS

PHMC M2572, Contamination Survey for Facility Characterization, dated 02/03/98 ..... B-1

PHMC M2781, Characterization Survey of C-Cell, dated 02/25/98 ..... B-5

PHMC M2793, Smears Taken for Characterization of A-Cell; 24-hr Count of C-Cell Smears, dated 02/25/98 ..... B-7

PHMC M2809, Characterization Smears of D-Cell, SMF Airlock, SMF East Cell, and 24-Hr Count on D-Cell Smear, dated 02/26/98 ..... B-9

PHMC M2818, B-Cell Smears and 24-Hr Count of Smears of D-Cell, SMF Airlock, and SMF East Cell, dated 02/27/98 ..... B-11

PHMC M2873, Dose Rate and Contamination Level Survey of Smears from B/D-Cells, dated 03/04/98 ..... B-13

PHMC M2896, Contamination Level Survey of C-Cell Smears, dated 03/05/98 ..... B-17

PHMC M2966, Smears Taken in REC Airlock, dated 03/11/98 ..... B-19

PHMC M2982, Contamination Survey of Characterization Samples, dated 03/12/98 ..... B-21

PHMC M2991, Contamination Level Survey of SMF Characterization Samples, dated 03/13/98 ..... B-25

PHMC M3014, 72-Hr Survey of Characterization Smears from SMF South Cell & Compartment 1, dated 03/16/98 ..... B-31

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002572

Date 2-3-98 2-4-98 2-5-98 | Time: Start / Stop 0800 1100 | RWP No.(s) M-177, M-073 | Page 1 of 4

Area/Bldg./Room/Location (Code): 300/324 / Various - See Description | F.C. M

Job Description: Contamination survey for facility characterization

Purpose of Survey (check appropriate box(es)):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☐ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No. NA

Map/Sketch

NA

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
1-A	Rm 146 Hood #1 Center Wall	NA					NA	<1000	<20	NA
1-B	Rm 146 Hood #1 Center Wall							<1000	<20	
2-A	Rm 146 Hood #2 Center Wall							<1000	<20	
2-B	Rm 146 Hood #2 Center Wall							<1000	<20	
3-A	Rm 147 Hood #1 Center Wall							45,000	<20	
3-B	Rm 147 Hood #1 Center Wall							95,000	<20	
4-A	Rm 147 Hood #3 Center Wall							15,000	<20	
4-B	Rm 147 Hood #3 Center Wall							12,500	<20	
5-A	Rm 147 Hood #2 Center Wall							15,000	35 <20	
5-B	Rm 147 Hood #2 Center Wall	NA					NA	25,000	<20	

Continued on page 2

Air Sample Results (µCi/ml)

	BZ	GA	Initial	Decay
α 1	NA			NA
β 1				
α 2				
β 2	NA			NA

Legend
(#) - Smear Location
△# - Air Sample Location
[#] - Large Area Smear
* - Contact Reading
Other NA

BD-6000-010 (02-94)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 4 | Survey No. M 002572

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pan) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
6-A	B-Cell 2nd S. Floor Drain	NA					NA	<1000	<20	NA
6-B	B-Cell 2nd S. Floor Drain							<1000	<20	
7-A	B-Cell 1st S. Floor Drain							<1000	<20	
7-B	B-Cell 1st S. Floor Drain							<1000	<20	
8-A	Rm 18 S. Floor Drain							<1000	<20	
8-B	Rm 18 S. Floor Drain							<1000	<20	
9-A	Rm 18 W. Floor Drain							<1000	<20	
9-B	Rm 18 W. Floor Drain							<1000	<20	
10-A	Rm 3K Hood over cover							<1000	350	
10-B	Rm 3K Hood over cover	NA					NA	2000	3150	↓

Comments

Job started on 2-3-91 starting with surveys of hoods in room 146 and on 2-4-91 samples were counted for 24 hr decay. 2-8-91 sample taken from B-Cell drains. 2-5-91 sample taken from 3-K and 3F. Samples are being stored in RM 4 of ACES Station in Instrument/Source cabinet for analysis.

NA NA NA NA

Samples Counted with portable instruments for 01 2 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM	GM P II	NA		NA
Serial No.	NA	CMEBJ-0026 DIHNJ-0140	CHNZ-0102 DIHNJ-0471	CMEBJ-0191 DYEBG-0219			
Efficiency	↓	.10	.14	.10			
Correction Factor		10	7	10	NA		NA

ADDITIONAL REPORTS

RPR No. ~~2100 Rev 2~~ 2-4-91 | Sample Counter Log(s) NA

RSR No. ~~2100 Rev 2~~ 2-4-91 | . . . Contamination - Skin | Procedure: HSRCM - REI 551/554

. . . Contamination - Clothing | Other(s)

RCT:	Reviewer:
Date: 2-11-91 Payroll No.: 94140	Date: 2-12-91 Payroll No.: 56529
Name (Print): G Arnold	Name (Print): David J Dodson
Signature: G Arnold	Signature: David J Dodson

BD-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT Continuation Sheet

F.C. M | Survey No. M 002572 | Page 3 of 4

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	¶ mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
11A	Rm 3F Hood #2 South	NA					NA	<1000	<20	NA
11A	Rm 3F Hood #2 South							<1000	<20	
12A	Rm 3F Hood #2 South							<1000	<20	
12A	Rm 3F Hood #2 South							<1000	<20	
13A	Rm 3F Hood #2 North							<1000	35	
13A	Rm 3F Hood #2 North	NA					NA	<1000	<20	
	Following Air Samples After	NA								
	24 HR Decay	NA								
1-A, 1-B, 2A, 2B, Samples		NA					NA	<1000	<20	NA
3-A	Sample							45,000	<20	
3-B	Sample							45,000	<20	
4-A	Sample							15,000	<20	
4-B	Sample							12,500	<20	
5-A	Sample							15,000	<20	
5-B	Sample	NA					NA	85,000	<20	
NA										NA
NA										NA

BD-6000-010.1 (03/97)

Project Hanford Management Contract RADIOLOGICAL SURVEY REPORT Continuation Sheet	F.C. M	Survey No. M-002572	Page 4 of 4

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
NA										NA
NA										NA

BD-6000-010.1 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002781

Date	Time: Start / Stop	RWP No.(s)	Page 1 of 2
2/24/00	1330 / 1530	M-070, M-077	

Area/Bldg./Room/Location (Code): 300/324/ C-Cell

F.C. M

Job Description: Characterization survey of C-Cell.

Purpose of Survey (check appropriate box[es]):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☐ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No. ____

Map/Sketch Reading in mrem/hr

		w/o	w/c
1.	C-Cell Open Rec	3	3
2.	Sample 18 A	50	2
3.	Sample 18 B	30	2
4.	Sample 19 A	60	3
5.	Sample 19 B	30	1.5
6.	Sample 20 A	30	<0.5
7.	Sample 20 B	10	1
8.	Sample 21 A	30	1.5
9.	Sample 21 B	30	2.5
10.	Sample 22A	1.5	<0.5
11.	Sample 22B	5	<0.5
12.	Floor Smears		
13.	Wall Cat. Cell Smear		

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pan) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
1	C-Cell Open Rec	F	3	3	NA	NA				NA
2	Sample 18A	1"	146	2						
3	Sample 18B	1"	86	2						
4	Sample 19A	1"	174	3						
5	Sample 19B	1"	87	1.5						
6	Sample 20A	1"	9	<0.5						
7	Sample 20B	1"	28	1						
8	Sample 21A	1"	87	1.5						
9	Sample 21B	1"	15	2.5						
10	Sample 22A	1"	5	<0.5		NA				NA

Continued on page 2

Air Sample Results (µCi/ml)

	BZ	GA	Initial	Decay
α 1	NA			
β 1				
α 2				
β 2				NA

Legend
(#) - Smear Location
△(#) - Air Sample Location
[#] - Large Area Smear
* - Contact Reading

Other w/o = window open / w/c = window closed
Reading in mrem/hr

BD-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 2 | Survey No. M 002781

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
11	Sample 220	1"	15	<0.5	NA	NA				NA
12	Floor	NA						<1000	<20	
13	Wall	NA						<1000	<20	
NA										
										NA

Comments

Samples were bagged and tagged then placed into storage locker in Rm 147 until further analysis can be completed. 2 beds on smears were not taken at the time.

NA

NA

Samples Counted with portable instruments for 1, 1, 1 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM	NA			NA
Serial No.	ICE03-0001	CMEA3-0294 OTEA4-0214	NA NA				
Efficiency	1	.10					
Correction Factor	3 / 1	10	NA NA	NA			NA

ADDITIONAL REPORTS

RPR No. NA ~~Sample Counter Log(s)~~

SSR No. ... Contamination - Skin Procedure: RWF 2.2.7 Rev 2.21

... Contamination - Clothing Other(s) 19000-SLB-97-011

RCT:
Date: 3-2-98 Payroll No.: 99414
Name (Print): L. Hendricks
Signature: Hend

Reviewer:
Date: 3-17-98 Payroll No.: 8B136
Name (Print): K. BARTON
Signature: K Barton

BD-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002793

Date 2/25/98 | Time: Start / Stop 0800 / 1600 | RWP No.(s) M-070 M-073 | Page 1 of 2

Area/Bldg./Room/Location (Code): 300/324/ACELL and B CELL | F.C. M

Job Description: Coverage of SMEARS Taken For Characterization of Hot cells A AND D / 24 Hour Counton C-Cell

NA

Purpose of Survey (check appropriate box[es]):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☒ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No. ____

Map/Sketch

15" Port with in CELL Door closed And Empty .5 C.W. 1.5 O.W.

*C-CELL 24Hr SMEARS

	A OW	A CW	B OW	B CW
18)	50	1.8	30	1.9
19)	60	3.1	30	1.6
20)	3.0	<0.5	10	1.2
21)	30	1.5	31	2.5
22)	1.5	<0.5	5.0	<0.5

*A CELL

	A OW	A CW	B OW	B CW
23)	12	0.5	11	0.5 or <0.5
24)	2.4	<0.5	1.0	<0.5
25)	<0.5	<0.5	<0.5	<0.5 (see contamination levels Below)

*D CELL SMEARS in CAM at 1' CW 1300 / OW 1500.0

open AND closed CP Readings at 30cm <0.5 For ALL A CELL SMEARS

ALL Reading in MR/HR unless noted
* These ARE Field Readings Corrected Readings ARE Below

OW = open window
CW = closed window

No.	Description	Dist.	Dose Rates: Shallow mrem/h	Dose Rates: γ (pen) mR/h	Dose Rates: n mrem/h	Contamination Levels: Total (/100 cm²) β (dpm)	Total (/100 cm²) α (dpm)	Removable (/100cm²) β (dpm)	Removable (/100cm²) α (dpm)	mrad/h
1	ACELL #23A	C	35	0.5	NA				<20	
2	ACELL #23B	C	32.4	0.3						
3	ACELL #24A	C	5.7	<0.5						
4	ACELL #24B	C	3.0	<0.5						
5	A CELL #25A	C	<0.5	<0.5				20,000		
6	A CELL #25B	C	<0.5	<0.5			NA	7,500		
7	C CELL #18A	C	146.4	1.8						
8	#18B	C	86.2	1.9						
9	#19A	C	173.8	3.1					NA	
10	#19B	C	86.8	1.6						

Continued on page 2

Air Sample Results (µCi/ml)

	BZ	GA	Initial	Decay
α 1				
β 1				
α 2				
β 2				

A A

Legend
(#) - Smear Location
△# - Air Sample Location
[#] - Large Area Smear
* - Contact Reading
Other NA

BD-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 2 | Survey No. M 002793

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
11	CCELL #20A	C	9.0	<0.5						NA
12	#20B	C	27.6	1.2						
13	#21A	C	87.0	6.5						
14	#21B	C	88.0	2.5						
15	#22A	C	4.5	<0.5			NA			
16	#22B	C	15	<0.5						
17	A CELL Readings at 30cm	30 cm	<0.5	<0.5						
18	C CELL Readings at 30cm	30 cm	<0.5	<0.5						
19	SMEAR of Port AREA	NA						<1000	<20	
20	Transfer Box For A CELL	NA						<1000	<20	

Comments

D CELL SMEARS ARE ALL in a one gallon can being stored in the 15" Port until an RWP can Be written to handle smears at the Levels Indicated.
C.P. Correction Factors used
OPEN Window — 3
CLOSED Window — 1

NA

Samples Counted with portable instruments for .5 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM				
Serial No.	ICEB3-0059	CMEB3-0270 DTHDC-0283	ACKA2-0493 DTHA3-0563		NA	NA	
Efficiency	NA	10%	18%				
Correction Factor	1/3	10	6				

ADDITIONAL REPORTS

RPR No. NA | Sample Counter Log(s) NA
RSR No. NA | ... Contamination - Skin NA | Procedure: HNF IP 0718 Appl 2, HSRCM Art. 551/554
... Contamination - Clothing NA | Other(s) 19000-SCR-97-011

RCT:
Date: 2-25-98 | Payroll No.: 80325
Name (Print): MS Collins
Signature: MS Collins

Reviewer:
Date: 3-3-98 | Payroll No.: 56529
Name (Print): David J Dodson
Signature: David J Dodson

80-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002809

Date	Time: Start / Stop	RWP No.(s)	Page 1 of 2
2/26/98	0830 / 1530	M-070, M-061, M-073, M-081	

Area/Bldg./Room/Location (Code): 300/324/147, CHA, SMF141, EastCell

F.C.: M

Job Description: Coverage of smear taken For Characterization of Hot Cells D Cell, SMF Airlock, East Cell and 24 Hr count on D Cell smear (see Comments about Dose Rate on Container)

Purpose of Survey (check appropriate box[es]):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☒ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No. ____

A CELL 24 Hr Count

	A ow	A cw	B ow	B cw
23	11.0	0.7	10.0	0.5
24	2.1	<0.5	1.1	<0.5
25	<0.5	<0.5	<0.5	<0.5

*Dose Rate at 20cm <0.5 For ALL A CELL smears

Map/Sketch

SMF Airlock (141)
ALL Dose Rates <0.5
SMEAR Levels will Be Indicated Below.

SMF East Cell
ALL Dose Rates <0.5
smear level will Be Indicated Below.

24 Hr Dose Rate of D Cell samples in One gallon can
100 cw / 1300 ow mR/Hr
Best Reading I can get on Two new smears From D CELL
140 cw / 3000 ow *See Comments

No.	Description	Dist.	DOSE RATES: Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS: Total (/100 cm²) β (dpm)	Total α (dpm)	Removable (/100cm²) β (dpm)	Removable α (dpm)	mrad/h
1	East Cell 32 smears (Floor) A							5,500	<20	NA
2	East Cell 32 smear (Roof) B							3,500	<20	
3	East Cell 33 smears A+B (wall)							<1000	<20	
4	Airlock (141) smears 34-37 A+B							<1000	<20	
5	Airlock (141) smear 38 A							<1000	<20	
6	Airlock (141) smear 38 B							2,200	<20	
7	A CELL 23A (24 Hr)	C	31.6	0.7						
8	A CELL 23B (24 Hr)	C	29.0	0.5						
9	A CELL 24A (24 HR)	C	6.3	<0.5			NA			
10	A CELL 24B (24 HR)	C	3.3	<0.5						

Continued on page 2

Air Sample Results (µCi/ml)

	BZ	GA	Initial	Decay
α 1				
β 1			NA	
α 2				
β 2				

Legend
(#) - Smear Location
△(#) - Air Sample Location
[#] - Large Area Smear
* - Contact Reading
Other ____

BD-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 2 | Survey No. M 002809

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
11	ACELL (25A (24Hr)							20,000	<20	NA
12	A CELL 25A (24Hr)							2,500	<20	
13	SMEAR of 15" port AREA							<1000	<20	
	NA				NA					

Comments

We took two more sample smears in ACell and put them in the 15" Port and since the other ACELL smears are also in the Port I can not get a good representative Dose Rate of these two smears.
CW = Closed Window
OW = OPEN Window
C.F. Correction Factor CW 1/OW 3

NA

Samples Counted with portable instruments for .5 minutes.

Instr./Probe Model	RO-3B (CPI)	(g-m/probe)	PAM				
Serial No.	ICE33-0059	CMEB3-0270 OTHAC-0783	ACHA2-0493 OTHAC-0563			NA	
Efficiency	NA	10%	18%				
Correction Factor	1/3	10	6				

ADDITIONAL REPORTS

RWR No. NA | Sample Counter Log(s) NA
SOR No. NA | ... Contamination - Skin NA | Procedure: HNF IP 0318 APP I 2.1 HSRCM Art. 551/554
... Contamination - Clothing NA | Other(s) 18000-SLB-97-011

RCT:
Date 3/26/98 | Payroll No.: 80325
Name (Print): M S Collins
Signature: M S Collins

Reviewer:
Date: 3-4-98 | Payroll No.: 56529
Name (Print): David J Dodson
Signature: David J Dodson

BD-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002818

Date: 2/27/98 | Time: Start / Stop: 0830 / 1550 | RWP No.(s): M-001, M-020, M-023 | Page 1 of 2

Area/Bldg./Room/Location (Code): 300/324/CHA, BCell | F.C.: M

Job Description: Coverage smears taken in B Cell and 24 Hr survey of Two smears From DCELL and smears From SMF Airlock and East Cell

Purpose of Survey (check appropriate box[es]):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☒ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No. ____

Map/Sketch

East Cell smears 24 Hr Count
32 A+B AND 38B (see below)

B CELL SMEARS 14 Total in shielded one gallon can
Field Reading on can
70.0 cw/15cw @ 1'
400 cw/50cw @ contact

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
1	East CELL 32A	NA						5,500	<20	NA
2	East Cell 32B	NA						3,500	<20	NA
3	B Cell smears	C	1120.0	50.0	NA					
4	15" Port smear #1	NA						15,000	<20	NA
5	15" Port smear #2	NA						2,500	<20	
6	15" Port Dose Rate Empty	F	1.2	0.5	NA					

Continued on page 2

Air Sample Results (μCi/ml)

	BZ	GA	Initial	Decay
α 1				
β 1				
α 2				NA
β 2				

Legend
(#) - Smear Location
△# - Air Sample Location
[#] - Large Area Smear
* - Contact Reading
Other NA

BD-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 2 | Survey No. M 002818

No.	Description	Dist.	DOSE RATES			CONTAMINATION LEVELS				
			Shallow mrem/h	γ (pen) mR/h	n mrem/h	Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
				NA						

Comments

ALL of BCell SMEAR ARE in one, one gallon can 7 Locations were smeared a total of 14 smears
C.P Correction Factors 3/1
WO = Window OPEN
WC = Window closed

NA

Samples Counted with portable instruments for .5 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM				
Serial No.	1CEA3-0059	CMEA3-0270 OTHAC-0783	ACHA2-0493 OTHAC-0563				
Efficiency	NA	10%	18%			NA	
Correction Factor	WO WC 3/1	10	6				

ADDITIONAL REPORTS

RPR No. NA | Sample Counter Log(s) NA
RSR No. NA | . . . Contamination - Skin NA | Procedure: HNF IP 0718 APPD.1 HSRCM Art. 551/554
. . . Contamination - Clothing NA | Other(s) 19000-SLR-92-011

RCT:	Reviewer:
Date: 2/27/98 Payroll No.: 80325	Date: 3-4-98 Payroll No.: 56529
Name (Print): MS Colling	Name (Print): David J Dodson
Signature: MS Colling	Signature: David J Dodson

BD-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002873

Date	Time: Start / Stop	RWP No.(s)	Page 1 of 4
3/4/98	0830 / 1530	M-183	

Area/Bldg./Room/Location (Code): 300/324/147

F.C.: M

Job Description: Dose rate and contamination level survey of smears taken from "D" & "B" Cells.

NA

Purpose of Survey (check appropriate box[es]):
- Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
- Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
- ☐ HRA/VHRA Work ☒ Job Coverage ☐ Other
- ☐ Exposure Incident ☐ Material Release
- ☐ RM Transfer/Shipment ☐ Required, Task No. ____

Map/Sketch

Smear	Ow 1"	Cw 1"	Ow 1ft	Cw 1ft
26 A	800 mR/h	30 mR/h	30 mR/h	9 mR/h
26 B	800 mR/hr	40 mR/hr	25 mR/h	5 mR/h
27 A	1 R/h	30 mR/h	25 mR/h	8 mR/h
27 B	500 mR/h	15 mR/h	15 mR/h	10 mR/h
28 A	25 R/h	360 mR/h	100 mR/h	50 mR/h
28 B	2.3 R/h	70 mR/h	90 mR/h	10 mR/h
29 A	35 R/h	1.2 R/h	NT	NT
29 B	110 R/h	2.5 R/h	1.7 R/h	100 mR/h
30 A	1.8 R/h	70 mR	40 mR	10 mR/h
30 B	1.7 R/h	45 mR/h	40 mR/h	6 mR/h
31 A	20 R/h	600 mR/h	550 mR/h	25 mR/h
31 B	10 R/h	220 mR/h	150 mR/h	12 mR/h

Smear	Ow 1"	Cw 1"	Ow 1ft	Cw 1ft
34 A	8 R/h	200 mR/h	200 mR/h	10 mR/h
34 B	4.8 R/h	150 mR/h	150 mR/h	8 mR/h
40 A	250 mR/h	8 mR/hr	8 mR/h	2.5 mR/h
40 B	250 mR/h	9 mR/h	8 mR/h	1.5 mR/h
41 A	12 R/h	400 R/h	250 mR/h	15 mR/h
41 B	18 R/h	1.2 R/h	450 mR/h	25 mR/h
42 A	3 R/h	80 mR/h	70 mR/h	4 mR/h
42 B	9 R/h	200 mR/h	170 mR/h	10 mR/h
43 A	150 mR/h	8 mR/h	8 mR/h	3 mR/h
43 B	1.1 R/h	20 mR/h	22 mR/h	3.5 mR/h
44 A	800 mR/h	15 mR/h	15 mR/h	3.5 mR/h
44 B	150 mR/h	7 mR/h	8 mR/h	3 mR/h

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
26-A	D-Cell Smear E. Wall	1"	2355	45	NA	NA	NA	NA	315 K	SEE Dose Rate
26-B	D-Cell Smear S. Wall	1"	2340	60					490 K	
27-A	D-Cell Smear E. Wall	1"	2955	45					350 K	
27-B	D-Cell Smear E. Wall	1"	1478	23					70 K	
28-A	D-Cell Smear E. Floor	1"	74460	540					>700 K	
28-B	D-Cell Smear E. Floor	1"	6795	105					>700 K	
29-A	D-Cell Smear Trn. Shld	1"	103200	1800					>100 K	
29-B	D-Cell Smear Trn. Shld	1"	236250	3750					NT	
30-A	D-Cell Smear W. Floor	1"	5295	105					70 K	
30-B	D-Cell Smear W. Floor	1"	5033	68					70 K	

Continued on page 2

Air Sample Results (µCi/ml)

	BZ	GA	Initial	Decay
α 1	NA			NA
β 1				
α 2				
β 2	NA			NA

Legend
- (#) - Smear Location
- (#) - Air Sample Location
- [#] - Large Area Smear
- * - Contact Reading

Other NT = Not Reading Taken

BD-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. m | Page 2 of 4 | Survey No. M 002873

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pon) mR/h	η mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
31A	B-Cell Lead Storage	1"	59100 ~~24300~~	400	NA	NA	NA	NA	> 700K	32 F Dose Rate
31B	B-Cell Lead Storage	1"	29670 ~~14280~~	330					280K	
39A	B-Cell S. Wall	1"	25700 ~~24300~~	300					49K	
39B	B-Cell S. Wall	1"	44175 ~~14280~~	225					525K	
40A	B-Cell N. Side Fuel Bundle	1"	738	12					17.5K	
40B	B-Cell N. Side Fuel Bundle	1"	737	14					17.5K	
41A	B-Cell S. Wall S. Side	1"	35400	600					> 700K	
41B	B-Cell S. Wall S. Side	1"	52200	1800					> 700K	
42A	B-Cell S. Wall Center	1"	5880 ~~7080~~	120					420K	
42B	B-Cell S. Wall Center	1"	26700	300					560K	

Comments

Samples were handled by 12" Tweezers inside the fume hood. All samples placed into plastic bag and placed into 1 gallon shielded can. Outside of all external bags (some were double bagged due to contam. on 1st bag) were found < 1000 dpm βγ and < 20 dpm α per 100cm². Approx. ½" of rubber used to shield cans. All samples marked on sample face and back of sample. Samples 29-A and 29-B were discarded due to high readings and are not part of load. C.P correction Factors: at 1" w/o 3/4" is 1.5 at 1" w/o 3/4" is 1

NA

Samples Counted with portable instruments for 1 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM	Black Widow CP			
Serial No.	ICEB3-0059	CMEB3-0158 ATEB9-0289	RCHN2-0368 OTHN3-0494	ICHN1-0037		NA	
Efficiency	NA	10%	14%	NA			
Correction Factor	See Comments	10	7	See Comments			

ADDITIONAL REPORTS

RPR No. NA | Sample Counter Log(s) NA

RSR No. NA | . . . Contamination - Skin NA | Procedure: HNFIP 0318 APP12.1 H Sacm ART 5-31-95

. . . Contamination - Clothing NA | Other(s) 19000-SLB-97-011

RCT:
Date: 3-4-98 | Payroll No.: 94419 / 80225
Name (Print): L. Mendick / MS Colling
Signature: L. Mendick / MS Colling

Reviewer:
Date: 3-5-98 | Payroll No.: 8B136
Name (Print): K. BARTON
Signature: K. Barton

BD-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT Continuation Sheet

F.C. M1 | Survey No. M-002823 | Page 3 of 4

No.	Description	Dist.	DOSE RATES Shallow mrem/h	DOSE RATES γ (pen) mR/h	DOSE RATES n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	Total (/100 cm²) α (dpm)	Removable (/100cm²) β (dpm)	Removable (/100cm²) α (dpm)	mrad/h
43A	A-CELL N. Fuel Storage Rack	1"	438	12	NA	NA	NA	NA	245 K	See Dose Rate
43B	A-CELL N. Fuel Storage Rack	1"	3230	30					28K	
44A	A-CELL S. Fuel Storage Rack	1"	2328	23					42 K	
44B	A-CELL S. Fuel Storage Rack	1"	439	10					21K	
26A	Repeat of 1" Description	12"	72	9						
26B		12"	59	8						
27A		12"	59	8						
27B		12"	35	10						
28A		12"	1200	50						
28B		12"	220	10						
29A		12"	8,100	1200						
29B		12"	NT	NT						
30A		12"	100	10						
30B		12"	108	6						
31A		12"	1000	25						
31B		12"	420	12						
39A		12"	580	10						
39B		12"	434	8						
40A		12"	19	2.5						
40B		12"	21	1.5						
41A		12"	1300	35						
41B		12"	220	15						
42A		12"	202	4						
42B		12"	490	10						
43A		12"	15	3						
43B		12"	59	3.5						
44A		12"	38	3.5						
44B		12"	15	3						
45A		12"	168 ~~11760~~	6						
45B		12"	670	10						
	MAX. Extremity Dose Rate	4"	11760	120						
	Hood Ledge – Gen Area MAX	F	265	15						
	Hood Ledge – smears	NA						<1000	<20	
	Floor Smears	NA						<1000	<20	
	5 gallon Containers	6"	35	35				<1000	<20	
75A	A Cell West Wall Below Window	1"	168	6				NA	140 K	
75B	A Cell West Wall Below Window	1"	670	10				NA	210 K	

BD-6000-010.1 (02/97)

Project Hanford Management Contract **RADIOLOGICAL SURVEY REPORT** Continuation Sheet	F.C. M	Survey No. M - 002873	Page 4 of 4

Map/Sketch

NA

BD-6000-010.1R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002896

Date	Time: Start / Stop	RWP No.(s)	Page 1 of 2
3-5-91	1400 / 1500	M-0115	

Area/Bldg./Room/Location (Code): 309/324/147

F.C. M

Job Description: Contamination Inst survey of tech smear taken in C-cell

Purpose of Survey (check appropriate box[es]):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☐ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No.

Map/Sketch

NA

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
18A	C-Cell Tech Smear	NA	NA					NA	28000	NA
18B									17000	
19A									14000	
19B									2,700	
20A									8400	
20B									140,000	
21A									77,000	
21B									140,000	
22A									91,000	
22B			NA					NA	56,000	

Continued on page 2

Air Sample Results (μCi/ml)

	BZ	GA	Initial	Decay
α 1	NA			NA
β 1				
α 2				
β 2	NA			NA

Legend
(#) - Smear Location
△# - Air Sample Location
[#] - Large Area Smear
* - Contact Reading
Other NA

BD-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 2 | Survey No. M002896

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
NA										NA
NA										NA

Comments

Dose rates were taken on earlier survey – M002781

NA

NA

Samples Counted with portable instruments for 1 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM	NA			NA
Serial No.	NA	NA	AEHM2-0162 DFEM3-0471				
Efficiency			.14				
Correction Factor			7	NA			NA

ADDITIONAL REPORTS

RPR No. NA ~~Sample Counter Log(s)~~

RSR No. ~~Contamination - Skin~~ Procedure HSRCA-PET. 551/554

~~Contamination - Clothing~~ ~~Other(s)~~

RCT:
Date: 3-6-98 Payroll No.: 94119
Name (Print): [illegible]
Signature: [illegible]

Reviewer:
Date: 3-16-98 Payroll No.: 56529
Name (Print): David J Dodson
Signature: David J Dodson

BD-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002966

Date	Time: Start / Stop	RWP No.(s)	Page 1 of 2
3/11/98	0800 / 1600	M-183	

Area/Bldg./Room/Location (Code): 300/324/CHA, REC Airlock, 147 Hood

F.C.: M

Job Description: SMEARS Taken in REC Airlock For Characterization, and Initial survey of smears

Purpose of Survey (check appropriate box[es]):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☒ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No.

	1" WO	1" WC		12" w/o	12" w/c
63 A	17	1.2	63A	1.4	.5
63 B	15	1	63B	1.2	.5
64 A	220	8	64A	6	.7
64 B	400	15	64B	9	1
65 A	900	21	65A	18	1.6
65 B	900	28	65B	18	1.4
66 A	12	1	66A	1.5	.7
66 B	16	1.2	66B	1.7	.7
67 A	80	3	67A	2.5	.7
67 B	80	2	67B	2	.7

Map/Sketch

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pon) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
63 A	REC Airlock	1"	49.2	1.8	NA					NA
63 B		1"	43.5	1.5						
64 A		1"	648	12						
64 B		1"	1177.5	22.5						
65 A		1"	2058	42						
65 B		1"	2058	42						
66 A		1"	34.5	1.5						
66 B		1"	46.2	1.8						
67 A		1"	235.5	9.5						
67 B		1"	237	3	NA					NA

Continued on page 2

Air Sample Results (μCi/ml)

	BZ	GA	Initial	Decay
α 1	NA			NA
β 1				
α 2				
β 2	NA			NA

Legend
(#) - Smear Location
△# - Air Sample Location
[#] - Large Area Smear
* - Contact Reading

Other WO = window open WC = window Closed

BD-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 2 | Survey No. M 002966

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
63A	PEL AIRLOCK	12"	3.2	.5	NA	NA	NA	NA	1400	NA
63B		12"	16	.5					1400	
64A		12"	16.6	.7					17500	
64B		12"	25	1					14000	
65A		12"	50.1	1.6					35000	
65B		12"	51.2	1.4					31500	
66A		12"	3.1	.7					700	
66B		12"	3.7	.7					6300	
67A		12"	6.1	.7					10500	
67B		12"	4.6	.7					14000	

Comments

Samples were individually wrapped in a plastic bag and smeared <1000 BB <200 per 100 cm². d/m. They were then placed into rubber lined 1 gallon can and stored in material ~~contaminated~~ 3-11-91 cabinet in Rm 147.

WC Correction Factor used at 1" was 1.5

N

A

Samples Counted with portable instruments for .1 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM	Black Widow (CP)			
Serial No.	1CEB3-0205	CMEB3-0198 0CHA2-0580	ACHA2-0937 0CHA3-0162	1CHA1-0027			
Efficiency	NA	10%	14%	NA		NA	
Correction Factor	WO 3 WC 1@12"	10	7	WO 3 WC 1@12"			

ADDITIONAL REPORTS

RSR No. NA | Sample Counter Log(s) NA

RSR No. NA | . . . Contamination - Skin NA | Procedure: HNF-IP-0718 App I & J HSRM Art 551/554

. . . Contamination - Clothing NA | Other(s) 19000-SLB-93-011

RCT:
Date: 3/11/91 | Payroll No.: 94119/80325
Name (Print): L. Hendricks / MS Collins
Signature: Hendricks / MS Collins

Reviewer:
Date: 4-9-98 | Payroll No.: 88136
Name (Print): K BARTON
Signature: K Barton

BD-6000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002982

Date	Time: Start / Stop	RWP No.(s)	Page 1 of 4
3/12/98	0800 / 1600	M- 183	

Area/Bldg./Room/Location (Code): 300/324/MT

F.C.: M

Job Description: Contamination survey of characterization samples.

NA

Purpose of Survey (check appropriate box(es)):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☒ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No.

Loc.	w/o 1"	w/c 1"	w/o 12"	w/c 12"
53A	1.6	0.8	1.2	0.8
53B	2.5	0.7	1.2	0.7
54A	2.6	0.9	1.1	0.4
54B	2.2	0.8	1.2	0.8
55A	2.0	0.8	1.2	0.8
55B	2.0	0.8	1.2	0.8
56A	1.5	1.0	1.0	1.0
56B	1.5	0.7	1.0	0.7
57A	1.5	0.8	1.1	0.7
57B	1.1	0.7	1.2	0.7
58A	1.3	0.8	1.0	0.8
58B	1.1	0.9	1.8	0.9
59A	120	2.5	4.0	1.0
59B	270	2.5	4.8	.7

Map/Sketch

Loc.	w/o 1"	w/c 1"	w/o 12"	w/c 12"
63A	20	1.5	1.5	0.7
63B	15	1.2	1.5	0.7
64A	250	8	6	1.0
64B	600	16	8	1.1
65A	1100	33	17	1.5
65B	900	28	15	1.5
66A	13	1.4	1.4	0.8
66B	17	1.3	1.5	0.7
67A	70	3.7	2.7	0.9
67B	70	3.0	2.3	0.9

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
53 A	SMF Initial Count	1"	3.6	1.2	NA	NA	NA	NA	<20	NA
53 B		1"	6.4	1.0					<20	
54 A		1"	6.5	1.4					<20	
54 B		1"	5.4	1.2					<20	
55 A		1"	4.8	1.2					<20	
55 B		1"	5.1	1.2					<20	
56 A		1"	3.0	1.5					<20	
56 B		1"	3.4	1.0					<20	
57 A		1"	3.3	1.2					<20	
57 B		1"	4.3	1.0					<20	

Continued on page 2

Air Sample Results (µCi/ml)

	BZ	GA	Initial	Decay
α 1				
β 1			NA	
α 2				
β 2				

Legend
(#) - Smear Location
△# - Air Sample Location
[#] - Large Area Smear
* - Contact Reading

Other: w/o + w/c = mrem/hr

BO-6000-010 (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

F.C. M | Page 2 of 4 | Survey No. M002982

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
58A	SMF Initial Count	1"	2.7 ~~4.7~~	1.2	NA	NA	NA	NA	<20	NA
58B		1"	4.1 ~~2.7~~	1.4					<20	
59A		1"	356	38					<20	
59B		1"	807	38					<20	
53A		12"	2	0.8					NA	
53B		12"	2.2	0.7						
54A		12"	1.5	0.9						
54B		12"	2.0	0.8						
55A		12"	2.0	0.8						
55B		12"	2.0	0.8						

Comments

samples were individually packaged in plastic with cut. of bags <1,000 dpm β + <20 dpm α per 100 cm². They were then placed into a 1-gallon can shielded with 3/4 inches of rubber.
CP- Correction Factor 1" = 8-3 & 1.5 12" = 8-3 x 1

NA

Samples Counted with portable instruments for .1 minutes.

Instr./Probe Model	RO-3B (CP)	(g-m/probe)	PAM ACHN1-0417 DTHN1-0162	Block Window CP			
Serial No.	ICE03-0207	CMEA7-0197 DTE89-0139	ACHN1-0417 DTHN1-0162	ICHN1-0027		NA	
Efficiency	Ice Correction	.10	.14	NA			
Correction Factor	Correction	10	7	wo / wc 3 1			

ADDITIONAL REPORTS

SSR No. NA Sample Counter Log(s)
CSR No. ~~Contamination - Skin~~ Procedure: HNF-IP-0719 Appl A1
Contamination / ~~Clothing~~ Other(s) HSRCM Art. 511/514

SCT:
Date: 3-12-96 Payroll No.: 94119/80325
Name (Print): Hendrick / MS Colling
Signature: Hendrick / MS Colling

Reviewer:
Date: 4-9-98 Payroll No.: 88136
Name (Print): K BARTON
Signature: K O Barton

BD-8000-010R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT Continuation Sheet

F.C. M | Survey No. M-00 2982 | Page 3 of 4

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
56 A	SME Initial Count	12"	1.0	1.0	NA	NA	NA	NA	NA	NA
56 B		12"	1.0	0.7						
57 A		12"	1.9	0.7						
57 B		12"	2.2	0.7						
58 A		12"	1.4	0.8						
58 B		12"	3.6	0.9						
59 A		12"	10	1.0						
59 B		12"	13	0.7						
63 A	REC Airlock 24 hr Cnt	1"	57.8	2.3					2100	
63 B		1"	47.2	1.8					1750	
64 A		1"	738	12					17,500	
64 B		1"	1776	24					17,500	
65 A		1"	3250	49.5					49,000	
65 B		1"	2658	42					49,000	
66 A		1"	36.9	2.1					1,050 ~~10,500~~	
66 B		1"	49.1	2.0					4,900	
67 A		1"	204.5	5.6					14,000	
67 B		1"	205.5	4.5					17,500	
63 A		12"	3.1	0.7 ~~2.3~~					NA	
63 B		12"	3.1	0.7						
64 A		12"	16	1.0						
64 B		12"	21.8	1.1						
65 A		12"	48	1.5						
65 B		12"	42	1.5						
66 A		12"	2.6	.8						
66 B		12"	3.1	.7						
67 A		12"	63	.9						
67 B		12"	5.1	.9						
68A	B-Cell Source Exterior Wall	NA						<1000	<20	NA
68B		NA						<1000	<20	

NA

BD-6000-010.1 (02/97)

Project Hanford Management Contract RADIOLOGICAL SURVEY REPORT Continuation Sheet	F.C. M	Survey No. M002912	Page 2 of 4

Map/Sketch

NA

BD-6000-010.1R (02/97)

Project Hanford Management Contract
RADIOLOGICAL SURVEY REPORT

Survey No. M 002991

Date: 3 8/13/98 | Time: Start / Stop: 0800 / 1600 | RWP No.(s): M-183 | Page 1 of 6

Area/Bldg./Room/Location (Code): 300 / 324 / 147 | F.C.: M

Job Description: Contamination level survey of characterization samples taken within the SMF Hot Cells.

NA

Purpose of Survey (check appropriate box(es)):
Contamination Incident: ☐ Skin, ☐ Clothing, ☐ Spill
Alarm Response: ☐ CAM, ☐ ARM(RAM), ☐ APM (PSD)
☐ HRA/VHRA Work ☒ Job Coverage ☐ Other
☐ Exposure Incident ☐ Material Release
☐ RM Transfer/Shipment ☐ Required, Task No.

Loc.	w/o 1"	wc 1"	wo 12"	wc 12"	Map/Sketch Loc.	wo 1"	wc 1"	wo 12"	wc 12"
47A	2100	25	38	23	60A	1500	25	33	9
47B	2600	28	45	2.6	60B	9000	60	150	13
49A	190	6.0	6.0	1.5	61A	13,000	80	200	13
49B	100	2.8	3.3	1.7	61B	20,000	120	300	15
49A	150	2.5	4	1.5	62A	38,000	250	450	15
49B	35	1.8	2.5	1.8	62B	32,000	250	420	18
50A	130	3.5	3.5	1.0					
50B	150	7	4.5	1.8					
51A	60	1.5	2.2	1.5					
51B	130	2	4	1.8					
52A	2000	15	31	1.8					
52B	130	3.5	3.5	1.0					

All Readings Are Initial Counts
Correction Factors are 3 Beta at 1" 1.5 & 1"
3 Beta at 1" 1 & 1"

No.	Description	Dist.	DOSE RATES Shallow mrem/h	γ (pen) mR/h	n mrem/h	CONTAMINATION LEVELS Total (/100 cm²) β (dpm)	α (dpm)	Removable (/100cm²) β (dpm)	α (dpm)	mrad/h
47A	South Cell Proper Initial Cnt.	1"	6262.5	37.5	NA	NA	NA	NA	350	NA
47B			2258	42					700	
49A			561	9					<20	
49B			296	4.2					<20	
49A			446	2.8					<20	
49A			102	2.7					<20	
50A			385	5.2					<20	
50B			440	10.5					<20	
51A			178	2.3					<20	
51B			387	3					<20	

Continued on page 2

Air Sample Results (µCi/ml)

	BZ	GA	Initial	Decay
α 1				
β 1			NA	
α 2				
β 2				

Legend
(#) - Smear Location
△# - Air Sample Location
[#] - Large Area Smear
* - Contact Reading

Other wo = window open wc = window closed
in mR/hr

BD-6000-010 (02/97)

APPENDIX C

LABORATORY ANALYTICAL REPORTS

Report 98-2463, Gamma Energy Analytical Results, dated 04/23/98 ..... C-1
Report 98-2463, Sr-90 Analytical Results, dated 04/24/98 ..... C-4
Report 98-2463, Alpha Energy Analytical Results, dated 07/28/98 ..... C-6

Battelle Pacific Northwest Laboratory
Analytical Chemistry Laboratory
Radioanalytical Group - 325 Bldg.

98-2463
4/23/98

Client : S. Landsman Wp#: K82285

Cognizant Scientist: Richard T. R Date: 4/23/98

Concur: L.L. Greenwood Date: 4-23-98

Measured Activities (µCi/sample)

ALO ID Client ID	Mn-54 Error %	Co-60 Error %	Sb-125 Error %	*Gamma* Cs-134 Error %	*Energy* Cs-137 Error %	*Analysis* Eu-154 Error %	Eu-155 Error %	Am-241 Error %
98-2463 03a	<4.E-6	<6.E-6	<4.E-5	<5.E-6	4.81E-3 6%	<2.E-5	<3.E-5	<6.E-5
98-2464 03b	<5.E-6	<7.E-6	<8.E-5	<6.E-6	1.41E-2 6%	<2.E-5	<5.E-5	<2.E-4
98-2465 04a	<3.E-6	<4.E-6	<3.E-5	<4.E-6	3.61E-3 5%	<9.E-6	<3.E-5	<2.E-4
98-2466 04b	1.05E-5 32%	5.97E-4 5%	<3.E-5	<7.E-6	2.40E-3 5%	<2.E-5	<3.E-5	<2.E-4
98-2467 05a	<1.E-5	9.11E-4 5%	<4.E-5	<2.E-5	2.20E-3 5%	<3.E-5	<2.E-5	<2.E-5
98-2468 05b	<7.E-6	1.61E-4 5%	<8.E-5	<8.E-6	1.93E-2 5%	<3.E-5	<3.E-5	<2.E-5
98-2469 10b	<4.E-6	<4.E-6	<9.E-6	<4.E-6	<4.E-6	<8.E-6	<2.E-5	6.05E-4 7%
98-2470 18a	<6.E-5	<1.E-4	<3.E-3	4.09E-3 5%	1.10E+0 5%	2.25E-3 5%	<1.E-3	1.51E-3 29%
98-2471 18b	<8.E-5	<2.E-4	<2.E-3	7.14E-4 10%	2.38E-1 5%	1.33E-3 8%	<8.E-4	1.37E-3 32%
98-2472 19a	<9.E-5	2.93E-4 11%	<3.E-3	<2.E-4	5.26E-1 5%	2.25E-3 6%	1.61E-3 20%	2.94E-3 20%
98-2473 19b	<9.E-5	<2.E-4	<3.E-3	8.05E-4 10%	5.77E-1 5%	1.60E-3 8%	<2.E-3	<2.E-3
98-2474 20a	<4.E-5	<5.E-5	<4.E-4	2.69E-4 11%	2.03E-2 5%	9.19E-4 5%	2.60E-4 26%	3.53E-4 27%
98-2475 20b	<2.E-4	<9.E-5	<2.E-3	5.55E-3 5%	2.11E-1 5%	6.98E-3 5%	2.01E-3 14%	3.67E-3 13%
98-2476 21a	<9.E-5	4.06E-4 8%	<2.E-3	2.34E-3 5%	7.04E-1 5%	3.96E-3 5%	<1.E-3	1.90E-3 30%
98-2477 21b	<2.E-4	8.49E-4 6%	<3.E-3	3.65E-3 5%	9.05E-1 5%	6.06E-3 5%	1.96E-3 16%	2.94E-3 21%

Measured Activities (µCi/sample)

Gamma Energy Analysis

ALO ID Client ID	Mn-54 Error %	Co-60 Error %	Sb-125 Error %	Cs-134 Error %	Cs-137 Error %	Eu-154 Error %	Eu-155 Error %	Am-241 Error %
98-2478 22a	<7.E-5	4.22E-5 45%	<7.E-4	2.34E-3 5%	9.09E-2 5%	2.77E-3 5%	8.66E-4 17%	4.09E-4 56%
98-2479 22b	<6.E-5	<2.E-5	<7.E-4	1.10E-3 5%	7.91E-2 5%	1.98E-3 5%	<4.E-4	1.09E-3 23%
98-2480 23a	<1.E-4	1.25E-4 28%	<2.E-3	<9.E-5	3.46E-1 5%	<3.E-4	<9.E-4	<2.E-3
98-2481 23b	<1.E-4	<2.E-4	<2.E-3	<2.E-4	2.45E-1 5%	<6.E-4	<8.E-4	<2.E-3
98-2482 24a	<6.E-5	<9.E-5	<5.E-4	<6.E-5	5.04E-2 5%	<2.E-4	<3.E-4	<4.E-4
98-2483 24b	<3.E-5	<4.E-5	<4.E-4	<4.E-5	3.12E-2 5%	<2.E-4	<2.E-4	<3.E-4
98-2484 25a	<4.E-5	<6.E-5	<2.E-4	<4.E-5	3.45E-3 5%	<1.E-4	<2.E-4	<2.E-4
98-2485 25b	<4.E-5	<8.E-5	<1.E-4	<4.E-5	9.25E-4 5%	<8.E-5	<8.E-5	<2.E-4
98-2486-PB Process Blank	<4.E-4	<6.E-4	<1.E-3	<3.E-4	3.48E-2 2%	<7.E-4	<8.E-4	<2.E-3
98-2486 26a	<3.E-3	2.47E-2 5%	<5.E-2	1.69E-2 9%	1.31E+1 2%	4.20E-2 6%	<3.E-2	7.29E-2 22%
98-2487 26b	<3.E-3	4.73E-2 4%	<5.E-2	2.92E-2 6%	1.70E+1 2%	8.43E-2 5%	<3.E-2	1.51E-1 14%
Note: Sample 26b also has Ag-108m activity at 1.59E-2 +/- 18% uCi/sample.								
98-2488 27a	<4.E-3	8.35E-2 3%	<6.E-2	2.94E-2 7%	2.81E+1 2%	6.34E-2 6%	<4.E-2	1.13E-1 20%
98-2489 27b	<2.E-3	2.81E-2 4%	<4.E-2	9.75E-3 14%	1.26E+1 2%	1.84E-2 10%	<3.E-2	<4.E-2
98-2490 28a	<2.E-1	1.31E+0 5%	<4.E+0	<3.E-1	1.25E+3 3%	6.99E+0 20%	<2.E+0	<2.E+0
98-2491 28b	<9.E-3	9.41E-2 5%	<2.E-1	4.44E-2 13%	4.92E+1 2%	8.24E-2 10%	<2.E-1	<2.E-1
98-2493 30a	<7.E-3	1.45E-2 17%	<2.E-1	2.28E-2 19%	4.36E+1 2%	1.46E-2 31%	<2.E-1	<2.E-1
98-2494 30b	<2.E-3	7.28E-3 9%	<4.E-2	1.78E-3 47%	1.21E+1 2%	1.19E-2 14%	<3.E-2	4.01E-2 36%

Page 2 of 3

Measured Activities (µCi/sample)

ALO ID Client ID	Mn-54 Error %	Co-60 Error %	Sb-125 Error %	*Gamma* Cs-134 Error %	*Energy* Cs-137 Error %	*Analysis* Eu-154 Error %	Eu-155 Error %	Am-241 Error %
98-2495-PB Process Blank	<4.E-4	1.38E-1 7%	<9.E-4	2.17E-1 13%	4.57E+2 2%	1.80E-1 23%	<8.E-4	<9.E-1
98-2495 39a	<3.E-2	6.50E-2 11%	<5.E-1	1.09E-1 15%	2.39E+2 2%	6.26E-2 36%	<3.E-1	<7.E-1
98-2496 39b	<4.E-2	<2.E-2	<4.E-1	<4.E-2	1.68E+2 2%	2.87E-1 8%	<2.E-1	<4.E-1
98-2497 40a	<3.E-3	1.02E-2 11%	<7.E-2	<4.E-3	7.70E+0 2%	2.07E-2 16%	<3.E-2	<4.E-2
98-2498 40b	<3.E-3	<5.E-3	<7.E-2	<4.E-3	7.16E+0 2%	1.73E-2 20%	<4.E-2	<6.E-2
98-2501 42a	<5.E-3	<6.E-3	<2.E-1	<8.E-3	4.30E+1 2%	1.67E-1 7%	<9.E-2	1.86E-1 26%
98-2502 42b	<2.E-2	<2.E-2	<4.E-1	<2.E-2	1.28E+2 2%	5.25E-1 4%	<2.E-1	6.49E-1 14%
98-2503 43a	<2.E-3	<4.E-3	<3.E-2	<2.E-3	1.62E+0 2%	<6.E-3	<2.E-2	<3.E-2
98-2504 43b	<4.E-3	<5.E-3	<2.E-1	<6.E-3	2.29E+1 2%	5.33E-2 9%	<6.E-2	<8.E-2
98-2505 44a	<3.E-3	<4.E-3	<2.E-1	<6.E-3	2.51E+1 2%	6.59E-2 7%	<6.E-2	<7.E-2
98-2506 44b	<2.E-3	<4.E-3	<4.E-2	<3.E-3	4.90E+0 2%	1.16E-2 14%	<2.E-2	<4.E-2
98-2507 45a	<6.E-3	<1.E-2	<3.E-1	<7.E-3	5.34E+1 2%	8.41E-2 9%	<9.E-2	<2.E-1
98-2508 45b	<3.E-2	<1.E-2	<6.E-1	<3.E-2	3.29E+2 2%	1.71E-1 10%	<3.E-1	2.77E-1 37%
98-2539 32a	<5.E-6	1.81E-5 11%	<3.E-5	<8.E-6	1.53E-3 5%	<2.E-5	<2.E-5	<9.E-6
98-2540 32b	<4.E-6	6.40E-6 17%	<3.E-5	1.53E-5 20%	1.32E-3 6%	<9.E-6	<2.E-5	<4.E-5
98-2552 38b	<3.E-6	<5.E-6	<8.E-6	<4.E-6	<4.E-6	<9.E-6	<2.E-5	<6.E-5
98-2854 31a	<6.E-2	1.38E-1 7%	<8.E-1	2.17E-1 13%	4.57E+2 2%	1.80E-1 23%	<6.E-1	<9.E-1
98-2855 31b	<3.E-2	6.50E-2 11%	<6.E-1	1.09E-1 15%	2.39E+2 2%	6.26E-2 36%	<4.E-1	<7.E-1

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Battelle Pacific Northwest Laboratory
Analytical Chemistry Laboratory
Radioanalytical Group - 325 Bldg.

98-2463
4/24/98

Client : S. Landsman Wp#: K82285

Cognizant Scientist: V. K. Adams Date: 4/24/98

Concur: L R Greenwood Date: 4/24/98

Measured Activities (µCi/sample)

ALO ID Client ID	Sr-90 1 σ Error %
98-2463 03a	1.78E-3 4%
98-2463-Duplicate 03a	1.73E-3 4%
98-2465 04a	2.58E-4 14%
98-2467 05a	7.23E-4 6%
98-2469 10b	5.68E-5 57%
98-2471 18b	3.71E-1 3%
98-2473 19b	3.31E-1 4%
98-2474 20a	5.83E-3 3%
98-2476 21a	3.34E-1 3%
98-2478 22a	1.09E-3 5%
98-2480 23a	8.55E-2 5%
98-2483 24b	1.19E-2 28%
98-2487 26b	6.04E-2 3%
98-2489 27b	2.36E-2 4%
98-2491 28b	1.21E-1 3%

Page 1 of 2

Measured Activities (µCi/sample)

ALO ID Client ID	Sr-90 1 σ Error %
98-2493 30a	1.39E-1 3%
98-2495-PB* Process Blank	4.59E-2 18%
98-2496* 39b	7.32E+1 3%
98-2498* 40b	3.84E+0 4%
98-2501* 42a	4.30E+1 4%
98-2503* 43a	2.57E+0 5%
98-2506* 44b	1.89E+0 6%
98-2507* 45a	2.89E+1 5%
98-2855 31b	
Standards	96% 92%
Sample Spikes	93% 94%
Blanks	<9.E-5 <8.E-6

*These samples were prepared in the hot cells by acid digesion.

Battelle Pacific Northwest Laboratory
Analytical Chemistry Laboratory
Radioanalytical Group - 325 Bldg.

98-2463
7/28/98

OK to release
Larry Kuya
3-26-10

Client : S. Landsman Wp#: K82285

Cognizant Scientist: L R Greenwood Date: 7/28/98

Concur: Richard T. R Date: 7/28/98

Measured Activities (µCi/sample)

ALO ID Client ID	Total Alpha Error %	Pu-239/240 Error %	Pu-238/Am-241 Error %	Cm-243/244 Error %	Cm-242 Error %
98-2463 03a	<2.E-5	<1.E-5	<1.E-5	<1.E-5	<1.E-5
98-2464 03b	<2.E-5	<1.E-5	<1.E-5	<1.E-5	<1.E-5
98-2465 04a	<2.E-5	<3.E-6	<3.E-6	<3.E-6	<3.E-6
98-2466 04b	<2.E-5	<2.E-5	<2.E-5	<2.E-5	<2.E-5
98-2467 05a	<3.E-5	<3.E-5	<3.E-5	<3.E-5	<3.E-5
98-2468 05b	1.49E-5 34%	<8.E-6	9.31E-6 42%	<4.E-6	<2.E-6
98-2469 10b	5.92E-5 15%	3.44E-5 18%	2.46E-5 20%	<3.E-6	<2.E-6
98-2470 18a	1.53E-2 3%	5.69E-4 21%	3.27E-3 11%	1.15E-2 6%	<3.E-5
98-2470 Dup 18a	1.50E-2 3%	6.33E-4 21%	2.82E-3 11%	1.15E-2 6%	<3.E-5
98-2471 18b	7.55E-3 3%	7.14E-4 25%	1.79E-3 16%	5.05E-3 11%	<1.E-5
98-2472 19a	5.62E-3 4%				
98-2473 19b	1.57E-2 3%	<1.E-3	4.18E-3 26%	1.15E-2 11%	<1.E-4
98-2474 20a	1.73E-3 5%	<1.E-4	2.03E-4 26%	1.53E-3 10%	<1.E-5
98-2475 20b	6.53E-2 3%				
98-2476 21a	3.82E-2 3%	<1.E-3	9.20E-3 21%	2.90E-2 9%	<1.E-4
98-2477 21b	7.90E-2 3%				
98-2478 22a	4.43E-4 7%	<1.E-5	4.64E-5 26%	3.97E-4 13%	<1.E-5

Page 1 of 3

Measured Activities (µCi/sample)

ALO ID Client ID	Total Alpha Error %	Pu-239/240 Error %	Pu-238/Am-241 Error %	Cm-243/244 Error %	Cm-242 Error %
98-2479 22b	1.83E-2 3%				
98-2480 23a	2.58E-4 9%	<3.E-5	1.71E-4 11%	8.72E-5 12%	<3.E-6
98-2481 23b	1.48E-3 5%				
98-2482 24a	1.01E-4 15%				
98-2483 24b	2.79E-5 27%	<2.E-6	2.07E-5 18%	7.22E-6 24%	<6.E-7
98-2484 25a	7.60E-6 56%				
98-2485 25b	<2.E-5				
98-2486-PB Process Blank	8.26E-4 9%	3.40E-4 10%	4.35E-4 10%	5.32E-5 15%	<7.E-7
98-2486 26a	2.67E-1 3%				
98-2487 26b	5.19E-1 4%	4.02E-2 4%	2.09E-1 4%	2.66E-1 4%	8.49E-4 11%
98-2488 27a	3.20E-1 4%				
98-2489 27b	1.09E-1 5%	9.60E-3 6%	4.69E-2 5%	5.24E-2 5%	1.36E-4 27%
98-2490 28a	2.28E+0 7%				
98-2491 28b	4.04E-1 4%	2.44E-2 4%	1.37E-1 4%	2.39E-1 4%	4.67E-4 16%
98-2493 30a	8.28E-2 6%	5.32E-3 7%	3.39E-2 6%	4.27E-2 6%	2.16E-4 22%
98-2494 30b	7.81E-2 6%				
98-2495-PB Process Blank	1.20E-3 12%	4.40E-4 18%	7.00E-4 16%	6.00E-5 39%	<7.E-6
98-2495 39a	4.26E-1 3%				
98-2496 39b	1.78E-1 4%	1.79E-2 11%	1.07E-1 7%	5.34E-2 7%	<9.E-5
98-2497 40a	1.15E-2 5%				
98-2498 40b	1.20E-2 5%	1.80E-3 26%	7.50E-3 9%	2.69E-3 13%	<2.E-4
98-2501 42a	3.36E-1 3%	<2.E-2	2.54E-1 5%	8.23E-2 5%	<1.E-3

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Measured Activities (µCi/sample)

ALO ID Client ID	Total Alpha Error %	Pu-239/240 Error %	Pu-238/Am-241 Error %	Cm-243/244 Error %	Cm-242 Error %
98-2502 42b	1.16E+0 3%				
98-2503 43a	9.90E-3 5%	2.15E-3 21%	5.64E-3 8%	2.11E-3 12%	<5.E-5
98-2504 43b	4.55E-2 4%				
98-2505 44a	4.10E-2 4%				
98-2506 44b	2.29E-2 5%	4.80E-3 16%	1.46E-2 6%	3.47E-3 8%	<1E-4
98-2507 45a	1.09E-1 4%	8.47E-3 21%	7.64E-2 7%	2.41E-2 9%	<5.E-4
98-2508 45b	3.69E-1 3%				
98-2508 Dup 45b	3.72E-1 3%				
98-2539 32a	<2.E-5				
98-2540 32b	1.03E-5 46%				
98-2552 38b	<2.E-5				
98-2552 Dup 38b	<2.E-5				
98-2854 31a	4.14E-1 4%				
98-2855 31b	1.79E-1 4%	1.38E-2 5%	9.54E-2 5%	6.84E-2 5%	4.25E-4 16%
Blank	<2.E-5, <2.E-5 <3.E-6				
Spike	101%, 106%, 105% 74%				
Matrix Spike	126%, 98%, 95% 94%				

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APPENDIX D

TOTAL TO REMOVABLE ACTIVITY RATIO CALCULATION

Total Contamination: Metal Sample Analytical Results (Source: Hill and Hobart 2000, Table 7)

Sample	(nCi/g)										
	^{60}Co	^{90}Sr	^{125}Sb	^{137}Cs	^{154}Eu	^{155}Eu	^{238}Pu	$^{239}Pu/^{240}Pu$	^{241}Am	^{243}Cm	^{244}Cm
1-1a	<48.4	29,432	---	42,847	186.7	<222.4	6.33	3.41	253.20	1.558	107.517
1-1b	<25.6	10,960	---	12,533	83.08	<93.5	1.90	1.05	71.72	0.330	22.786
1-2a	<42.4	25,149	---	30,756	127.7	<174.8	5.18	2.99	222.22	1.366	94.279
1-2b	<31.8	14,798	---	23,714	114.9	<127.8	2.98	1.45	101.20	0.374	25.808
3-1a	<35.6	27,210	---	17,773	123.7	<135.6	3.76	2.46	54.46	0.280	19.340
3-1b	<18.5	8,000	---	15,901	62.00	<59.8	2.28	1.43	30.37	0.138	9.556
3-2a	<17.5	25,290	---	16,497	61.41	<81	3.02	1.99	57.71	0.285	19.663
3-2b	<0.59	15,290	---	10,704	19.31	<9.4	2.83	1.83	33.37	0.169	11.681
1A-1a	<0.52	5,450	---	3,116	4.44	<5.2	0.47	0.22	5.72	0.026	1.784
1A-1b	<0.66	9,480	---	3,462	9.35	<6.4	0.48	0.27	10.30	0.048	3.292
1A-1c	<0.15	1,589	---	1,927	7.46	<3.9	0.33	0.16	10.99	0.049	3.390
1A-1d	<0.14	10,500	---	6,669	9.86	<3.7	0.69	0.74	15.80	0.077	5.323
1A-1e	<0.31	4,494	---	1,766	2.98	<2.5	0.37	0.17	3.51	0.015	1.008
1A-1f	<0.36	7,615	---	4,967	3.36	<5.3	0.75	0.60	3.90	0.016	1.115
1A-1g	<0.28	15,082	---	14,873	7.38	<8.9	2.16	2.08	11.27	0.043	2.988
1A-1h	<0.38	1,364	---	1,847	1.41	<2.8	0.14	0.09	0.99	0.005	0.341
1A-2	<1.03	1,959	81.1	2,377	3.29	<3.3	0.50	0.24	1.98	0.011	0.735
1A-3	<0.05	233	---	918	0.19	<0.8	0.09	0.04	0.37	0.002	0.129
1A-5	<0.13	749	<0.29	500	1.55	<0.9	0.45	0.22	2.27	0.012	0.796
1A-7	<0.49	1,616	<34.8	3,089	9.63	<2.5	2.25	0.97	22.74	0.117	8.090
1A-8	<0.58	2,226	2.01	1,937	4.06	<2.7	0.39	0.15	2.75	0.011	0.748
1A-9	<0.4	1,640	---	1,595	1.30	<3	0.62	0.30	2.96	0.015	1.005
1A-10	<0.32	518	---	1,510	1.36	<2.9	0.42	0.19	1.71	0.008	0.573
1A-11	<0.54	339	---	646	1.66	<2.7	0.08	0.04	0.59	0.003	0.223
1A-12	<0.12	4,220	---	4,051	3.27	<2.8	0.71	0.69	5.18	0.023	1.567
1A-14	<2.3	1,660	---	904	7.31	<4.5	0.93	0.53	4.65	0.030	2.070
2B-1a	<0.35	184	---	424	1.16	<0.8	1.51	1.13	1.77	0.003	0.203
2B-1b	<0.02	139	---	390	0.25	<0.3	0.66	0.49	1.00	0.002	0.155
Average	ND	8,114	41.56	8,132	30.72	ND	1.51	0.93	33.38	0.179	12.363
Max	---	29,432	81.10	42,847	186.70	---	6.33	3.41	253.20	1.558	107.517

Removable Contamination: Smear Analytical Results (Source: Hill and Hobart 2000, Table 9)

Sample	(nCi/smear or nCi/100 cm^2)										
	^{60}Co	^{90}Sr	^{125}Sb	^{137}Cs	^{154}Eu	^{155}Eu	^{238}Pu	$^{239}Pu/^{240}Pu$	$^{238}Pu/^{241}Am$	^{243}Cm	^{244}Cm
39b	<18.5	72,428	---	167,582	284	<195.6	---	17.3	106	0.761	52.5
40b	<3.5	3,068	---	7,042	14.6	<35.6	---	1.16	6.63	0.037	2.54
42a	<4.5	42,228	---	42,862	164	<85.6	---	19.4	253	1.174	81.0
43a	<2.5	1,798	---	1,502	3.30	<15.6	---	1.51	4.77	0.029	1.97
44b	<2.5	1,118	---	4,782	8.90	<15.6	---	4.16	13.7	0.048	3.31
45a	<8.5	28,128	---	53,302	81.4	<85.6	---	7.83	75.5	0.343	23.7
Average	ND	24,795		46,179	92.70	ND		8.56	76.6	0.399	27.5
Max	---	72,428		167,582	284.00	---		19.40	253.00	1.17	81.00

Total Contamination: Metal Sample Analytical Results (Source: Hill and Hobart 2000, Table 7)

Sample	Etched Surface Area (cm^2)	Etched Area Mass (g)	g/cm^2	Total Activity		Total Alpha		Total Beta-Gamma	
				(nCi/g)	(nCi/ 100 cm^2)	(nCi/g)	(nCi/ 100 cm^2)	(nCi/g)	(nCi/ 100 cm^2)
1-1a	5.30	5.39	1.02	72,838	7.41E+06	366	3.72E+04	72,472	7.37E+06
1-1b	8.69	8.83	1.02	23,674	2.41E+06	96	9.74E+03	23,578	2.40E+06
1-2a	6.52	6.62	1.02	56,359	5.72E+06	321	3.26E+04	56,038	5.69E+06
1-2b	6.54	6.64	1.02	38,759	3.94E+06	129	1.31E+04	38,630	3.92E+06
3-1a	6.44	6.54	1.02	45,187	4.59E+06	77	7.77E+03	45,110	4.58E+06
3-1b	7.45	7.57	1.02	24,007	2.44E+06	41	4.22E+03	23,965	2.44E+06
3-2a	9.97	10.12	1.02	41,931	4.26E+06	80	8.08E+03	41,851	4.25E+06
3-2b	5.25	5.33	1.02	26,063	2.65E+06	47	4.78E+03	26,016	2.64E+06
1A-1a	27.90	57.65	2.07	8,579	1.77E+06	8	1.60E+03	8,571	1.77E+06
1A-1b	12.00	23	1.92	12,966	2.49E+06	14	2.67E+03	12,952	2.48E+06
1A-1c	5.52	9.81	1.78	3,538	6.29E+05	15	2.59E+03	3,524	6.26E+05
1A-1d	12.00	22.21	1.85	17,201	3.18E+06	22	4.06E+03	17,180	3.18E+06
1A-1e	11.19	19.29	1.72	6,268	1.08E+06	5	8.11E+02	6,263	1.08E+06
1A-1f	9.72	18.65	1.92	12,592	2.42E+06	6	1.08E+03	12,586	2.41E+06
1A-1g	14.57	29.46	2.02	29,981	6.06E+06	16	3.31E+03	29,965	6.06E+06
1A-1h	4.70	8.9	1.89	3,214	6.09E+05	1	2.70E+02	3,213	6.08E+05
1A-2	21.80	25.26	1.16	4,424	5.13E+05	3	3.44E+02	4,421	5.12E+05
1A-3	42.90	54.83	1.28	1,152	1.47E+05	1	6.91E+01	1,151	1.47E+05
1A-5	44.50	53.86	1.21	1,254	1.52E+05	3	3.99E+02	1,251	1.51E+05
1A-7	31.80	39.41	1.24	4,749	5.89E+05	32	3.96E+03	4,717	5.85E+05
1A-8	24.80	19.09	0.77	4,173	3.21E+05	4	2.82E+02	4,169	3.21E+05
1A-9	33.20	81.11	2.44	3,241	7.92E+05	4	1.05E+03	3,237	7.91E+05
1A-10	22.50	39.78	1.77	2,032	3.59E+05	2	4.39E+02	2,030	3.59E+05
1A-11	26.00	50.21	1.93	988	1.91E+05	1	1.65E+02	987	1.91E+05
1A-12	18.20	43.4	2.38	8,282	1.98E+06	7	1.78E+03	8,275	1.97E+06
1A-14	58.90	106.7	1.81	2,580	4.67E+05	7	1.32E+03	2,572	4.66E+05
2B-1a	12.00	60.86	5.07	614	3.11E+05	3	1.58E+03	611	3.10E+05
2B-1b	16.49	88.41	5.36	532	2.85E+05	2	8.83E+02	530	2.84E+05
Average	NA	NA	1.78	16,328	2.06E+06	47	5.22E+03	16,281	2.06E+06
Max	NA	NA	5.36	72,838	7.41E+06	366	3.72E+04	72,472	7.37E+06

Removable Contamination: Smear Analytical Results (Source: Hill and Hobart 2000, Table 9)

Sample		Total Activity		Total Alpha		Total Beta-Gamma	
		(nCi/ smear)	(nCi/ 100 cm^2)	(nCi/ smear)	(nCi/ 100 cm^2)	(nCi/ smear)	(nCi/ 100 cm^2)
39b		240,471	2.40E+05	177	1.77E+02	240,294	2.40E+05
40b		10,135	1.01E+04	10	1.04E+01	10,125	1.01E+04
42a		85,609	8.56E+04	355	3.55E+02	85,254	8.53E+04
43a		3,312	3.31E+03	8	8.28E+00	3,303	3.30E+03
44b		5,930	5.93E+03	21	2.12E+01	5,909	5.91E+03
45a		81,619	8.16E+04	107	1.07E+02	81,511	8.15E+04
Average		71,179	7.12E+04	113	1.13E+02	71,066	7.11E+04
Max		240,471	2.40E+05	355	3.55E+02	240,294	2.40E+05

Total to Removable Activity Ratios

Average	28.97	46.15	28.94
Max	30.80	104.88	30.67

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